CURRICULUM TEMPLATE FROM SEMESTERS I TO VIII

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	66
5	Program Elective Courses	PEC	19
6	Open Elective Courses	OEC	9
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
MSA	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Introduction to ---- Engineering, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management-I, (Organizational Behaviour)/ Finance & Accounting, Economics etc

Mandatory non-credit courses: Environmental Science, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS (CALCULUS AND MULTI VARIABLE CALCULUS)	3-1-0	4	4
B 1/2	BSC	ENGINEERING PHYSICS	3-1-0	4	4
	BSC	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	ESC	ENGINEERING MECHANICS	2-1-0	3	3
	ESC	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	ESC	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	ESC	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	MNC	LIFE SKILLS	2-0-2	4	--
S 1/2	BSC	ENGINEERING PHYSICS LAB	0-0-2	2	1
	BSC	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESC	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESC	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS (DIFFERENTIAL EQUATION AND LINEAR ALGEBRA)	3-1-0	4	4
B 1/2	BSC	ENGINEERING PHYSICS	3-1-0	4	4
	BSC	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	ESC	ENGINEERING MECHANICS	2-1-0	3	3
	ESC	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	ESC	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	ESC	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	MNC	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	ESC	PROGRAMMING IN C	2-1-2	5	4
S 1/2	BSC	ENGINEERING PHYSICS LAB	0-0-2	2	1
	BSC	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESC	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESC	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Physics to be made separate for programs according to their requirements like
   Physics (Mechanics & Mechanics of Solids and Introduction to Quantum Mechanics): for AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY
   Physics (Waves and Optics, Electromagnetic and Solid State Mechanics): for AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA
   Physics Lab: Same syllabus for all courses
3. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
4. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.
   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

5. LIFE SKILLS
   Objective is to develop in the under-graduate students of engineering a level of communication competence. Coverage: Communication Skill, Critical Thinking & Problem Solving, Teamwork, Moral & Professional Values, Leadership Skills, Language Lab.

6. PROFESSIONAL COMMUNICATION
   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS	3-1-0	4	4
B	PCC/ESC	CORE/OTHER STREAM COURSE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PCC	CORE	3-1-0	4	4
E 1/2	ESC	DESIGN & ENGINEERING	2-0-0	2	2
	HMC	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M	VAC	Remedial/Minor course	3-1-0	4 *	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa. Professional ethics should include academic ethics, IPR etc.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS	3-1-0	4	4
B	PCC/ESC	CORE/OTHER STREAM COURSE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PCC	CORE	3-1-0	4	4
E 1/2	ESC	DESIGN & ENGINEERING	2-0-0	2	2
	HMC	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC	CONSTITUTION OF INDIA	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.
3. Professional ethics shall include academic ethics, IPR etc.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PCC	CORE	3-1-0	4	4
B	PCC	CORE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PEC	PROGRAM ELECTIVE I	3-1-0	4	4
E 1/2	HMC	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HMC	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MNC	DISASTER MANAGEMENT	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PEC	i	3-1-0	4	4
	PEC	ii	3-1-0		
	PEC	iii	3-1-0		
	PEC	iv	3-1-0		
	PEC	v	3-1-0		
	PEC	vi	3-1-0		

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PCC	CORE	3-1-0	4	4
B	PCC	CORE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	OEC	OPEN ELECTIVE I	2-1-0	3	3
E 1/2	HMC	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HMC	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	PCC	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	PCC	CORE LAB	0-0-3	3	2
T	PWS	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**29**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted online by the University. Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

4. Miniproject: To identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The final evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Work knowledge and Involvement	: 20
Level of completion and demonstration of functionality/specifications	: 25
Guide	: 10
Project Report	: 15
Final Presentation & oral examination	: 20

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	PROGRAM ELECTIVE II	2-1-0	3	3
B	PEC	PROGRAM ELECTIVE III	2-1-0	3	3
C	OEC	OPEN ELECTIVE II	2-1-0	3	3
D	MNC	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	PCC	CORE LAB	0-0-3	3	2
T	PWS	SEMINAR	0-0-3	3	2
U	PWS	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PEC	i	3-1-0	4	4
	PEC	ii	3-1-0		
	PEC	iii	3-1-0		
	PEC	iv	3-1-0		
	PEC	v	3-1-0		
	PEC	vi	3-1-0		

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before a departmental committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation, 2 times in the semester by a committee	: 50
The report evaluated by the above committee	: 20

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	PROGRAM ELECTIVE IV	2-1-0	3	3
B	PEC	PROGRAM ELECTIVE V	2-1-0	3	3
C	PEC	PROGRAM ELECTIVE VI	2-1-0	3	3
D	OEC	OPEN ELCTIVE III	2-1-0	3	3
E	PCC	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	PWS	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**28**	**17/21**

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

PROGRAM ELECTIVE VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Viva Voce: The comprehensive viva voce in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the syllabus mentioned for comprehensive course work in the sixth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide	: 30
Interim evaluation, 2 times in the semester by a committee	: 50
Quality of the report evaluated by the above committee	: 30
Final evaluation by a three member committee	: 40

OPEN ELECTIVE (OE)

The courses listed below are offered by the Department of ECE for students of following departments: AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY.

Course Title

A.1 Fuzzy systems and Applications
A.2 Analog Communication
A.3 Digital Image Processing
B.1 MEMS
B.2 Electronic Packaging
B.3 Electronic Materials
C.1 Electronic Instrumentation
C.2 Embedded Systems
C.3 Biomedical Engineering

Minor

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by M slot courses.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

For example: Students who have registered **for B.Tech Minor in Electronics & Communication Engineering** can opt to study the courses listed below:

3.1 Semiconductor Physics and Devices
3.2 Digital Circuits and Systems
3.3 Signals and Systems
3.4 Analog Communication
4.1 Electronic Circuits
4.2 Computer Organization
4.3 Digital Signal Processing
4.4 Digital Communication
5.1 Analog Integrated Circuits
5.2 Microprocessors and Micro Controllers
5.3 Digital Signal Processors and Applications
5.4 Antennas and Propagation
6.1 Digital Integrated Circuits
6.2 Embedded Systems
6.3 Statistical Signal Processing
6.4 Fiber Optic Communication
7/8.X Mini Project based on the chosen area

In third semester, a student can choose any one course grouped under3.X. If S/he chooses 3.1 in S3, s/he should choose 4.1 in S4, 5.1 in S5 and 6.1 in S6. Similarly, if the student chooses 3.2 in S3, s/he should choose 4.2 in S4, 5.2 in S5 and 6.2 in S6 and so on. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. Shifting of courses between semesters not permitted. In any case, they should carry out a mini project based on the chosen area in S7 or S8.

Honours

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 5 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

For example: Students who have registered for **B.Tech Honours in Electronics & Communication Engineering** can opt to study the courses listed below:

4.1 Advanced Digital Signal Processing
4.2 Digital System Design
4.3 Analog IC Design
4.4 Detection and Estimation
5.1 Digital Signal Processing For Medical Imaging
5.2 Asynchronous System Design
5.3 Mixed - Signal Circuit Design
5.4 Spectral Analysis of Signals
6.1Wavelet Signal Processing
6.2Low Power VLSI Circuits
6.3Electronic Design Automation Tools

6.4
7.1VLSI Digital Signal Processing Systems
7.2 Design of ASICS
7.3 RF Circuits
7.4
8.X Mini project based on chosen area

In fourth semester, a student can choose any one course grouped under4.X. If S/he chooses 4.1 in S4, s/he should choose 5.1 in S5, 6.1 in S6 and 7.1 in S7. Similarly, if the student chooses 4.2 in S4, s/he should choose 5.2 in S5, 6.2 in S6 and 7.2 in S7 and so on. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. Shifting of courses between semesters not permitted. In any case, they should carry out a mini project based on the chosen area in S8.

CLASSIFICATION

After successful completion of the programme, degree will be awarded as per the following classifications based on the CGPA.

a) Students who complete all the courses in the first attempt in four years and complete the requirements (additional 20 credits, each course having a grade of 'C' or better) with CGPA of 8.5 and above shall be awarded B.Tech (Honours) degree.

b) Students who complete the programme within ten consecutive semesters getting a CGPA of 8.5 and above will be declared to have passed in first class with distinction.

c) Students who complete all the courses in the first attempt and in four years and complete the requirements (additional 20 credits) shall be awarded Minor.

d) Students who get a CGPA of 6.5 and above, but below 8.5 and who complete the course within 12 semesters will be declared to have passed in first class.

ONLINE EXAMINATION

Online examination can be conducted for comprehensive exam, Life skills, SUSTAINABLE ENGINEERING, CONSTITUTION OF INDIA, DISASTER MANAGEMENT, INDUSTRIAL SAFETY ENGINEERING.

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

<table>
<tr><td colspan="3">MINUTES OF LMCST COLLEGE COUNCIL MEETING</td></tr>
<tr><td>Subject: Academic and Administrative Matters</td><td colspan="2">Meeting Number: 102</td></tr>
<tr><td>Venue: Principal’s Chamber</td><td>Date: 2.04.2019</td><td>Time: 1.30 PM</td></tr>
<tr><td colspan="3">Members Present</td></tr>
<tr><td colspan="3">1. Dr. P.P Mohanlal. (Principal)
2. Dr. Retnakumari Amma (HoD, ASH)
3. Dr.K. Kumara Pillai (HoD, MBA)
4. Prof.Jessy Ann Francis (HoD, CE)
5. Prof.Beshiba Wilson(HoD , CSE)
6. Prof.Swapna M. (HoD, EEE)
7. Prof. Selma Joseph (HoD , MCA)
8. Dr. Dinakar Das. (HoD, ECE)
9. Prof. Bindu M V(HoD in-charge, ME)</td></tr>
</table>

The meeting started at 1:30 PM and the Principal welcomed the members. The college council had a special meeting to discuss suggestions on KTU curriculum change proposal put forward by University based on suggested from KTU and also to finalize PTA meeting schedule.

Sl. No	REVIEW OF ACTION POINTS OF PREVIOUS MEETINGS	Remark/ Actionee
1	It has been decided by the college council to conduct PTA meeting on the following dates. **Civil Engineering Department** S2 - 6/4/19 AN S4 - 4/4/19 FN S6 - 4/4/19 AN S8 - 5/4/19 FN **Computer Science Engineering Department** S2 and S4 - 5/4/19 AN S6 - 9/4/19 from 10:30 onwards S8 - 8/4/19 from 10:30 onwards **Mechanical Engineering Department** S2 and S4 - 12/4/19 from 10:30 onwards S6 - 11/4/19 from 10:30 onwards S8 - 6/4/19 FN **Electrical & Electronics Engineering Department** S2,S4,S6 and S8 - 10/4/19 from 10:30 onwards **Electronics & Communication Engineering Department** S2,S4,S6 and S8 - 25/4/19 AN **MCA Department** S2 and S4 - 24/4/19 FN S6 - 24/4/19 AN **MBA Department** - 25/4/19 FN	HOD/Advisors
2.	The revised curriculum proposal for 2019 admission onwards from KTU was discussed in detail point by point as listed in the proposal. Accordingly all the feedback and conclusions arrived based on the discussion is attached with the list of proposal from KTU for reference.	See the attachment

DISCUSSION POINTS: CURRICULUM REVISION, B.Tech

Academic Philosophy of KTU

Academic philosophy of the University shall be in line with the outcome based education adopted by AICTE. Academic philosophy of KTU B.Tech curriculum shall be a curriculum which is quality motivated, outcome based and socially & industrially relevant, as pointed out by the Chairman, AICTE in the 'Model Curriculum for Undergraduate courses in Engg. & Technology' published in Jan 2018. The teaching learning process and evaluation of students shall be based on program objectives and desired outcomes. The curriculum, syllabus, teaching learning process and evaluation should conform to graduate attributes (GA) of KTU. The syllabus shall be such as to include problem solving approach and develop analytical skill. Further the new vision for education has to be far reaching and should not be dictated by immediate needs as concluded in Chapter 9 of the "Report of AICTE Review Committee, 2015" (the Kaw committee report). The report says that future education system would be defined by mobility, credit transfer, nonlinearity, flexibility, agility, modularity, intensity, diversity, churn and experientiality.

KTU is an affiliating University with about 150 colleges offering B.Tech programmes and about 40000 students in the range of average to very brilliant calibre. The curriculum and syllabus designed should take into consideration the wide gap of student calibre. A bright student should not loose opportunity to acquire advanced knowledge and at the same time an average student should acquire minimum knowledge required for an Engineering graduate. AICTE has designed the revised model curriculum where number of credits have been reduced to 160 credits with a core comprising basic sciences and engineering having focus on fundamentals, discipline level significant courses and ample opportunity for the students to take electives from the discipline and cross disciplines, provision for internship to understand the industry requirements, have hands on experience and to pursue project work in their final year relevant to industry. The Chairman, AICTE has requested institutions/Universities to adopt the model curriculum for various engineering disciplines. Further, AICTE model curriculum allows some flexibility in readjustment of courses/credits without disturbing the total credit structure of 160 credits As the model curriculum and syllabus are drafted by subject-wise Heads of Committees with a respective team of academic experts along with industry experts, KTU may adopt AICTE model curriculum in principle allowing flexibility to accommodate local needs.

Based on Academic philosophy of KTU, AICTE model curriculum, internal discussions, feedback from various curriculum committee and external sources, KTU has arrived at certain points for discussion. You are requested to go through it and offer your comments.

Item	University Views	Our response
B.Tech (hons)	Design of choice based curriculum which may have (i) Mandatory credit courses (total credits =160), (ii) Mandatory non-credit courses as given in AICTE model curriculum and (iii) Non-mandatory credit courses (value addition courses) (total = 20 credits) such as elective courses in emerging areas such as Artificial intelligence, Internet of Things Blockchain, Robotics, Quantum Computing, Data Science, Cyber Security, 3D Printing and Design, Virtual Reality for which AICTE has framed model syllabus and similar courses. The additional credits could also be earned through MOOC and/or summer project. These courses carrying 20 credits may be termed as 'value addition' courses. A pass in value addition courses shall not be mandatory for B.Tech, however for B.Tech(Hons.) attaining 180 credits shall be mandatory. The CGPA for all students shall be computed based on 180 credits and whoever gets CGPA equal to above 9.0 from 180 credits shall be awarded B.Tech (Hons.) and whoever gets 160 to 179 credits and CGPA greater than or equal to 5.0 shall be awarded B.Tech. Also this system does not require any modification in class time table. The time table for 180 credits followed in existing curriculum can be continued. Bright students opting for value addition courses can attend such courses and other students can attend remedial courses during same slot.	Recommendation: 1.B.Tech (Hons): must be allowed in all AICTE approved Institutions based on the stipulated criteria. (180 credits) 2.CGPA Computation for BTech shall be for 160 credits
B.Tech with Minor	Skill based “Minor in Engineering” in line with AICTE norms. (Specialized in one area, starts from third semester, 20 credits, Can opt Regular courses, MOOC courses and practical courses). Implementation of the concept of Virtual laboratories. NPTEL has already developed 180 labs comprising of 1700 experiments. A method to utilise this vast resource should be evolved. This is one of the salient features of the AICTE model curriculum.	This is a good idea. Accepted
Classification of degree	Classification as distinction, first class, second class required	CGPA >8 Distinction .> 6.5 & < 8 First Class >5 & < 6.5 no mention of Class
Internal marks	Internal mark normalisation: Increment enhanced from 25% to 30%. No minimum requirement for internal assessment	No minimum requirement for internal assessment is strongly recommended

		30% Increment recommended
Pass requirement	To reduce the pass minimum for University examination from 45% to 40%. However, for a pass grade the mandatory requirement is 50% (Internal assessment and University examination put together)	**Suggestion:** 40% for University exam and 10% for Internal , aggregating 50% for pass
Promotion to higher semesters	One recommendation is 'a student will be eligible for promotion to next odd semester from even semester only if he/she has earned 40% of total credits up to the previous odd semester in the first attempt including revaluation'. **OR** shall we follow the existing cut-off barrier at 5th and 7th semester.	Remove First attempt stipulation. At S3 no stoppage of promotion Existing criterion is OK
Induction program	As per AICTE guideline,'3 weeks' induction program is to be conducted before commencement of classes. The first semester curriculum should be designed to accommodate this. Follow up?	2 weeks duration is sufficient
Courses in each semester	No of courses per semester (5 Theory + 2 lab/ Drawing). The course plan may be divided in to 5 modules. The first internal test may be conducted after completing two modules and the second internal test may be conducted after completing 4 modules. For the end semester examination all modules may be given equal weightage (20%) to eliminate complexities in question paper setting. One course in each semester may be identified for project based learning with one third of aggregate marks allotted for project, one third for internal tests, quizzes and assignments and one third for end semester examination. In the first two semesters, sustainable engineering and Design & Engg. can be project based courses.	Agreed
Internal assessment	Including innovation and research ideas as part of internal assessment: Assignments may be replaced by solving non-routine problem/term paper/case study/seminar. As per the current ordinance the split up of internal marks is 20% for tutorials/assignments/mini projects and 80% for two internal tests. This may be changed to attendance 20%, assignments 30% and tests 50%.	1.Min 75% attendance mandatory to write UTY exam 2.Existing IA weightages is OK 3. No marks for attendance
Mark details	Assessment/Evaluation: IA marks to ESA marks ratio for theory courses, practical courses, project etc.	Existing ratio Ok.
Prerequisite	Prerequisite required	Not required

Educational Tour	After 4th semester, students can go for educational tour for maximum 15 days and should include minimum 2 industrial visits. Those who are not going for tour should undergo industrial visit/training/internship for minimum 15 days. Students should submit tour report/training report as a mandatory requirement to registration to 5th sem and be made available for academic audit. All guidelines regarding the tour issued by DTE/Govenment should be strictly adhered to. Slot for the tour June/July. No working days permitted	1.Internship compulsory Industrial Visits shall be **optional** and maximum days shall be limited to 10.
General rules	Guide lines for Seminar, mini-projects, Industrial visits, Internship, Tech fest common	agreed
Project evaluation	Project and Project evaluation (7 and eight semesters? Mark distribution, % assessment by the guide, external experts, separate minimum requirement etc)	External:50% Report:30% Guide:20%
Conduct of examinations	Possibility of conducting online objective type exam for selected courses (eg.: Basic Engineering courses, Economics, Principles of Management, Environmental science etc.), Conduct of practical exam in minimum time, Question paper setting - implementation of revised Bloom's taxonomy, mapping to course outcomes etc. , Model question paper/QP pattern (including max choice permissible) (model QP published by AICTE may also be discussed) and question bank, Modified Bloom's taxonomy may be followed in question paper setting. The pattern/scheme should also contribute to GAs, Detailed scheme with solutions shall be insisted with the question paper submitted, Choice of questions in question paper shall be such that total marks of all questions should not exceed 150% of maximum marks and should not be less than 140% of maximum marks.	Except Basic Engineering, others can be online
Graduate Attributes	While designing the curriculum and preparing the syllabus the Graduate Attributes should be the basis. Each course in the curriculum shall be mapped to GA. The objectives and outcomes of each course shall be mapped to GA. The BoS/ Curriculum and syllabus committee may be instructed to comply mapping of curriculum, course objectives and outcomes with GA. A mapping table may be designed and given to faculty drafting the syllabus. The approved syllabus of each course must invariably has mapping with GA, course objectives and course outcomes. It must be ensured that the curriculum and syllabus properly address the graduate attributes.	agreed

Online examination for Practical	An online exam may be conducted by the University for end semester assessment of practical courses as done in Rajiv Gandhi Technical University, Bhopal. It is objective type covering experimental procedure, theory, observations, calculations etc.	agreed
Curriculum requirement Mech (Prod), Mech (Auto) etc	It is proposed that curriculum of such programmes shall be framed from the curricula of parent branch and child branch such that in Semesters 3 to 8, theory and practical courses with credits 45-55% of total credits shall be from parent branch and the remaining from child branch. eg:- For Mech (Auto) branch 45-55% credits (theory & practical courses) must be from S3 to S8 Mechanical Engg branch and remaining from S3 to S8 of Automobile Engg. branch.	If introduced in future Ok for LMCST
Common curriculum for S1 and S2	It would be preferable to have a common curriculum in the first two semesters for all branches of engineering. The basic/introduction courses in engineering which are four courses now may be reduced to two courses viz. Introduction to Engg –I (Covering introduction to all conventional branches of engineering) & Introduction to Engg._II (Covering introduction to emerging engineering fields). The text book by Philip Kosky et.al titled "Exploring Engineering – An Introduction to Engineering Design" published by Elsevier would be a good resource book for this course. An engineer should have been exposed to all disciplines of engineering as practical problems that an engineer would face is multidisciplinary. Objective type examination can be conducted for these two courses.	Very Good Strongly Recommended
Sample curriculum for Semesters I & II	Mathematics – 2 courses, 1 in each semester – 8 credits, Physics – Theory & Lab – 4 credits, Chemistry – Theory & Lab – 4 credits, Engineering Mechanics – 4 credits, Sustainable engineering – 2 credits, Design & Engineering – 2 credits, Introduction to Engg I & II – 1 course in each semester- 8 credits, Computer programming – 4 credits, Computer aided engg. graphics (P) – 2 credits, Basic Engg lab (P)- 2 courses – 1 course in each semester – 2 credits	Agreed
Engineering graphics	It may be offered as a computer aided practical course. The text book by Duff J M and Ross W A titled "Engineering Design and Visualisation" published by Cengage Learning will be a good resource book	Agreed
Non-credit mandatory courses	Life skills, Disaster Management (Mandatory as per UGC) and Industrial safety engineering shall be included as non-credit mandatory courses in semesters 3 to 5. Business economics and Principles of management may be offered in third and fourth semesters alternately. The performance in these courses can also be evaluated by objective type examination. These courses may be permitted to study as MOOC courses offered by NPTEL	Agreed

Maths and basic science	The respective branch should decide the broader content. Detailed syllabus by Maths/Basic science faculty	Agreed
Retention of newly introduced courses in KTU 2015 admission	Retention of courses such as Design Engineering, Design project, Life skills, Comprehensive Examination etc. (The Design Engineering and Design project have been included in 2015 curriculum as the Kaw committee report recommended that a design spine should be incorporated in the curriculum to inculcate creative thinking and creative design abilities in students. Life skills has beem introduced in a view to enhance employability of graduates. Comprehensive exam is introduced to guide students in preparing for competitive examination and technical interview).	Agreed
Books	Only reference books and from standard publishers be given	agreed
Activity points	To be retained at 100 points with 2 credits	agreed
Attendance requirements	Norms for attendance, duty leave etc	Min 75% Existing norms OK
Credit transfer from MOOC	Inclusion of MOOC & Summer project in curriculum. To what extent we can go for MOOC courses. MOOC courses evaluation criteria?	Wider discussion required
Elective courses	Guidelines on elective courses- Maximum number of elective courses to be included in the curriculum, minimum and maximum number of students in each elective course	Existing rules is adequate
Branch and college transfer	No branch change, College transfer only in third semester,	If same subjects for S1 & S2, It is logical to **allow branch change.** But has many practical disadvantages. Hence not recommended
Collaborative programs.	Criteria for recognizing reputed agencies and reputed institutions and what extent they can be collaborated with the academic activities of the University	To be decided through discussion

Grace marks/ Activity points	Common institutional frame work for Sports, NSS, NCC, Cultural festivals and other extra-curricular activities.	Grace marks only for students already passed
Changes in syllabus	No suggestions/modifications shall be entertained once final syllabus is approved.	yes
Any other		To be discussed

Structure of B. Tech. Program

Sl. No.	Category	Code	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HSMC	12
2	Basic Science courses	BSC	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	24
4	Professional core courses	PCC	48
5	Professional Elective courses relevant to chosen specialization/branch	PEC	18
6	Open subjects – Electives from other technical and /or emerging subjects `	OEC	18
7	Project work, seminar and internship in industry or elsewhere	PROJ	15

8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	MC	Non credit
9	Mandatory Students Activities (Pass/Fail)	SA	2
	Total Credits		**162**

The meeting concluded at 3:45 PM.

Principal, LMCST

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number: **62**	
Venue: Principal's Chamber	Date: **03.04.18**	Time: 1.30 PM

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr.Retnakumari Amma (HoD, ASH)
3. Dr.K. Kumara Pillai (HoD, MBA)
4. Prof.Mohan S. (HoD, CE)
5. Prof. Beshiba Wilson (HoD, CSE)
6. Prof.Swapna M. (HoD, EEE)
7. Prof.Sabarinath A.R.(HoD, ME)
8. Prof.Selma Joseph (HoD, MCA)
9. Dr.Dinakardas C.N. (for HoD, ECE)

Sl. No.& Date	Subject and Decision	Action by	Action Date
9 10.01.17	Decided to initiate necessary actions for conducting International Conference in association with IEEE (Institute of Electrical and Electronics Engineers) before June 2018. Amendment on 20.06.17 :The first meeting is scheduled for 28.06.17 (Wednesday) at 10 am. The meeting will be coordinated by Prof. Ram Prasad Tripathy (ECE). Amendment on 30.10.17:It is proposed to conduct the International conference on 23.04.18 and 24.04.18. Amendment on 03.01.18: The International conference is scheduled for 26.04.18 and 27.04.18. Amendment on 14.02.18: The conference has received a grant of rupees one-lakh from KSCSTE.	Prof. Dinakardas C. N. (ECE) and Prof. Jayaram. V. (ME)	27.04.18
395 12.12.17	In continuation to decision number 374, it is decided to provide coaching for Lateral Entry Test (LET) for students in polytechnic institutions. The following team is entrusted with the conduct of coaching classes: • ASH –Prof.Nisha R.S. and Prof.Carold Wilson Lazer • CE –Prof.Mohan S. • CSE –Prof.Christy Jojy • ECE – Prof.Binu Chacko • EEE – Prof.Sreekala Devi • ME –Prof.Ankur A. Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE) must coordinate the entire process. Amendment on 21.03.18 : The idea proposal for implementation of LET coaching classes including preparation of study materials and scheduling coaching classes must be submitted on or before 28.03.18.	Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE)	28.03.18
410 03.01.18	Entrusted Prof.Ashima C.R. (EEE) and Prof.Anjana Thampy (CSE) with the framing of the Vision, Mission of LMCST and evaluating Strengths, Weaknesses, Opportunities and Threats - SWOT Analysis (College level). The work must be implemented incorporating the core team formulated for this purpose.	Prof.Ashima C.R. (EEE) and Prof.Anjana Thampy (CSE)	23.01.18
445 06.02.18	Decided to implement at least one course in MOODLE (based on a particular topic in the subject being handled in the current semester) where faculty can add resources and activities for students. The implementation must be effectively planned by all faculty members on or before 12.03.18.	Faculty	12.03.18

	Faculty who are in need of training for the same can attend the ICT FDP on "MOODLE" which is scheduled for 16.02.18 and 17.02.18 at LMCST.		
491 06.03.18	HoDs are requested to submit proposals for conducting FDP during the month of May/June /July 2018 on or before 20.03.18.	HoDs	20.03.18
492 06.03.18	The status of the implementation of at least one course in MOODLE is to be reported from all departments to Principal during forthcoming Council meetings.	HoDs	06.03.18
496 14.03.18	02.04.18 (Monday) will be a holiday for LMCST and 07.04.18 (Saturday) will be a regular working day with Monday's timetable.	Principal	07.04.18
497 14.03.18	Lab examinations (internal exam for KU and University exam for KTU) must be conducted on or before 06.04.18 (Friday). KTU examination must be conducted by putting an external.	Faculty	06.04.18
498 14.03.18	The oral comprehensive examination with an industrial expert as external examiner must be conducted on or before 07.04.18 (Saturday)	Comprehensive examination coordinators	07.04.18
505 27.03.18	The internal audit of ISO 9001:2008 (QMS) is scheduled for 20.04.18.	Prof.Roy K. Varghese (ASH)	20.04.18
506 27.03.18	HoDs are requested to give an introduction about electives to be offered by KTU for S5 and S7 B.Tech. The electives opted as per the interest of students must be signed by them and the list of electives offered in the department as per KTU rules must be submitted to Principal on or before 06.04.18	HoDs	06.04.18
507 27.03.18	The third series test of S8 B.Tech is scheduled for 10.04.18, 11.04.18 and 13.04.18. The timetable for the same must be intimated to students and published in department notice board on 28.03.18.	Prof.Jean Dickson (EEE)	13.04.18
512 03.04.18	The fourth course/class committee of KTU courses must be conducted on or before 06.04.18.	Prof.Swapna M. (EEE)	06.04.18
513 03.04.18	The NSS Technical Cell in association with Primary health Centre, Kuttichal is organizing a blood donation camp at our campus on 04.04.18 from 9 am onwards. Staff members willing to donate blood are requested to make use this opportunity.	Prof.Susanth S.G.(ASH) and team	04.04.18
514 03.04.18	The department of Management Studies is organizing a talk on "Future of World Business and Disruptive technologies" for MBA students by Dr.Jebamalai, Former Principal Advisor to Director General UNIDO on 04.04.18 at Conference Hall from 10.30 am.	Dr.K.Kumara Pillai (MBA)	04.04.18
515 03.04.18	The final sessional marks of KTU students must be published on 05.04.18.	Faculty	05.04.18

Actions Taken

495 14.03.18	Details of approved retest requests of students from each department must be informed to series exam cell by concerned department coordinators on or before 19.03.18. Retest of KTU students is scheduled on 03.04.18, 04.04.18, 05.04.18 and 06.04.18. Two tests will be conducted on third and fourth of April. Amendment on 21.03.18: In case of two retests per day, the examination timings are as follows: • 9.15 am to 10.15 am and 11.15 am to 12.15 pm	Prof.Jean Dickson (EEE)	19.03.18
501 21.03.18	Pradhan Mantri YUVA Yojana (YuvaUdyamitaVikasAbhiyan) is a centrally sponsored scheme on entrepreneurship education and training implemented by the Ministry of Skill Development and Entrepreneurship, Government of India. LMCST is a recognized nodal centre for Entrepreneurship education and training. In connection with this, a one-hour training session is arranged for S2 B.Tech students on 24.03.18 (Saturday)	Prof.Cibumol B. Babu (EEE), Prof.Jayaram V. (ME) and Prof.Ashima C.R. (EEE)	24.03.18
502 21.03.18	A session on "Blockchain Technology" organized by FOSS Club (CSE department) and sponsored by ICFOSS is scheduled for 04.04.18 for selected students of CSE department. Remarks : Due to the tight academic schedule at the end of semester, the workshop is postponed to next semester.	Prof.Preethi W. (CSE), Prof.Sumi Maria A (CSE) &Prof.Cibumol B. Babu (EEE)	04.04.18
508 27.03.18	Appreciation to Prof. Renetha J.B (CSE) and Prof.Justin G. Russel (MCA) for receiving the silver partner certificate under Inspire – Campus Connect of Infosys.	Prof.Renetha J.B (CSE) and Prof.Justin G. Russel (MCA)	27.03.18
509 27.03.18	LMCST is recognized as the advanced partner institute of Infosys Campus Connect. Appreciation to Prof.Selma Joseph - SPOC (MCA) for receiving the award.	Prof.Selma Joseph (MCA)	27.03.18
510 27.03.18	Faculty members are requested to enter the marks for Assignment III and Note submission assignment VI in CMS. The sessional marks should be computed by CMS and the final sessional marks generated from CMS must be submitted to Principal on or before 03.04.18.	Faculty members	03.04.18
511 27.03.18	The details of students (KTU) who were absent (medical reasons) for both first and second series tests must be informed to Principal and the retest (Six modules, two hours test) must be conducted on or before 10.04.18.	Prof.Jean Dickson (EEE)	10.04.18

Dr.Syam Prakash V.

PRINCIPAL
LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY
Lourde Hills, Kattichal P.O.
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LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING

Subject: Academic and Administrative Matters | Meeting Number: 46

Venue: Principal's Chamber | Date: 08.12.17 | Time: 12.30 pm

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr. Remakumari Amma (HoD, ASH)
3. Dr.K.Kumarapillai (HoD, MBA)
4. Prof.Mohan S. (HoD, CE)
5. Prof.Ram Prasad Tripathy (HoD, ECE)
6. Prof. Neethu Mohan (HoD, MCA)
7. Prof. Beshiba Wilson (HoD, CSE)
8. Prof.Swapna M. (HoD, EEE)
9. Prof.Resmi V. Prasad (for HoD, ME)

Sl. No.& Date	Subject and Decision	Action by	Action Date
9 10.01.17	Decided to initiate necessary actions for conducting an International Conference in association with the Professional Society IEEE (Institute of Electrical and Electronics Engineers) before June 2018. Amendment on 20.06.17 :The first meeting is scheduled for 28.06.17 (Wednesday) at 10 am. The meeting will be coordinated by Prof. Ram Prasad Tripathy (ECE). Amendment on 30.10.17:It is proposed to conduct the International conference on 23.04.18 and 24.04.18.	Prof. Dinakardas C. N.and Prof. Jayaram. V.	24.04.18
328 19.10.17	Entrusted Prof.Justin G. Russel (MCA) and Prof.Tony Jacob (MBA) to take immediate measures for the campaigning of students for MCA and MBA. Amendment on 14.11.17 : Entrusted the coordinator of MCA to plan and conduct workshop for BCA and BSc Computer Science students. Amendment on 21.11.17 : The detailed proposal must be submitted on or 12.12.17.	Prof.Justin G. Russel (MCA) and Prof.Tony Jacob (MBA)	12.12.17
344 07.11.17	Decided to provide sickrooms in each department for catering the needs of students.	HoDs	20.11.17
348 14.11.17	Staff advisors are entrusted to verify the affidavit submited by students during the start of the semester listing the damages in the classroom and submit a verification report on the last working day of the corresponding batch. The verification must be done in the presence of class representatives. Amendment on 28.11.17 : The consolidated list of damages if any, in classrooms must be submitted to Principal on 29.11.17.	Staff Advisors and HoDs	29.11.17
361 14.11.17	Entrusted HoDs to take measures to segregate the unused items in the department into the following categories: • Can be Used within 1year but may not require its use in department/college (To be auctioned) • Can be Used for future purpose barring time limit.(To be kept) • Cannot be used (To be disposed) The segregated list of unused items must be handed over to Mr.Chandradas S.V.(ME)/Mr.Ajino Philip (ME) /Mr.Aby C. Jacob (PRO) on or before 11.12.17.	Mr.Chandradas S.V.(ME)/ Mr.Ajino Philip(ME) /Mr.Aby C. Jacob (PRO)	11.12.17
363 14.11.17	The idea proposals for Smart India Hackathon 2018 must be submitted to Single Point of Contact (SPOC) of LMCST, Prof.Cibumol Babu (EEE) on or before 23.11.17.	Prof.Cibumol Babu (EEE)	23.11.17
364 14.11.17	Decided to conduct a brain storming session to evaluate Strengths, Weaknesses, Opportunities and Threats - SWOT Analysis (department and college level) and framing the Vison, Mission and Objectives of department on or before 06.12.17.	Prof. Beshiba Wilson	06.12.17

373 28.11.17	Decided that all faculty members must contribute books to Library.	Ms Sunu S. Nair (Librarian)	28.11.17
374 28.11.17	Entrusted Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE) to schedule the visit to Polytechnic institutions and to provide awareness about Lateral Entry Test which is intended for diploma holders. The team must make necessary arrangements for the conduct of KV scholarship examination for diploma holders and LET Coaching for B.Tech aspirants.	Prof.Smitha J.C (CSE) and Prof.Ashima C.R.(EEE)	15.1.2018
376 28.11.17	The second phase of stock verification audit must be completed on or before 15.12.17. The serial numbers of already numbered items is to be provided along with missing sequence number for items in each department.	Prof.Selma Joseph (MCA)	15.12.17
379 28.11.17	Entrused Prof.Beshiba Wilson (CSE) to prepare academic calendar for January to May 2018.	Prof.Beshiba Wilson (CSE)	17.12.17
381 28.11.17	Formulated the timetable committee with following faculty members : • Prof.Daniel C. Ribu (ME) – Coordinator • Prof.Sunitha Rani P.R.(CE) • Prof.Revathy Sasidharan (EEE) • Prof.Nisha O.S. (CSE) • Prof.Sheeba B.S. (MBA) • Prof.Shamny Arun Mathew K.(ECE) • Prof.Priya S.A. (MCA) The final timetable must be published on or before 14.12.17.	Prof.Daniel C. Ribu (ME)	14.12.17
384 05.12.17	A staff meeting with Principal is scheduled for 20.12.17 (Wednesday) at 1.30 pm in LOMAA Hall to discuss the plans and preparations for the upcoming semester. The meeting will provide a forum where ideas and views can be shared for improvement can be exchanged.	Principal	20.12.17
385 05.12.17	The faculty members handling the subject Principles of Management (HS 300) of S6 B.Tech (CE,CSE and EEE) are requested to identify difficult areas if any and seek help from Prof.Ankur A.(ME) and department of Management Studies, if necessary.	Prof.Sarika A.S.(CE), Prof.Divya Christopher (CSE) and Prof.Revathy Sasidharan (EEE)	11.12.17
386 05.12.17	The choice of Electives for all the courses in the department must be collected from students with signature. An elective cannot be offered if it is opted by less than 10 students (Out of 60 students) and HoD must write specific remarks indicating the allocation of electives and has to be approved by the Principal.	HoDs	05.12.17
387 05.12.17	The Annual Inter Collegiate Techno - Cultural fest Equinox is scheduled for 09.02.18 and 10.02.18. The following faculty members are entrusted as coordinators of Equinox 2018. • Prof.Renu V. (EEE) -Coordinator • Prof.Priyanka C.P. (EEE) -Co-coordinator	Prof.Renu V. (EEE) and Prof.Priyanka C.P. (EEE)	10.02.18
388 05.12.17	The placement training for MBA students is scheduled for 07.12.17 and 08.12.17 in LOMAA Hall.	Prof.Alphonse D. (ECE)	08.12.17
389 05.12.17	Prof.Selma Joseph (MCA) is entrusted as Single Point of Contact (SPOC) of Infosys Campus Connect Programme.	Prof.Selma Joseph (MCA)	05.12.17
390 05.12.17	The Soft skill/Pre-Placement/Finishing School training programmes for B.Tech students for even semester is scheduled as follows: • S2 – 04.01.18, 05.01.18 and [illegible]	Prof.Alphonse D. (ECE)	20.01.18

	• S8 - 08.01.18, 09.01.18 and 10.01.18		
391 05.12.17	Entrusted Dr.Retnakumari Amma (ASH) and Prof.Roy K. Varghese (ASH) as Squad members for examinations in Adminstrative block	Dr.Retnakumari Amma (ASH) and Prof.Roy K. Varghese (ASH)	05.12.17
392 05.12.17	Entrusted Dr.Lenin Jothi as Criteria 6 coordinator for NAAC from MBA department.	Dr.Lenin Jothi (MBA)	05.12.17

Actions Taken

334 24.10.17	HoDs must take initiatives to submit proposals for conducting FDPs, STTPs, Workshops or Training programmes during the semester break. Submit it on or before 27.10.17.	HoDs	27.10.17
343 07.11.17	Decided to depute the following number of faculty members as listed below from each department to participate in the FAB lab visit during the first or second week of December. • ECE -10; CSE – 10; EEE -5; ME -5 Amendment on 14.11.17 : The FAB Lab visit is scheduled for 08.12.17 at 10.00 am. The list of faculty members attending the visit along with details of boarding point must be submitted to Principal on or before 17.11.17.	Prof.Angeline Reeba (ECE)	08.12.17
347 14.11.17	The last date for mailing the objective type questions already prepared by faculty members as study material for Comprehensive Examination of sixth semester B.Tech (KTU) to website@lmest.ac.in is 30.11.17. The objective questions must be easily accessible in document directory form (Proper Folders). [Branch -> Semester -> Subject]	Prof.Chithra A.S. (CSE)	30.11.17
349 14.11.17	An FDP on "Mentoring and Counselling Skill for Psychological Change" for faculty members (ASH – 4 Nos, CE -4 Nos, CSE -6 Nos, ECE -6 Nos, EEE- 6 Nos, ME -6 Nos, MBA -2 Nos and MCA - 2 Nos) by ICT Academy is scheduled for 11.12.17, 12.12.17 and 13.12.17. The list of faculty members (Name, Department, Email Id and Contact Number) attending the FDP must be mailed to Prof.Alphonse D.(ECE) on or before 16.11.17.	Prof.Alphonse D.(ECE)	16.11.17
350 14.11.17	Entrusted Prof.AnjanaThampy (CSE) as Single Point Of Contact (SPOC) for Red Hat Academy Programme and to take immediate steps to complete the registration process of free membership (Account Setup) of Red Hat Academy from interested faculty and students of S2 to S8 B.Tech (CSE, ECE and EEE) and MCA. Amendment on 28.11.17 : The process of membership registration (Account setup) must be completed on or before 05.12.17.	Prof.Anjana Thampy (CSE)	05.12.17
351 14.11.17	Formulated the Scholarship and Financial Aid Committee and entrusted the following faculty members to take adequate measures to provide awareness and guide our studentson the availability of loans and various scholarships that an engineering student can avail (AICTE fee waiver, AICTE scholarships, MHRD scholarships,Minority community scholarship and Financial Aid from Infosys foundation, HCL foundation, etc.). • Prof.RetnakumariAmma (ASH) – Mentor • Prof.RevathySasidharan (EEE)- Coordinator • Prof.Nisha R.S. (ASH) - Coordinator The team is expected to be updated with the details through websites and newspapers.	Prof.Retnakumari Amma (ASH), Prof.Revathy Sasidharan (EEE) and Prof.Nisha R.S. (ASH)	14.11.17

	Amendment on 21.11.17 : The following members are also included in the Scholarship and Financial Aid committee : • CE – Prof.Lekshmi Satheesh • CSE – Prof.Sunu Thomas • ECE –Prof.Veena V.U. • ME – Prof.Resmi V. Prasad • MBA –Prof.Sheeba B.S. • MCA – Prof.Sherin Joseph		
353 14.11.17	A meeting of all the members of IQAC is scheduled for 29.11.17 at 11.00 am. Entrusted Prof.Nisha George (ECE) to take appropriate measures. Amendment on 28.11.17 : The meeting is postponed to 2.00 pm on 30.11.17.	Prof.Nisha George (ECE)	30.11.17
355 14.11.17	The venue Drawing hall DH 3 instead of MCA Seminar Hall for Innovation andEntrepreneurship Development Centre (IEDC) suggested by Prof.Cibumol Babu (EEE), IEDC Coordinator is under consideration.	Prof.Cibumol Babu (EEE)	14.11.17
356 14.11.17	The proposals for availing financial assistance through the following AICTE Quality Improvement Schemes (AQIS - 2017-18)must be submitted to Principal on 21.11.17. • Skill and Personality Development Programme Centre for SC/ST students • Prerana (Scheme for preparing SC/ST students for Higher Education) • Samriddhi (Scheme for SC/ST students for setting start-ups) • Faculty Development Programme (FDP) • Grant for organising Conference • Short Term Training Programme (STTP) • E-ShodhSindu – Subscription to E-Resources • AICTE - ISTE Induction Refresher Programmes Amendment on 21.11.17 : The proposals must be uploaded in AICTE website on or before 23.11.17.	HoDs	21.11.17
365 14.11.17	Faculty members (CSE – 20 nos, ECE -4 nos, EEE- 4 nos and MCA-2 nos) must participate in the face to face interaction of IITB FDP on "Machine Learning" from 16.12.17 to 17.12.17.	Prof. Beshiba Wilson	17.12.17
366 14.11.17	Staff club is planning to conduct a refreshing day trip to Mankayam waterfalls and Tropical Botanical Garden and Research Institute (TBGRI), Palode on 28.11.17. Amendment on 28.11.17 : The trip is planned to be conducted after University exams and is posponed to 20.12.17.	Prof. Beshiba Wilson	20.12.17
371 21.11.17	Entrusted Prof.Binu Chacko (ECE) to make necessary arrangements for PMKVY programme including preparation of the application format, awareness to faculty, advertisement for skill development courses, etc. The first course is proposed to commence from 12.12.17.	Prof.Binu Chacko (ECE)	12.12.17
372 21.11.17	The KTU external audit is scheduled for 29.11.17. All faculty members are requested to produce documents completed in all respects for the audit.	Dr.K. Kumara Pillai	29.11.17
375 28.11.17	Decided to allot 2 hours per week for comprehensive examination of S6 B.Tech. Comprehensive examination must commence from third week of January. The schedule must be published prior to exam in college website. The committee which was looking after the Design Project will be regarding the Comprehensive	Prof.Ram Prasad Tripathy (ECE)	17.12.17

	examination		
377 28.11.17	Decided to make arrangements for a LMCST campus visit on 07.12.17 from 10.30 am for VHSE school students attending the OJT programme conducted by MCA department.	Prof.Neetha Mohan (MCA)	07.12.17
378 28.11.17	Formulated the e-Governance Cell of LMCST with the following members: • Ms.Jessy Augustine (Office) – Convenor • Prof.Anjana J. (MCA) • Prof.Prajisha J.P. (CE) • Prof.Sunu Thomas (CSE) – Nodal Officer • Prof. Jobin Jose (ECE) • Prof.Sreedevi R.C. (EEE) • Prof.Adarsh S.J. (ME) • Prof.Tony Jacob (MBA) The committee will be under the Membership of Prof. Beshiba.	Ms.Jessy Augustine (Office)	28.11.17
380 28.11.17	The ISO internal auditing is scheduled for 07.12.17.	Prof.Roy K. Varghese (ASH)	07.12.17
382 28.11.17	Formulated the NAAC name board committee with following faculty members for finalising name boards, sign boards and direction boards in campus and departments: • Prof.Shammy Arun Mathew (ECE) -Coordinator • Prof.Roy K. Varghese (ASH) –Environment club related boards • Mr.Chandradas S.V. (ME) – Campus related boards • Prof.Daniel C. Robu (ME) • Prof.Justin G. Russel (MCA) • Prof.Lekshmy Surendran (ASH) • Prof.Nisha R.S. (ASH) • Prof.Veena V.U. (ECE) • Prof.Haritha Simon (MBA) • Prof.Preethi W. (CSE) • Prof.Madhav S. (CE) • Prof.Cincy Mary Sebastian (EEE) Entrusted CE department to prepare college site plan and building-wise layout plan.	Prof.Shammy Arun Mathew (ECE) and Mr.Chandradas S.V. (ME)	28.11.17
383 28.11.17	Decided to provide Karunya Varsha Scholarship with full fee waiver to Ms Sethu Parvathi, M.E M.Tech CSE for securing first rank in Trivandrum cluster (first and second semester), second rank and third rank in state level in first and second semester respectively.	Principal	28.11.17

Dr. [illegible] Pradeesh V.

PRINCIPAL
LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY
Thiruvananthapuram

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number: **94**	
Venue: Principal's Chamber	Date: **27.11.18**	Time: 1.30 PM

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr.RetnakumariAmma (HoD, ASH)
3. Dr.K. Kunnara Pillai (HoD, MBA)
4. Prof.Beshiba Wilson (HoD, CSE)
5. Prof.Swapna M. (HoD, EEE)
6. Prof. Selna Joseph (HoD, MCA)
7. Prof.Saharinath A.R. (HoD, ME)
8. Dr.Dinakardas C.N. (HoD, ECE)
9. Prof.InduRajan (for HoD, CE)

Sl. No.& Date	Subject and Decision	Action by	Action Date
558 08.05.18	The data of previous university results (KTU) of students must be madeavailable with staff advisors for entering in CMS. The date for data entry will be intimated soon. Amendment on 11.06.18: The last dates for entry of previous University marks(starting from S1) in CMS are given below: • S2 B.Tech – 25.06.18 • S4 B.Tech – 02.07.18 • S6 B.Tech – 09.07.18 Amendment on 10.07.18:The problem encountered in the entry of previous University marks in CMS has been rectified. The last dates for entry of previous University marksin CMS has beenextended as mentioned below: • 2017 -2021 batch - S1B.Tech – 18.07.18 • 2016 -2020 batch - S1, S2, S3B.Tech – 25.07.18 • 2015 -2019 batch - S1, S2, S3, S4, S5B.Tech – 30.07.18 Amendment on 22.11.18:All pending entries (if any) must be completedon or before 10.12.18.	Prof.PriyaSekhar S. (CMS Coordinator)	09.07.18
700 16.10.18	Staff advisors of S3, S5 and S7 B.Tech are requested to maintain the complete documents required for assigning activity points for students. An external audit will be conducted by the audit team of LMCST on or before 09.11.18 to verify the documents regarding the activity points assigned to students. Amendment on 22.11.18 : Decided to complete the internal auditing of activity points on or before 10.12.18.	Prof.Bindu M.V. (KTU Internal Auditor)	09.11.18
708 23.10.18	Staff advisors are requested to ensure the correctness of the following mandatory fields entered by students in CMS: • Name of student • Name of Parent • Mobile number of Parent *Note: If based on acceptable reasons, the details of fathercannot be provided, please ensure that the details of mother are entered correctly.*	Staff advisors	03.11.18
715 30.10.18	Staff advisors are requested to discuss aboutthe necessary measures to be taken before the start of next semester, for increasing the activity points, with students who have currently earned less activity points: i.e; S1 B.Tech < 20, S3 B.Tech < 40, S5 B.Tech <60 and S7 B.Tech < 100. The action plan must be submitted to Principal on 07.11.18.	Staff advisors	07.11.18
734 13.11.18	To appreciate the students involvement in extracurricular and co-curricular activities, HoDs are requested to submit the list of students who have scored more activity points (S7 > 150 and S1,S3,S5 > 100 points).	HoDs	18.11.18

737 22.11.18	A meeting of faculty members with Principal is scheduled for 30.11.18 (Friday) at 2.30 pm in LOMAA Hall.	Faculty	30.11.18
745 27.11.18	Project proposals (3 copies each) for INNOVATE and TECHFEST 2019 of KSCSTE and KTU must be submitted on or before 12 noon on 29.11.18 (Thursday) to Principal for screening by the expert committee.	Principal	29.11.18
746 27.11.18	The list of S6 and S8 B.Tech students along with the electives opted must be submitted to Principal before 9.30am on 29.11.18.	HoDs	29.11.18
747 27.11.18	Last date for submitting the condonation request with supporting documents by students is 30.11.18.	Staff Advisors/HoDs	30.11.18
748 27.11.18	The TMA Student Chapter of LMCST is organizing a talk on "The Prospectus of management Studies" by Col. R.G.Nair at 11.00am on 29.11.18 at LMCST.	Dr. K. Kumara Pillai (MBA)	29.11.18
749 27.11.18	The list of interdepartmental subjects to be handled by faculty from other departments for the next semester (Jan to May 2019) must be forwarded to Principal on or before 30.11.18.	HoDs	30.11.18
750 27.11.18	The statement of sessional marks signed by students must be forwarded to Principal on or before 29.11.18.	Staff Advisors/HoDs	29.11.18
751 27.11.18	Formulated the Arts club with following faculty members : • Prof.Beshiba Wilson (CSE)- Mentor • Prof.Renu V. (EEE) – Coordinator • Prof.Resmi V. Prasad (ME) – Co-coordinator • Prof.Divya S. Nair (ASH) - Co-coordinator • Prof.Neethu Mohan (MCA) Prof.Bincy Louis (ECE) • Prof.Sheeba B.S. (MBA) Prof.Revathy Krishna (CE) • Prof.Greeshma R.G. (CSE) Decided to form a literary club to conduct literary activities at LMCST.	Principal	27.11.18
752 27.11.18	Decided to conduct the College day in the month of February 2019.	Principal	Feb, 2019
753 27.11.18	Appreciation to Ms.Sivakami (S5 MCA) and Ms.Neeraja Radhakrishnan (S7 CSE) for being placed in Hexaware Technologies on 27.11.18 through LMCST Placement Cell.	Principal	27.11.18
754 27.11.18	Appreciation to the entire Placement Cell especially Prof.Anjana Thampy (CSE), Prof.Justin G. Russel (MCA), Prof.ShammyArun Mathew (ECE) and Prof.Sajith Krishnan (ME) for the successful conduct of the recruitment drive of EJ Gates Infotech Private Limited on 23.11.18 at LMCST. Special mention to Prof.Jayaram V. (ME) –Placement Coordinator, for the overall coordination of the event.	Principal	27.11.18
755 27.11.18	Appreciation to the MBA team under the leadership of Dr.K.Kumara Pillai, for having won the second prize for Best Finance team in the National Management Fest of UIM, Varkala on 23.11.18.	Principal	27.11.18

Actions Taken

722 30.10.18	The final sessional marks of KTU students must be published on or before 23.11.18.	Faculty	23.11.18
723 30.10.18	The second course / class committee must be conducted on 26.11.18.	Faculty	26.11.18
738 22.11.18	As per the general observation of KTU external auditor, it is suggested to use numerical values for the awarding of assignment marks (Assignment I, II and III) to students.	Faculty	22.11.18

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF LMCST COLLEGE COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number**: 118**	
Venue:Principal's Chamber	Date**:31.12.2019**	**Time: 1:30 PM**
Members Present		
1. Dr. P.P Mohanlal. (Principal) 2. Dr. RetnakumariAmma (HoD, ASH) 3. Prof.Mohan S (HoD, CE) 4. Prof.Beshiba Wilson(HoD, CSE)	5. Prof.Sreekala Devi K (EEE) 6. Prof. Selma Joseph (HoD , MCA) 7. Dr.Dinakar Das. (HoD, ECE) 8. Prof.Adarsh (ME) 9. Dr Smitha Jose Panackal (HoD MBA)	

<table>
<tr><th colspan="3">Discussion & Decisions</th></tr>
<tr><th>Point No</th><th></th><th>Action Taken</th></tr>
<tr><td>1</td><td>It has been decided to conduct classes for students aspiring for B. Tech (Honors) degree without disturbing normal TT hours. The faculties can avail extra hours including activity hours for the same.</td><td>Staff Advisors/ HoDs</td></tr>
<tr><td>2</td><td>The department wise list of electives and MOOC courses for the students aspiring for B. Tech (Honors) degree are listed below
<table>
<tr><th>Departmnet</th><th>Elective</th><th>MOOC</th></tr>
<tr><td>ECE</td><td>RTOS</td><td>Biomedical Image Processing for cancer detection</td></tr>
<tr><td>CSE</td><td>Mobile Computing</td><td>Joy of computing using Python</td></tr>
<tr><td>CE</td><td>Air-Quality management</td><td>Modern construction materials</td></tr>
<tr><td>EEE</td><td>Data structures and algorithm</td><td>Mathematical methods and techniques in signal processing</td></tr>
<tr><td>ME</td><td>Operations Research</td><td>1. IC Engines and Gas turbines
2. Engineering Mechanics</td></tr>
</table></td><td></td></tr>
<tr><td>3</td><td>The Principal sought suggestions for electives in S7 and MOOC courses in S7 For the Honors students in all branches.</td><td>HoDs</td></tr>
<tr><td>4</td><td>The status of activity points in all the engineering departments has been sought by the Principal and the response is as given below
<table>
<tr><th>Department</th><th>Status of activity points</th></tr>
<tr><td>CSE</td><td>All students attained 100 credits</td></tr>
<tr><td>ECE</td><td>Five students has got less than 100 points</td></tr>
<tr><td>ME</td><td>Fifteen students has got less than 100 points</td></tr>
<tr><td>EEE</td><td>Almost all students have got 100 credits and rest of the students will be credited 50 points in addition to the points which they have already got for NSS activities.</td></tr>
<tr><td>CE</td><td>Almost all students have got 100 credits and rest of the students will be credited 50 points in addition to the points which they have already got for NSS activities.</td></tr>
</table></td><td>Any Concern In attaining minimum of 100 points shall be reported with highest priority for S8 students

Action: HoDs</td></tr>
</table>

<table>
<tr><td>5</td><td>The principal has enquired the readiness of workbooks for the even semester classes and the status of the same is listed below
<table>
<tr><th>Department</th><th>Status of workbooks</th></tr>
<tr><td>CSE</td><td>The workbooks of all courses are ready for printing</td></tr>
<tr><td>ME</td><td>Only 5 out of 24 books are ready for printing</td></tr>
<tr><td>EEE</td><td>The workbooks of all courses except two are ready for printing</td></tr>
<tr><td>ECE</td><td>The workbooks of all courses will be ready by Jan 1, 2020</td></tr>
<tr><td>CE</td><td>Status to be reported</td></tr>
</table></td><td></td></tr>
<tr><td>6</td><td>It has been decided to conduct The inter-collegiate techno-cultural fest EQUINOX-2020 will be conducted in association with LMIHMCT on March 20 and 21. Transportation facilities will be arranged for students for the rehearsals of the programs and three Saturdays will be allotted for the same. Compensatory leave will be given to the faculties for additional duty if performed on these Saturdays</td><td>HoDs And faculties</td></tr>
<tr><td>7</td><td>The Principal has requested suggestions and feedback from the faculties regarding the make –up of loss of classes on the first two hours (specifically for the subjects of first two periods) of the series test.</td><td>HoDs</td></tr>
<tr><td>8</td><td>The Principal has also requested suggestion from the faculties and HoDs in consultation with the faculties for the 4 periods/week for Professional Communication of S2: 2 periods by regular faculty, 2 period for English and special training.</td><td>HoDs/ TT Coordinator</td></tr>
<tr><td>9</td><td>HoDs are requested to ensure the completion of course notes of faculties before Jan 9, 2020.</td><td></td></tr>
<tr><td>10</td><td>The advisory committee meeting should be conducted once in a year. The committee includes FAs, SFAs, faculties and students. The minutes and action taken report of the same must be maintained by the staff advisors.</td><td></td></tr>
<tr><td>11</td><td>The department level advisory committee meeting should be conducted once in a year for all batches. All departments are requested to submit the members of the committee which must include HoD, Senior faculty, an Alumnus and an Industry expert by Jan 6th , 2020.</td><td></td></tr>
<tr><td>12</td><td>All departments are requested to submit the list of activities planned for the upcoming semester by Jan13,2020</td><td></td></tr>
<tr><td>13</td><td>The first internal examination of the even semester will be held from 26.02.2020 to 03.03.2020 (note: 29-2-2020 is working day and series exam scheduled on that day)</td><td></td></tr>
<tr><td>14</td><td>The second internal examination of the even semester will be held from 01.04.2020 to 8.04.2020. (Note: NSS Camp from 8-4-2020 evening to 14-4-2020)</td><td></td></tr>
<tr><td>15</td><td>The first internal examination of the even semester for the students aspiring for Honors degree will be held on 04.03.2020</td><td></td></tr>
<tr><td>16</td><td>The second internal examination of the even semester for the students aspiring for honors degree will be held on 16.04.2020</td><td></td></tr>
<tr><td>17</td><td>The PTA meeting for the even semester will be held on 17.03.2020 and 18.03.2020</td><td></td></tr>
<tr><td>18</td><td>The schedule for the KTU Internal Audit is as follows</td><td></td></tr>
</table>

	KTU First Internal Audit: 05.03.2020 and 06.03.2020 KTU Second Internal Audit: 02.07.2020 and 03.07.2020	
19	The marks of the first and second internal examinations must be sent to parents on or before 09.03.2020 and 21.04.2020 respectively	
20	The PG Coordinator is requested to submit all the important dates for the evaluation	Prof. Dinakar Das
21	All staff advisors are requested to send the monthly attendance to parents on the following dates 31.01.2020 28.02.2020 31.03.2020 28.04.2020	
22	All staff advisors are requested to publish the monthly attendance on the following dates 31.01.2020 14.02.2020 16.03.2020 15.04.2020	
23	The Project Committee for the eighth semester B.Tech is reconstituted with Dr. Johnson Y as the coordinator. The following faculty members are nominated as the committee members from the respective departments CSE: Prof. Priya Sekhar & Prof. Asha Chandran EEE: Prof. Ashima C R ME: Prof. Ananthu ECE: Prof. Bincy Louis & Prof. Binu Chacko CE: Prof. Anupama & Prof. Sneha	
24	The project committee is requested to submit all the important dates and activities for the even semester on or before 06.01.2020	

Principal

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

<table>
<tr><td colspan="3">MINUTES OF LMCST COLLEGE COUNCIL MEETING</td></tr>
<tr><td>Subject: Academic and Administrative Matters</td><td colspan="2">Meeting Number: 102</td></tr>
<tr><td>Venue: Principal’s Chamber</td><td>Date: 2.04.2019</td><td>Time: 1.30 PM</td></tr>
<tr><td colspan="3">Members Present</td></tr>
<tr><td colspan="3">1. Dr. P.P Mohanlal. (Principal)
2. Dr. Retnakumari Amma (HoD, ASH)
3. Dr.K. Kumara Pillai (HoD, MBA)
4. Prof.Jessy Ann Francis (HoD, CE)
5. Prof.Beshiba Wilson(HoD , CSE)
6. Prof.Swapna M. (HoD, EEE)
7. Prof. Selma Joseph (HoD , MCA)
8. Dr. Dinakar Das. (HoD, ECE)
9. Prof. Bindu M V(HoD in-charge, ME)</td></tr>
</table>

The meeting started at 1:30 PM and the Principal welcomed the members. The college council had a special meeting to discuss suggestions on KTU curriculum change proposal put forward by University based on suggested from KTU and also to finalize PTA meeting schedule.

Sl. No	REVIEW OF ACTION POINTS OF PREVIOUS MEETINGS	Remark/ Actionee
1	It has been decided by the college council to conduct PTA meeting on the following dates. **Civil Engineering Department** S2 - 6/4/19 AN S4 - 4/4/19 FN S6 - 4/4/19 AN S8 - 5/4/19 FN **Computer Science Engineering Department** S2 and S4 - 5/4/19 AN S6 - 9/4/19 from 10:30 onwards S8 - 8/4/19 from 10:30 onwards **Mechanical Engineering Department** S2 and S4 - 12/4/19 from 10:30 onwards S6 - 11/4/19 from 10:30 onwards S8 - 6/4/19 FN **Electrical & Electronics Engineering Department** S2,S4,S6 and S8 - 10/4/19 from 10:30 onwards **Electronics & Communication Engineering Department** S2,S4,S6 and S8 - 25/4/19 AN **MCA Department** S2 and S4 - 24/4/19 FN S6 - 24/4/19 AN **MBA Department** - 25/4/19 FN	HOD/Advisors
2.	The revised curriculum proposal for 2019 admission onwards from KTU was discussed in detail point by point as listed in the proposal. Accordingly all the feedback and conclusions arrived based on the discussion is attached with the list of proposal from KTU for reference.	See the attachment

DISCUSSION POINTS: CURRICULUM REVISION, B.Tech

Academic Philosophy of KTU

Academic philosophy of the University shall be in line with the outcome based education adopted by AICTE. Academic philosophy of KTU B.Tech curriculum shall be a curriculum which is quality motivated, outcome based and socially & industrially relevant, as pointed out by the Chairman, AICTE in the 'Model Curriculum for Undergraduate courses in Engg. & Technology' published in Jan 2018. The teaching learning process and evaluation of students shall be based on program objectives and desired outcomes. The curriculum, syllabus, teaching learning process and evaluation should conform to graduate attributes (GA) of KTU. The syllabus shall be such as to include problem solving approach and develop analytical skill. Further the new vision for education has to be far reaching and should not be dictated by immediate needs as concluded in Chapter 9 of the "Report of AICTE Review Committee, 2015" (the Kaw committee report). The report says that future education system would be defined by mobility, credit transfer, nonlinearity, flexibility, agility, modularity, intensity, diversity, churn and experientiality.

KTU is an affiliating University with about 150 colleges offering B.Tech programmes and about 40000 students in the range of average to very brilliant calibre. The curriculum and syllabus designed should take into consideration the wide gap of student calibre. A bright student should not loose opportunity to acquire advanced knowledge and at the same time an average student should acquire minimum knowledge required for an Engineering graduate. AICTE has designed the revised model curriculum where number of credits have been reduced to 160 credits with a core comprising basic sciences and engineering having focus on fundamentals, discipline level significant courses and ample opportunity for the students to take electives from the discipline and cross disciplines, provision for internship to understand the industry requirements, have hands on experience and to pursue project work in their final year relevant to industry. The Chairman, AICTE has requested institutions/Universities to adopt the model curriculum for various engineering disciplines. Further, AICTE model curriculum allows some flexibility in readjustment of courses/credits without disturbing the total credit structure of 160 credits As the model curriculum and syllabus are drafted by subject-wise Heads of Committees with a respective team of academic experts along with industry experts, KTU may adopt AICTE model curriculum in principle allowing flexibility to accommodate local needs.

Based on Academic philosophy of KTU, AICTE model curriculum, internal discussions, feedback from various curriculum committee and external sources, KTU has arrived at certain points for discussion. You are requested to go through it and offer your comments.

Item	University Views	Our response
B.Tech (hons)	Design of choice based curriculum which may have (i) Mandatory credit courses (total credits =160), (ii) Mandatory non-credit courses as given in AICTE model curriculum and (iii) Non-mandatory credit courses (value addition courses) (total = 20 credits) such as elective courses in emerging areas such as Artificial intelligence, Internet of Things Blockchain, Robotics, Quantum Computing, Data Science, Cyber Security, 3D Printing and Design, Virtual Reality for which AICTE has framed model syllabus and similar courses. The additional credits could also be earned through MOOC and/or summer project. These courses carrying 20 credits may be termed as 'value addition' courses. A pass in value addition courses shall not be mandatory for B.Tech, however for B.Tech(Hons.) attaining 180 credits shall be mandatory. The CGPA for all students shall be computed based on 180 credits and whoever gets CGPA equal to above 9.0 from 180 credits shall be awarded B.Tech (Hons.) and whoever gets 160 to 179 credits and CGPA greater than or equal to 5.0 shall be awarded B.Tech. Also this system does not require any modification in class time table. The time table for 180 credits followed in existing curriculum can be continued. Bright students opting for value addition courses can attend such courses and other students can attend remedial courses during same slot.	Recommendation: 1.B.Tech (Hons): must be allowed in all AICTE approved Institutions based on the stipulated criteria. (180 credits) 2.CGPA Computation for BTech shall be for 160 credits
B.Tech with Minor	Skill based “Minor in Engineering” in line with AICTE norms. (Specialized in one area, starts from third semester, 20 credits, Can opt Regular courses, MOOC courses and practical courses). Implementation of the concept of Virtual laboratories. NPTEL has already developed 180 labs comprising of 1700 experiments. A method to utilise this vast resource should be evolved. This is one of the salient features of the AICTE model curriculum.	This is a good idea. Accepted
Classification of degree	Classification as distinction, first class, second class required	CGPA >8 Distinction .> 6.5 & < 8 First Class >5 & < 6.5 no mention of Class
Internal marks	Internal mark normalisation: Increment enhanced from 25% to 30%. No minimum requirement for internal assessment	No minimum requirement for internal assessment is strongly recommended

		30% Increment recommended
Pass requirement	To reduce the pass minimum for University examination from 45% to 40%. However, for a pass grade the mandatory requirement is 50% (Internal assessment and University examination put together)	**Suggestion:** 40% for University exam and 10% for Internal , aggregating 50% for pass
Promotion to higher semesters	One recommendation is 'a student will be eligible for promotion to next odd semester from even semester only if he/she has earned 40% of total credits up to the previous odd semester in the first attempt including revaluation'. **OR** shall we follow the existing cut-off barrier at 5th and 7th semester.	Remove First attempt stipulation. At S3 no stoppage of promotion Existing criterion is OK
Induction program	As per AICTE guideline,'3 weeks' induction program is to be conducted before commencement of classes. The first semester curriculum should be designed to accommodate this. Follow up?	2 weeks duration is sufficient
Courses in each semester	No of courses per semester (5 Theory + 2 lab/ Drawing). The course plan may be divided in to 5 modules. The first internal test may be conducted after completing two modules and the second internal test may be conducted after completing 4 modules. For the end semester examination all modules may be given equal weightage (20%) to eliminate complexities in question paper setting. One course in each semester may be identified for project based learning with one third of aggregate marks allotted for project, one third for internal tests, quizzes and assignments and one third for end semester examination. In the first two semesters, sustainable engineering and Design & Engg. can be project based courses.	Agreed
Internal assessment	Including innovation and research ideas as part of internal assessment: Assignments may be replaced by solving non-routine problem/term paper/case study/seminar. As per the current ordinance the split up of internal marks is 20% for tutorials/assignments/mini projects and 80% for two internal tests. This may be changed to attendance 20%, assignments 30% and tests 50%.	1.Min 75% attendance mandatory to write UTY exam 2.Existing IA weightages is OK 3. No marks for attendance
Mark details	Assessment/Evaluation: IA marks to ESA marks ratio for theory courses, practical courses, project etc.	Existing ratio Ok.
Prerequisite	Prerequisite required	Not required

Educational Tour	After 4th semester, students can go for educational tour for maximum 15 days and should include minimum 2 industrial visits. Those who are not going for tour should undergo industrial visit/training/internship for minimum 15 days. Students should submit tour report/training report as a mandatory requirement to registration to 5th sem and be made available for academic audit. All guidelines regarding the tour issued by DTE/Govenment should be strictly adhered to. Slot for the tour June/July. No working days permitted	1.Internship compulsory Industrial Visits shall be **optional** and maximum days shall be limited to 10.
General rules	Guide lines for Seminar, mini-projects, Industrial visits, Internship, Tech fest common	agreed
Project evaluation	Project and Project evaluation (7 and eight semesters? Mark distribution, % assessment by the guide, external experts, separate minimum requirement etc)	External:50% Report:30% Guide:20%
Conduct of examinations	Possibility of conducting online objective type exam for selected courses (eg.: Basic Engineering courses, Economics, Principles of Management, Environmental science etc.), Conduct of practical exam in minimum time, Question paper setting - implementation of revised Bloom's taxonomy, mapping to course outcomes etc. , Model question paper/QP pattern (including max choice permissible) (model QP published by AICTE may also be discussed) and question bank, Modified Bloom's taxonomy may be followed in question paper setting. The pattern/scheme should also contribute to GAs, Detailed scheme with solutions shall be insisted with the question paper submitted, Choice of questions in question paper shall be such that total marks of all questions should not exceed 150% of maximum marks and should not be less than 140% of maximum marks.	Except Basic Engineering, others can be online
Graduate Attributes	While designing the curriculum and preparing the syllabus the Graduate Attributes should be the basis. Each course in the curriculum shall be mapped to GA. The objectives and outcomes of each course shall be mapped to GA. The BoS/ Curriculum and syllabus committee may be instructed to comply mapping of curriculum, course objectives and outcomes with GA. A mapping table may be designed and given to faculty drafting the syllabus. The approved syllabus of each course must invariably has mapping with GA, course objectives and course outcomes. It must be ensured that the curriculum and syllabus properly address the graduate attributes.	agreed

Online examination for Practical	An online exam may be conducted by the University for end semester assessment of practical courses as done in Rajiv Gandhi Technical University, Bhopal. It is objective type covering experimental procedure, theory, observations, calculations etc.	agreed
Curriculum requirement Mech (Prod), Mech (Auto) etc	It is proposed that curriculum of such programmes shall be framed from the curricula of parent branch and child branch such that in Semesters 3 to 8, theory and practical courses with credits 45-55% of total credits shall be from parent branch and the remaining from child branch. eg:- For Mech (Auto) branch 45-55% credits (theory & practical courses) must be from S3 to S8 Mechanical Engg branch and remaining from S3 to S8 of Automobile Engg. branch.	If introduced in future Ok for LMCST
Common curriculum for S1 and S2	It would be preferable to have a common curriculum in the first two semesters for all branches of engineering. The basic/introduction courses in engineering which are four courses now may be reduced to two courses viz. Introduction to Engg –I (Covering introduction to all conventional branches of engineering) & Introduction to Engg._II (Covering introduction to emerging engineering fields). The text book by Philip Kosky et.al titled "Exploring Engineering – An Introduction to Engineering Design" published by Elsevier would be a good resource book for this course. An engineer should have been exposed to all disciplines of engineering as practical problems that an engineer would face is multidisciplinary. Objective type examination can be conducted for these two courses.	Very Good Strongly Recommended
Sample curriculum for Semesters I & II	Mathematics – 2 courses, 1 in each semester – 8 credits, Physics – Theory & Lab – 4 credits, Chemistry – Theory & Lab – 4 credits, Engineering Mechanics – 4 credits, Sustainable engineering – 2 credits, Design & Engineering – 2 credits, Introduction to Engg I & II – 1 course in each semester- 8 credits, Computer programming – 4 credits, Computer aided engg. graphics (P) – 2 credits, Basic Engg lab (P)- 2 courses – 1 course in each semester – 2 credits	Agreed
Engineering graphics	It may be offered as a computer aided practical course. The text book by Duff J M and Ross W A titled "Engineering Design and Visualisation" published by Cengage Learning will be a good resource book	Agreed
Non-credit mandatory courses	Life skills, Disaster Management (Mandatory as per UGC) and Industrial safety engineering shall be included as non-credit mandatory courses in semesters 3 to 5. Business economics and Principles of management may be offered in third and fourth semesters alternately. The performance in these courses can also be evaluated by objective type examination. These courses may be permitted to study as MOOC courses offered by NPTEL	Agreed

Maths and basic science	The respective branch should decide the broader content. Detailed syllabus by Maths/Basic science faculty	Agreed
Retention of newly introduced courses in KTU 2015 admission	Retention of courses such as Design Engineering, Design project, Life skills, Comprehensive Examination etc. (The Design Engineering and Design project have been included in 2015 curriculum as the Kaw committee report recommended that a design spine should be incorporated in the curriculum to inculcate creative thinking and creative design abilities in students. Life skills has beem introduced in a view to enhance employability of graduates. Comprehensive exam is introduced to guide students in preparing for competitive examination and technical interview).	Agreed
Books	Only reference books and from standard publishers be given	agreed
Activity points	To be retained at 100 points with 2 credits	agreed
Attendance requirements	Norms for attendance, duty leave etc	Min 75% Existing norms OK
Credit transfer from MOOC	Inclusion of MOOC & Summer project in curriculum. To what extent we can go for MOOC courses. MOOC courses evaluation criteria?	Wider discussion required
Elective courses	Guidelines on elective courses- Maximum number of elective courses to be included in the curriculum, minimum and maximum number of students in each elective course	Existing rules is adequate
Branch and college transfer	No branch change, College transfer only in third semester,	If same subjects for S1 & S2, It is logical to **allow branch change.** But has many practical disadvantages. Hence not recommended
Collaborative programs.	Criteria for recognizing reputed agencies and reputed institutions and what extent they can be collaborated with the academic activities of the University	To be decided through discussion

Grace marks/ Activity points	Common institutional frame work for Sports, NSS, NCC, Cultural festivals and other extra-curricular activities.	Grace marks only for students already passed
Changes in syllabus	No suggestions/modifications shall be entertained once final syllabus is approved.	yes
Any other		To be discussed

Structure of B. Tech. Program

Sl. No.	Category	Code	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HSMC	12
2	Basic Science courses	BSC	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	24
4	Professional core courses	PCC	48
5	Professional Elective courses relevant to chosen specialization/branch	PEC	18
6	Open subjects – Electives from other technical and /or emerging subjects `	OEC	18
7	Project work, seminar and internship in industry or elsewhere	PROJ	15

8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	MC	Non credit
9	Mandatory Students Activities (Pass/Fail)	SA	2
	Total Credits		**162**

The meeting concluded at 3:45 PM.

Principal, LMCST

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF LMCST COLLEGE COUNCIL MEETING		
Subject: Academic and Administrative Matters	Online Google Meet	
	Date**: 15-9-2021**	Time: 14:00 Hrs
Members Present		
1. Dr. P.P Mohanlal. (Principal) 2. Prof.Mohan S (HoD, CE) 3. Dr.Beshiba Wilson, HoD CSE 4. Dr. Retnakumari Amma, HoD, ASH 5. Dr.Johnson Y (HoD, EEE)	6. Prof. Selma Joseph (HoD, MCA) 7. Prof.Soorya (HoD, ECE) 8. Dr Syamnath HoD I/C, MBA 9. Prof Sajith Krishnan, ME Invitee	

Prof. Sajith Krishnan R., NBA Coordinator was the special invitee

Agenda of the program were as follows

- Preparation of contact classes for Final year students from 4th October ,2021
- KTU course class committee
- KTU NBA audit regarding

I. Preparation of contact classes for Final year students from 4th October, 2021

- Considering the number of students in each department, classes can be arranged., either as single batch or two batches
- Timing will be from 8:30 am to 4 pm
- Faculty has to come regularly to college from 4th Oct onwards.
- Faculties having online class should take class from the college
- More importance to Product development activities, startup needs to be focused
- To improve the result of final year students, special attention to be given on the backlog subjects in each department.
- Remedial classes to be arranged for the critical subjects and a special timetable has to be prepared for the same.
- A detailed plan to be presented by the HODs of each department based on the following aspects
  - ✓ How to improve the result of final year students
  - ✓ What methods adopted by the department to achieve the result
- Decided to provide **one hour exclusively for remedial class in the Time table**.
- For all pass students, they have to either undergo additional courses like NPTEL, MOOC or engage in Product Development Initiatives.

II. KTU course class committee

- Chairman for various course and class committees were finalized

III. KTU NBA audit

- Prof. Dr. Beshiba Wilson presented the requirements of NBA audit
- **Files required in Department are as follows (for last 3 years)**
  - ✓ Class Timetable with Tutorial to be published

- ✓ Internal Exam Question Paper must be approved by IQAC
- ✓ Innovating Teaching Methods to be adopted – subjects, faculty and course files are required
- ✓ Tutorial samples with log book is essential (a suggestion came to add Tutorial option in CMS)
- ✓ Student Faculty Ratio

- **Files required in Academics (for last 3 years)**
  - ✓ Course files
  - ✓ CO-PO, CO-PSO mapping
  - ✓ Add on courses-A committee to be formulated and they should design the course structure (for a duration of 30 hrs), minutes of the committee decision is required. Final assessment procedures like test to be conducted and certificated to be distributed, and the whole Summary.
  - ✓ Subject Group (academic groups for core areas in each branch) to be formulated and then identify the Curriculum Gap in each field.

- **Files required by Staff**
  - ✓ Research Funding
  - ✓ Journal Publications
  - ✓ IPR related activities (briefed by Prof. Dr. Johnson)
  - ✓ FDPs / Conferences attended / organized inside and outside
  - ✓ Awards/Honours
  - ✓ Activities conducted based on MoU
  - ✓ Students Roll list
  - ✓ KTU Result Analysis
  - ✓ Success data of passed out batch
  - ✓ Placement/ Higher studies details
  - ✓ Professional Society membership and related activities in each department to be encouraged (Each department should have altleast one professional society membership)
  - ✓ Staff Extension activities (decided to enhance extension activities on behalf of SADP as soon as the offline class starts)
  - ✓ Duties and Responsibilities of Staff
  - ✓ Yearly Department budget to be submitted to Principal

Other Matters:

- Department wise NCs, after second audit, was still pending for a few faculties and they were asked to clear all NCs urgently on or before 18th September 2021.Feedback form link provided in LMCST website to be filled and submitted by all the staffs.

Principal

MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 2

April 2016

Subjects and Credits in Trimester 2

Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam duration (Hrs.)	Credits
21	Organizational Behaviour II	4-0-0	40	60	3	3
22	Macro Economics	4-0-0	40	60	3	3
23	Marketing Management I	4-0-0	40	60	3	3
24	Operations Management	4-0-0	40	60	3	3
25	Financial Management I	4-0-0	40	60	3	3
26	Business Law	4-0-0	40	60	3	3
27	Soft-Skills II	0-2-0	20	-	-	-
28	Project	0-0-3	-	-	-	-
	Total	24-2-3	260	360	-	18

SECOND TRIMESTER SYLLABUS

Course No.	Course Name	L-T-P	Credits	Year of Introduction
21	Organizational Behaviour II	4-0-0	3	2015

Course Objectives

The course focuses on managing teams at work and the organization system as a whole. The objective is to understand how individuals, groups and whole organizations work together more effectively within the increasing pace of corporate change, dramatic restructuring and downsizing and advanced global competition.

Syllabus

Group Behaviour and Interpersonal Influence, Organizational Processes, Organizational Design, Change and Innovation, Emerging Aspects of Organizational Behaviour.

Expected Outcome

- Apply problem solving and critical thinking abilities to analyse the kinds of choices available for developing alternative organisational behaviour approaches in the workplace
- Form an appreciation of the complexities and uncertainties of organisational behaviour by examining your own role in the light of experience of real-time problem settings
- Demonstrate a developmental approach to personal and key skills of planning, review and feedback and verbal communication

References

1. Aswathappa, K. Organizational Behavior. Himalaya Publishing House, 2007.
2. Berg, Green. Behavior in Organizations. New Delhi: Pearson, 2013.
3. Chandran, Jit S. *Organizational Behavior.* New Delhi: Vikas Publishing House, Third Edition.
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5. Dwivedi, R. S. *Human Relations & Organizational Behavior: A Global Perspective.* Delhi: Macmillan India, 2001.
6. Luthans, Fred. *Organisation Behaviour.* New Delhi: McGraw Hill Education, 2011.
7. McShane, Steven Lattimore, Mara Olekalns and Tony Travaglioni. *Organizational Behavior: Emerging Knowledge, Global Insights.* McGraw Hill, 2012.
8. Newstorm, John W and Keith Davis. *Organizational Behavior: Human Behavior at Work.* New York: McGraw-Hill, 2014.
9. Poertner, Shirley and Karen Massetti Miller. *The art of giving and receiving feedback.* Coastal Training Technologies, 1996.
10. Robins, Stephen P. *Organization Behaviour.* New Delhi: Pearson Education, 2012.
11. Sanghi, Seema. *Essentials of Organisational Behaviour.* New Delhi: Pearson, 2010.
12. Sekaran, Uma. *Organizational Behavior.* New Delhi: McGraw-hill, 2004.
13. Werner, David. *Managing Company-wide Communication.* Chapman & Hall, 1995.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Social systems and organizational culture - Understanding a Social System, Social Culture, Role, Status, Organizational culture, Influencing culture change, Sustaining the culture, Characteristics of effective socialization	7	20
II	Managing the Organization System: Effects of organization culture on employee performance - creating and sustaining organization culture - Management of Change: forces responsible for change - resistance to change overcoming resistance to change - planned change – approaches to manage organization change -OD inventions- creating a culture for change - Learning Organizations	10	20
	First Internal Examination		
III	Empowerment and Participation- The nature of empowerment and Participation- How participation works- Programs for participation-Important considerations in participation- Assertive Behaviour: Interpersonal Orientations- Facilitating smooth relations- Stroking	6	10
IV	Managing misbehaviour - The emergence in Management of the study of misbehaviour, Selected misbehaviours; work stress and its management - Stress and Counselling - What is stress?, Stress model, Work stressors, Stress outcomes, Stress moderators, Stress prevention and management,	9	20
	Second Internal Examination		
IV	Employee counselling, Types of counselling-Ethical decision making in organisations: Factors that inhibit or facilitate ethical decision making in organizations, Steps to ensure ethical decisions	6	10
V	Global implications of organizational behavior: International setting for the management criteria - planning, organizing, staffing, controlling and leading; Cultural influences on international negotiations; managing multi-cultural teams; Organisational structure that connects organizational departments, functions and geography to achieve organizational goals; Impacts of globalization on organizational culture	7	20
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
22	Macro Economics	4-0-0	3	2015

Course Objectives

This subject provides the macro economic environment at national as well as global level for managing business. The subject also provides an introduction to the determination of aggregate income and employment with an analysis of fiscal and monetary policy. Policy issues relating to overall aggregate demand management will be discussed.

Syllabus

Indian Economy and Business environment - Political and legal, economic, technological, International Business environments, Globalization and Indian business environment, Meauring the economy, business cycles, inflation, national income, economic and monetary policies. Industrial policies and structure, industry and inter-industry analysis.

Expected Outcome

On completion of the course the students will acquire knowledge about the linkages and functioning of macro-economic variables like aggregate income, aggregate demand and sup-ply, savings, investment and employment. They also will learn about aggregate output and price levels and general equilibrium, money, credit and dynamics of inflation, national in-come and sectoral contributions, business environment and the global scenarios.

References

1. Abel, Andrew B, Ben Bernanke and Dean Croushore. Macro Economics. Pearson, 2013.
2. Agarwal, Vanita. Macro Economics: Theory and Policy. Pearson Education India, 2010.
3. Bedi, Suresh. Business Environment. Excel Books, 2005.
4. Datt, Ruddar and KPM Sundharam. Indian Economy. S Chand, 2013 (70th Edition).
5. Femando, A C. Business Environment. Pearson, 2011.
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7. Hill, Charles WL and Arun Kumar Jain. International Business: Competing in the Global Market-place. Tata McGraw Hill, 2009.
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9. Leontief, Wassily. Structure of American Economy. Oxford University Press, 1951.
10. Mankiw, N Gregory. Principles of Macroeconomics. Cengage Learning, 2015.
11. Misra, SK and VK Puri. Economic Environment of Business (With Case Studies). Himalaya Publish-ing House, 2012.
12. Paul, Justin. Business Environment: Text and Cases. Tata McGraw Hill, 2010.
13. Vaish, M. C. Macro Economic Theory. Vikas Publishing House, 2009.
14. Wetherly, Paul and Dorron Otter. The Business Environment: Themes and Issues in a Globalizing World. OUP Oxford, 2014.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Indian Economy and Business environment: Nature and scope, Structure of the Business Environment- Internal and external environment Political and legal environment: Overview, philosophies, political system, judiciary Constitution of India Economic environment: Overview, Nature of Indian economy, Features of Indian economy, Changes in recent times Socio-cultural environment: Socio-cultural factors affecting business	7	15
II	Globalization and Indian business environment: Meaning and implications, phases, Globalization impact on Indian economy across sectors, Modes of entry strategies India's foreign trade policies: Recent developments, Global outsourcing, MNCs and FDIs in retail, infrastructure, pharma, insurance, banking & finance, and automobile; Impact of WTO on India's foreign trade Technological environment: Technology and development, Integrating technology with business, India and global knowledge market	8	15
	First Internal Examination		
III	International Business Environment: Review of global economy, The global recession, Business environment in developed and developing countries International trade theories GATT and WTO: Agreements and implications International cultural aspects: Values and norms, religion and ethics, language, education, impact of cultural differences in business	6	15
IV	Measuring the economy: Basic economic concepts, Open and closed economies, Primary, secondary and tertiary sectors and their contribution to the economy, SWOT analysis of the Indian economy, Measuring GDP and GDP growth rate, Components of GDP Business Cycle: Features, Phases, Economic time series, Economic indicators, Correlation, persistence, coherence Inflation: Types, Measurement, Kinds of price indices Employment and unemployment rates: Measurement National income: Estimates, Trends, Measurement, Problems in measuring National income	8	20
	Second Internal Examination		

IV	Industrial policies and structure: Leontief's inter-industry analysis, Planning, Problems in industrial development during the plan period, classification of industries based on ownership, Industrial policies, Industrial strategy for the future, New industrial policy 1991 Structure of Indian Industry: Public and private sector enterprises, Objectives of PSUs, Performance and short-comings, Private sector - growth, problems and prospects, SSI - Role of Indian economy, Disinvestments in Indian public sector units since 1991 Industry analysis: Textiles, Electronics, Automobile, FMCG, Telecom and Pharma sectors	7	15
V	Economic Policies: Privatization-problems and prospects Fiscal policy: Objectives, instruments, Union budget, Reforms-Rajah Chelliah Committee Recommendations, Taxes, Role of Government Monetary Policy: Money, Measures of money supply, Monetary system in India, Monetary policy -Tools for credit control, Structure of the banking system, RBI and its functions, Banking structure reforms - Narasimham Committee recommendations	8	20
	Trimester Examination		

Course No	Course Name	L-T-P	Credits	Year of Introduction
23	Marketing Management I	4-0-0	3	2015

Course Objectives

The objective of this course is to equip the students with the concepts and practices of modern marketing and to provide the understanding of different marketing processes for an effective decision making. The course also aims to develop the students' skills in applying the analytic perspectives, decision tools, and concepts of marketing to decisions involving segmentation, targeting and positioning; product offering; pricing; distribution channels and marketing communications

Syllabus

Introduction to Marketing Management, Marketing environment, Strategic Marketing Planning, Consumer Behaviour, Segmenting ,Targeting, Positioning and Branding, Life cycle Strategies, Product Decisions, Pricing Decisions.

Expected Outcome

On completion of the course, the students are expected to be familiar with the basic concepts and components of the marketing management and to be knowledgeable in marketing principles and thus enable them to make marketing decisions.

References

1. Arunkumar and NMeenakshi. *MarketingManagement.*Vikas Publishing, 2011.
2. Etzel,MJ, BJWalker andWilliam J Stanton. *Marketing (Fourteenth Edition).*McGraw Hill, 2007.
3. Evans, Joel R and Barry Berman. *Marketing in the 21st Century.*Cengage Learning, 2010.
4. Karunakaran, K.*MarketingManagement (Text and Cases)*. Himalaya Publishing House, 2010.
5. Kotler, Philip, et al. *MarketingManagement: A South Asian Perspective.* Pearson, 2012.
6. Lamb, CharlesW, et al. *Marketing.* Cengage Learning India, 2012.
7. Masterson, Rosalind and David Pickton. *Marketing: An Introduction.* Sage Publications, 2014.
8. Neelamegham, S.*Marketing in India: Text and Cases (4/e).* Vikas Publishing House, 2012.
9. Panda, TapanK.*MarketingManagement: Text and Cases Indian Context.* Excel Books India, 2009.
10. Pride, William M and OC Ferrel. *Marketing: Planning, Implementation and Control.* Cengage Learning, 2011.
11. Ramaswamy, VS and S Namakumari. *MarketingManagement: Global Perspective, Indian Context.* Maxmillan Publishers, 2009.
12. Saxena, Rajan. *MarketingManagement (Fourth Edition).*TataMcGraw Hill, 209.
13. Shahajan, S. *Applied Case Studies inMarketing.* Primus Books, 2011.

Course Plan – MARKETING MANAGEMENT - I

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Concept - nature and scope of marketing - evolution - Marketing vs selling concept – Consumer need, want and demand concepts Marketing environment: Micro and macro environment of marketing – marketing challenges in the globalized economic scenario	8	20
II	Consumer Behaviour: Consumer and business markets – buying motives – stages involved in buying decision process - factors influencing buying decision – types of consumer buying decisions – organizational buying vs household buying – changing pattern of consumer behavior	6	15
	FIRST INTERNAL EXAMINATION		
III	Market segmentation, targeting, positioning and branding. Segmentation – Meaning, factors influencing segmentation, market aggregation, basis for segmentation, segmentation of consumer and industrial markets.	8	25
	Targeting – Meaning, basis for identifying target consumers, target market strategies. Positioning – Meaning, Product differentiation strategies, tasks involved in positioning Branding – Concepts of branding, brand types, brand equity, branding strategies	8	10
	SECOND INTERNAL EXAMINATION		
IV	Marketing decisions, Product Decisions: Concept of product - product line and product mix - new product development- diffusion process - Product Lifecycle – product mix strategies, merchandise planning and strategies - product vs strategies	8	10
V	Pricing Decisions: - Pricing concepts, factors influencing price decisions - pricing strategies: value based, cost based, market based, new Packaging / Labeling: Packaging as a marketing tool, role of labeling in packaging product pricing - Price skimming & penetration pricing	**7**	20
	TRIMESTER EXAMINATION	**45**	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
24	Operations Management	4-0-0	3	2015

Course Objectives

This subject aims to impart to the students:

- *Ability to analyze the manufacturing operations of a firm*
- *Learn to understand and apply sales and operations planning, MRP and lean manufacturing concepts*
- *Deeper understanding on quality management tools for process improvement*

Syllabus

Scope of Operations Management, Evolution of OM, productivity Management, Forecasting - features of good forecast - classification of forecasting techniques, inventory management, Capacity Planning, Design capacity and Effective capacity, Location Planning, World Class Manufacturing Concepts, MRP, MRP II, quality concepts.

Expected Outcome

After the successful completion of the course the students will have the ability to analyze manufacturing operations of a firm, understand and apply sales and operations planning, understand supply chain operations and the basic understanding on process improvement techniques.

References

1. Adam, Everette E and Ronald J Ebert. *Production and Operations Management: Concepts, Models, and Behavior.* PHI, 2010.
2. Aswathappa, K and Sridhara Bhat. *Production and Operations Management.* Himalaya Publishing House, 2010.
3. Bozarth, Cecil. *Introduction to Operations and Supply Chain Management (3/e).* Pearson, 2011.
4. Chase, Richard B. *Operations Management for Competitive Advantage.* Tata McGraw Hill, 2004.
5. Chunawala, S A. *Basics of Production and Operations Management.* Himalaya Publishing House, 2001.
6. Finch, Byron J. *Operations Now: Supply Chain Profitability and Performance.* McGraw Hill, 2007.
7. Gaither, Norman G and Greg Frazier. *Operations Management.* Cengage Learning, 2002.
8. Garg, Ajay K. *Production and Operations Management.* Tata McGraw Hill, 2012.
9. Hill, Terry. *Operations Management.* Palgrave Macmillan, 2006.
10. Kachru, Upendra. *Production and Operations Management.* Excel Books, 2007.
11. Mahadevan, B. *Operations Management: Theory and Practice.* Pearson Education India, 2010.
12. Russell, Robert S and Bernard W Taylor. Operations Management: Along the Supply Chain (6/e). Wiley India, 2009.
13. Stevenson, William J. *Operations Management.* McGraw Hill, 2011.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Operations Management: Production-systems concept, transformation process, difference between products and services, 5P's and 9M's of OM, Operations as service. Evolution of OM - Craft, Mass and Lean Production. Operations strategy: Operations strategy in manufacturing, Operations strategy in services Process Analysis: Process Flowcharting, Types of process, process performance metrics	7	20
II	Employee productivity: Productivity and the organization, variables affecting labour productivity, Capacity- capacity utilization Work study-Method study-work measurement techniques Quality: Total Quality Management Defined Malcolm Baldrige National Quality Award, Quality Specifications, Costs of Quality, Continuous Improvement, SPC Tools, Benchmarking, Fail-safing ISO 9000, six sigma-Mumbai Dabbawallas	8	15
	First Internal Examination		
III	Materials management-Stores management, maintenance management, Inventory management, types of inventory, classification - ABC analysis, VED analysis, FSN analysis, HML analysis, Inventory costs, inventory models - EOQ, safety stocks, Re-order point, Problems in Basic EOQ model.	9	15
IV	Managerial use of Break-even analysis and make or buy Decisions Facility planning and plant layout, cellular manufacturing Supply Chain strategy: Elements of supply chain - Measuring supply chain performance, bull whip effect, outsourcing, mass customisation	6	15
	Second Internal Examination		
V	Master Production Scheduling (MPS), Materials Requirement Planning (MRP), Manufacturing Resource Planning (MRP II), Rough Cut Capacity Planning (RCCP), ERP. Contributions of Japanese Manufacturing - Kanban, Kaizen, Poka Yoke, JIT, 5S - TPS - Lean Manufacturing	8	20
V	World Class Manufacturing: Principles of WCM- Computer Integrated Manufacturing, Flexible Manufacturing Systems, Group Technology and Cellular Manufacturing, Quick Response manufacturing, concurrent engineering	7	15
	Trimester Examination		

Course No	Course Name	L-T-P	Credits	Year of Introduction
25	Financial Management I	4-0-0	3	2015

Course Objectives

The objectives of this course are to familiarise with fundamentals of financial management in an organization, Time value of money, risk Management, various sources of financing business investment, cost of capital and investment decisions

Syllabus

Introduction, meaning and goals, concept of time value, risk & return, various sources of financing business investments, concepts of cost of capital and criteria for investment decisions

Expected Outcome

The course expects that the students will become proficient in the following areas of financial Management

- Basic functions and goals of financial management
- Risk & return of projects
- Sources of finance
- Investment decision making criteria

References

1. Brealey, Richard A and Stewart C Myers. *Principles of Corporate Finance.* McGraw Hill India, 2012.
2. Brigham, Eugene F and Joel F Houston. *Fundamentals of Financial Management (13/e).* Cengage Learning, 2012.
3. Chandra, Prasanna *Financial Management, Theory & Practice.* Tata McGraw Hill, 2014.
4. Damodaran, Aswath. *Corporate Finance: Theory and Practice (4/e).* Wiley India, 2012.
5. Gitman, Lawrence J and Chad J Zutter. *Principles of Managerial Finance (14/e).* Pearson Education, 2007.
6. Kapil, Sheeba. *Financial Management.* Pearson Education India, 2010.
7. Khan, M Y and P K Jain. *Financial Management: text, problems and cases.* New Delhi: Tata Mc-Graw Hill, 2013
8. Kishore, Ravi M. *Financial Management: Comprehensive Text Book with Case Studies (7/e).* Taxmann Allied Services, 2009.
9. Kothari, Rajesh and Bobby Dutta. *Contemporary Financial Management.* Mcmillan Publishers, India, 2005.
10. Pandey, IM. *Financial Management.* Vikas Publishing House, 2009.
11. Reddy, G Sudarsana. *Financial Management.* Himalaya Publishing House, 2011.
12. Ross, Stephen, Randolf Westerfield and Bradford Jordan. *Fundamentals of Corporate Finance,* McGraw Hill, 2010.
13. Sharan, Vyuptakesh. *Fundamentals of Financial Management.* Pearson Education, 2012.
14. Srivastava, Rajiv and Anil Misra. *Financial Management.* Oxford University Press India, 2011.
15. Vanhome, James C. *Financial Management and Policy (12/e).* Pearson Education, 2002.
16. Vanhorne, James C and John M Wachowicz (Jr). *Fundamentals of Financial Management, (13/e).*Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester exams
1	Business Finance: Meaning and scope - objectives of financial management - Financial goal - profit maximization and wealth maximization - finance functions – role of finance manager - interface of financial management with other functional areas	6	15%
2	Concept of value and return - Time Value of money: Future value of single cash flow & annuity, present value of a single cash flow, annuity & perpetuity, Simple interest & compound interest, capital recovery & loan amortization Risk & Risk management, Definition, Computation, Types of risk, Beta , Computation of beta, Application of Beta	9	20%
First Internal Examination			
3	Sources of Finance - Primary market, Secondary market - long term, short term, and medium term funds – equity shares - preference shares - debentures and bonds - retained earnings - institutional borrowings - public deposits- lease financing - venture capital investing – commercial paper -Warrants - Angel investing - Private equity, Warrants and convertibles	6	15%
4	Cost of capital: Basic concepts - Cost of debenture capital, cost of preferential capital, cost of term loans, cost of equity capital (Dividend discounting and CAPM model), Cost of retained earnings, methods of computing cost of capital - Weighted average cost of capital (WACC) and Marginal cost of capital.	9	15%
Second Internal Examination			
5	Nature and types of investment decisions - capital budgeting process - selection of projects - estimation of cash flows - investment evaluation techniques - payback and discounted payback period - accounting rate of return NPV - IRR - capital rationing - project selection under rationing Capital Budgeting decisions under risk	15	35%
Trimester Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
26	Business Law	4-0-0	3	2015

Course Objectives

This subject provides an analysis of substantive law relevant to business. Topics include contracts, agency arrangements, credit transactions, and the relationship between the firm and its competitors, stockholders, customers, and other groups. The current legal scenario enveloping the Labour Laws, IPR, IT Act, Mergers & Acquisition, Arbitration & Conciliation Act etc. along with exploration of the judicial process and the current legal environment are examined. Throughout the subject emphasis is placed on the primary sources of law - cases and statutes

Syllabus

Sources of law, classification of law, mercantile law, legal procedures, features of contract, company law, negotiable instrument act, consumer protection act, Cyber laws and IPR laws, industrial laws.

Expected Outcome

After the successful completion of the course, the students will have the knowledge of law relevant to business contracts and also provide an insight to the issues associated with glob-alization, diversity, internet, intellectual property rights, limited liability business structures, company laws, negotiable instruments, to name a few areas which is undergoing tremendous changes in commercial laws

References

1. Bare Acts. *Government or Private Publications,* n.d.
2. Gulshan, S S and G K Kapoor. *Business Law Including Company Law (12/e).* New Age International, n.d.
3. Kapoor, N D. *Elements of Mercantile Law.* Sultan Chand & Sons, 2014.
4. Ramaiya. A Ramaiya. *Guide to the Companiees Act (18/e).* Lexis Nexis, 2014.
5. Sen, Arun Kumar and Jitendra Kumar Mitra. *Commercial Law (including company law) and Industrial Law.* World Press, 1977.
6. Wadhwa, Anirudh. Mulla: *Indian Contract Act (13/e).* Lexis Nexis, 2011.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Sources of law - classification of law	2	5
II	Indian Contract Act 1872: Definition (Sec 2); Essential elements of a contract - offer, acceptance, considerations; Competency to enter in contracts (Sec 11 & 12); Consent - free consent, coercion, undue influence, fraud, misrepresentation, mistake (Sec 13-23); Legality of object & consideration; Types of contracts; Performance of contracts; Void agreement (Sec 24-30); Quasi contracts, discharges of contracts; Consequences of breach of contract (Sec 73-75) Bailment (S.148 - S.171 & S.180 & S.181) Pledge (S.173 - S.179) Indemnity & Guarantee (S.124, 125 128 - 147) Distinguish Indemnity & Guarantee Laws 0f Agency	8	20
III	Sale of Goods Act (1930)Â (Sec 2 - 11) Conditions and warranties; (Sec12 - 17, 59) Rights of an unpaid seller. (S.45 - S.58) Title to goods - (S.27 - 30) Rights & Duties of Buyer & Seller; (S.31 - 44)	6	10
	First Internal Examination		
III	The Companies Act 2013 Meaning, Definition & Characteristics of a company; Company distinguished from partnership; Kinds of companies; Types of Companies, Formation-S.3, Promoter, Remuneration, Rights & Liabilities of a Promoter, Memorandum of Association (S.4,S.10, S.13), Form, Purpose, Clauses, Alteration. Articles ofAssociation (S.5, S.10, S.14,) Provisions for Membership, Share capital etc., Contents, Form, Purpose, Clauses, Alteration, Procedure & Restrictions for Alteration, Distinction Between Memorandum & Articles Incorporation (S.7, S.9, S.12), Advantages & Disadvantages Prospectus - Public Offer S.25 - S.27, S.30 - S.40; Private Offer S.42. Kinds of shares S.43 44, Meetings & proceedings; S.173 -S.195 Directors S. 149 - 152, 164, 165. Boards powers and restrictions; S. 179, 180. Accounts & audit S.128 - 148. Lifting of Corporate Veil. Doctrine of Ultra Vires, Doctrine of Indoor management, Prevention of oppression &mismanagement S.241 Winding up of companies - Modes S.270, 271, 304. C.S.R. Meaning & Scope S.135. Mergers & Acquisitions - Meaning & Definition	10	30
IV	The Indian Partnership Act 1932 The Limited Liability Partnership Act 2008 Sole Proprietorship	6	10
	Second Internal Examination		

V	Consumer Protection Act 1986: Definitions, consumer dispute, deficiency, goods manufacturer, restrictive trade practices, service, unfair trade practices; Central Consumer Protection Council, State Consumer Protection Council; Consumer Redressal Forum.	4	5
	Negotiable Instruments Act 1881 Meaning and characteristics of negotiable instrument; Presumption; Promissory Notes, Bills of Exchange & Cheques; Negotiation (Sec 46 to 60); Crossing of cheque & dishonour of cheque (Sec 138 to 142)	4	5
	Law of Intellectual Property Rights - An Overview The Copy Rights Amendment Act 2012 The Trademarks Amendment Act 2010 The Designs Act 2000 The Patents Amendment Act 2005 The Information Technology Act	4	10
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
27	Soft Skills II	0-2-0	-	2015

Course Objectives

The objective of this course is to enable students to understand what 'personality' means, understand the different kinds of personalities, to develop public speaking skills, time management and team work to prepare for the corporate life while getting the grip on basics of emotional intelligence for applying all throughout one's life

Syllabus

Personality, Self-motivation, time management, team work, emotional intelligence

Expected Outcome

1. *Enhancement of the holistic development of students and improvement of their employability skills.*
2. *To develop emotional intelligence*
3. *To develop professionals with idealistic, practical and moral values.*
4. *To develop time management skills*
5. *To get over the fear of public speaking*

References

1. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
2. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata Mc Graw Hill.
3. The Emotionally Intelligent Manager - David R. Caruso, Peter Salovey

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Definition of Personality - Determinants of Personality - biological, psychological and socio- cultural factors - Misconceptions and clarifications - Need for personality development	4	2
II	Time Management - definition - importance - functions Using to-do lists - procrastination - delegating effectively	4	6
III	Concept of team in work situation, promotion of team spirit, characteristics of team player - Awareness of one's own leadership style, performance and qualities	4	10
IV	Emotional Intelligence : what it means - role and benefit - awareness of emotions in self and others - and management of emotions in ourselves and in others (Use of EI tests to assess)	4	10
V	Public Speaking - Prepared Speech by students for 5 minutes	6	12

MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 3

April 2016

Subjects and Credits in Trimester 3

Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam duration (Hrs.)	Credits
31	Marketing Management II	4-0-0	40	60	3	3
32	Financial Management II	4-0-0	40	60	3	3
33	Human Resource Management	4-0-0	40	60	3	3
34	Business Research Methods	2-0-0	20	30	1.5	1.5
35	Management Information Systems	2-0-0	20	30	1.5	1.5
36	Operations Research	4-0-0	40	60	3	3
37	Strategic Management	4-0-0	40	60	3	3
38	Soft-Skills III	0-2-0	-	60	-	3
39	Project	0-0-3	-	-	-	-
	Total	24-2-3	240	420	-	21

Course No	Course Name	L-T-P	Credits	Year of Introduction
31	Marketing Management - II	4-0-0	3	2016

Course Objectives

The objective of this course is to equip the students with the concepts of Planning, designing and implementing marketing strategy to achieve the long-term objectives have been critical for any firm in a competitive market situation. This course seeks to develop the different analytical perspectives and management decision tools.

Syllabus

Promotion and Distribution Decisions, Marketing communications, Marketing Research,, Creating Competitive Advantage, Services Marketing, Rural Marketing,
Emerging Trends in Marketing

Expected Outcome

On completion of the course, the students are expected to understand the importance and role of marketing in a global environment, to understand the scope and process of marketing, to know the process of designing effective marketing strategies and to understand how marketing mix decisions are made and managed over time.

References

1. Arunkumar and N Meenakshi. *Marketing Management.*Vikas Publishing, 2011.
2. Etzel,MJ, BJWalker and William J Stanton. *Marketing (Fourteenth Edition).*McGraw Hill, 2007.
3. Evans, Joel R and Barry Berman. Marketing in the 21st Century.Cengage Learning, 2010.
4. Karunakaran, K.Marketing Management (Text and Cases). Himalaya Publishing House, 2010.
5. Kotler, Philip, et al. Marketing Management: A South Asian Perspective. Pearson, 2012.
6. Lamb, CharlesW, et al. Marketing. Cengage Learning India, 2012.
7. Masterson, Rosalind and David Pickton. Marketing: An Introduction. Sage Publications, 2014.
8. Neelamegham, S.Marketing in India: Text and Cases (4/e). Vikas Publishing House, 2012.
9. Panda, TapanK.Marketing Management: Text and Cases Indian Context. Excel Books India, 2009.
10. Pride, William M and OC Ferrel. Marketing: Planning, Implementation and Control. Cengage Learning, 2011.
11. Ramaswamy, VS and S Namakumari. Marketing Management: Global Perspective, Indian Context.Maxmillan Publishers, 2009.
12. Saxena, Rajan. Marketing Management (Fourth Edition).TataMcGraw Hill, 209.
13. Shahajan, S. Applied *Case Studies in Marketing.* Primus Books, 2011.

Course Plan – MARKETING MANAGEMENT - II

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Distribution Decisions- distribution channels - physical distribution systems- channel intermediaries - channel management -wholesaling and retailing - retail marketing - multi level marketing (network marketing)-Direct marketing: Meaning, features, functions, basic concepts of e-commerce, e-business, e-marketing, m-commerce, m-marketing, E-networking	8	25
II	Promotion Decisions: Promotion mix -integrated marketing communication - advertising – sales promotion - personal selling - publicity - public relations- Marketing communication: Concept of communication mix, communication objectives, steps in developing effective communication. Stages in designing message Advertising: Advertising objectives, Advertising budget, advertising copy, AIDA model, advertising agency decision	7	10
	FIRST INTERNAL EXAMINATION		
III	Sales promotion: Sales promotion mix, kinds of promotion, tools and techniques of sales promotion, push-pull strategies of promotion Public Relations: Meaning, objectives, types, functions of PR Marketing Research: Marketing Information System and Research - demand estimation and sales forecasting. Creating Competitive Advantage: Competitor Analysis - competitive strategies - competitive positions – balancing customer and competition orientations	8	10
IV	Marketing organization: Concept of marketing organization, factors influencing size of the marketing organization, various types of marketing structures / organization Marketing control systems: Organizing marketing department - marketing control techniques - annual plan control - profitability control - strategic control-Marketing audit: Meaning, features of marketing audit, various components of marketing audit	7	25
	SECOND INTERNAL EXAMINATION		
V	Services Marketing - Meaning- characteristics of services and their marketing implications - strategies for service firms - managing service quality - managing productivity - managing product support services - marketing mix for service marketing. Rural Marketing - Meaning - current Indian rural market scenario - scope - difficulties - strategies to cope up- case studies	8	10
	Emerging trends in marketing: social marketing – digital marketing - green marketing - global marketing – marketing analytics - Current developments in Marketing, Ethics in Marketing	**7**	20
	TRIMESTER EXAMINATION	**45**	

Course No	Course Name	L-T-P	Credits	Year of Introduction
32	Financial Management 2	4-0-0	3	2016

Course Objectives

This course enables the students to familiarize with management and analysis of financial performance, capital structure planning, dividend policy, working capital management and some of the emerging areas in financial management.

Syllabus

The syllabus of the course includes financial performance, capital structure decisions, dividend policy, working capital management and some emerging areas in financial management.

Expected Outcome

This course will enable the students to have sound knowledge on performance analysis of firms, Capital Structure planning, dividend policy and Working capital management

References

1. Brealey, Richard A and Stewart CMyers. *Principles of Corporate Finance.* McGraw Hill India, 2012.
2. Brigham, Eugene F and Joel F Houston. Fundamentals of Financial Management (13/e). Cengage Learning, 2012.
3. Chandra, Prasanna Financial Management, Theory & Practice. Tata McGraw Hill, 2014.
4. Damodaran, Aswath. Corporate Finance: Theory and Practice (4/e). Wiley India, 2012.
5. Gitman, Lawrence J and Chad J Zutter. Principles of Managerial Finance (14/e). Pearson Education, 2007.
6. Kapil, Sheeba. Financial Management. Pearson Education India, 2010.
7. Khan, M Y and P K Jain. Financial Management: text, problems and cases. New Delhi: Tata Mc-Graw Hill, 2013
8. Kishore, Ravi M. Financial Management: Comprehensive Text Book with Case Studies (7/e). Taxmann Allied Services, 2009.
9. Kothari, Rajesh and Bobby Dutta. Contemporary Financial Management. McMillan Publishers, India, 2005.
10. Pandey, IM. Financial Management. Vikas Publishing House, 2009.
11. Reddy, G Sudarsana. Financial Management. Himalaya Publishing House, 2011.
12. Ross, Stephen, Randolf Westerfield and Bradford Jordan. Fundamentals of Corporate Finance, McGraw Hill, 2010.
13. Sharan, Vyuptakesh. Fundamentals of Financial Management. Pearson Education, 2012.
14. Srivastava, Rajiv and Anil Misra. Financial Management. Oxford University Press India, 2011.
15. Vanhome, James C. Financial Management and Policy (12/e). Pearson Education, 2002.
16. Vanhorne, James C and John M Wachowicz (Jr). *Fundamentals of Financial Management, (13/e).*Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester exams
I	Financial Performance Analysis: Trend analysis; Ratio analysis- liquidity ratios, leverage ratios, activity ratios, profitability ratios, , market capitalization ratios - Inter firm comparison - Common Size Statement – Comparative Statements and Trend Analysis.	9	20%
II	Capital structure planning - optimum capital structure - financial leverage, operating leverage and combined leverage -.	6	10%
First Internal Examination			
II	capital structure theories - net income approach - net operating income approach -Modigliani and Miller (MM) approach -traditional approach - Factors affecting Capital structure	7	15%
III	Dividend Policy - factors influencing dividend policy stable dividend policy-forms of dividend - cash dividend - bonus shares - stock split - buyback of shares – dividend policy and value of firms - models - Walter's model - Gordon's Model - MM Irrelevance Approach - the bird-in-the hand argument.	8	20 %
Second Internal Examination			
IV	Working capital management - concepts of working capital - issues in working capital management – operating cycle and determinants of working capital - estimation of working capital, Management of cash - management of the receivables, Inventory management - financing of working capital - trade credit - accrued expenses and deferred income - bank finance for working capital	9	20%
V	Emerging areas in Financial Management: Corporate restructuring, mergers and acquisition - Behavioural finance, and Financial engineering	6	15%
	Trimester Examination	45	

Course Objectives

This subject provides the key aspects of managing human resources in domestic and

Course No.	Course Name	L-T-P	Credits	Year of Introduction
33	Human Resource Management	4-0-0	3	2016

multi-national organizations, including a consideration of labour relations and diversity manage-ment issues. Topics include job analysis, planning, recruiting, selection, orientation, train-ing and development, performance appraisal, compensation and benefits, dispute resolution, and legal frameworks for both the non-union and union environments.

Syllabus

Evolution of HR, Definition- Meaning- objectives-differences between personnel management and HRM, Human Resource Acquisition, Analysis and Designing of Jobs, HR planning, Hu-man Resource Development, Compensation, Employee Relations

Expected Outcome

The students are expected to have critical skills required to manage human resources in a multitude of workplace environments. Students are expected to get basic knowledge about management of Human Resources and Industrial Relations.

References

1. Decenzo, David A and Stephen P Robbins. *Human Resource Management (11/e).* Wiley, 2013.
2. Dwivedi, R S. *A Text Book of Human Resource Management.* Vikas Publishing House, 2009.
3. Fisher, Cynthia D and Lyle F Schoenfeldt. *Human Resource Management (6/e).* Cengage Learning, 2006.
4. Gomex-Mejia, Luis R, David B Balkin and Robert L Cardy. *Managing Human Resources.* Person/Prentice Hall, 2009.
5. Kandula, Srinivas R. *Human Resource Management in Practice with 300 Models, Tech-niques and Tools.* PHI Learning, 2009.
6. Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* Cengage Learning, 2009.
7. lvancevich, John M. *Human Resource Management.* McGraw Hill, 2007.
8. Mamoria, C B and S V Gankar. *Personnel Management.* Himalaya Publishing House, 2009.
9. Pattanayak, Biswajeet. *Human Resource Management.* PHI Learning, 2005.
10. Rao, P Subha. *Essentials of Human Resource Management and Industrial Relations: (Text, Cases and Games).* Himalayan Books, 2011.
11. Rao, V S P. *Human Resource Management.* Excel Books, 2010.
12. Sanghi, Seema. *Human Resource Management.* Vikas Publishing, 2014.
13. Snell, Scott, George Bohlander and Veena Vohra. *Human Resource Management: A South Asian Perspective.* Cengage Learning India, 2010.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Evolution of HRM - Meaning and significance - differences between personnel management and HRM - Major functions of HRM - Line functions and staff functions - human capital management – Characteristics and qualities of HR Manager - Recent trends in HRM	6	10
II	Job Design, Work and Motivation - Job design and quality of work life, A conceptual model of job design, Job performance outcomes, Job analysis, Job designs: the result of job analysis. The way people perceive their jobs, Designing Job range: Job rotation and job Enlargement, Designing Job depth: Job enrichment and job design.	8	10
	First Internal Examination		
II	Pre-recruitment functions: Organizational structure - Analysis and Designing of Jobs - HR planning - Factors affecting HR Planning - HRP process - Requisites of a good HRP - Barriers to HRP Recruitment, selection and appointment: Meaning and significance of recruitment - Process of recruitment -Sources of recruitment - Cost-benefit analysis of recruitment - Process of selection - Difference between recruitment and selection - Selection techniques: tests, interviews and salary negotiation - Meaning and significance of appointment - Process of appointment - Induction and Placement.	12	20
III	Training and development: Meaning and significance of training and development - Process of training development - Training Need Analysis - Training Design – Training Implementation - Training evaluation - Methods of training: on-the-job and off-the-job methods	6	10
	Second Internal Examination		
IV	Performance Management: Meaning and significance of Performance Management - Types of performance appraisal system - Performance goal setting – Performance coaching and monitoring - Performance evaluation and performance feedback - Aligning performance outcome to career and succession planning Compensation and benefits: Meaning and significance - Components of Compensation - Factors affecting wages and salaries	7	10
V	Employee relations: Meaning and significance of employee relations - Employee relations in unionised and non-unionised organizations, participative management - Handling grievances, managing discipline, conducting domestic enquiry -	6	15
	Trimester Examination	45	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
34	Business Research Methods	2-0-0	1.5	2016

Course Objectives

The course objective is to familiarize the research methods used in decision making by managers. The subject aims to meet the challenge of the fast pace decision making environment, to provide the knowledge and skills a manager needs to solve business problems.

Syllabus

Introduction to Business Research, Definition - need for business research, types of research, formulating research hypothesis and research design, Sampling design, Research Variable-Identification and defining research problems, secondary and primary methods of data collection, Questionnaire construction, data analysis and drawing inferences

Expected Outcome

After the completion of the course, the students will be able to study business problems and find ways to solve them by collecting relevant data and analyzing it in the appropriate manner to reach valid and insightful results and conclusions. The students will become familiar with sampling methods, defining research hypotheses and testing them statistically.

References

1. Chawla, Deepak and Neena Sondhi. *Research Methodology: Concepts and Cases.* Vikas Publishing House, 2011.
2. Cooper, Donald R, Pamela S Schindler and J K Sharma. *Business Research Methods (11/e).* New Delhi: McGraw Hill Educaiton India, 2013.
3. Krishnaswamy, O R and M Ranganathan. *Methodology of Research in Social Sciences.* Himalaya Publishing House, 2011.
4. Levin, Richard I, et al. *Statistics for Management (7/e).* Pearson Education, 2012.
5. Malhotra, Naresh K. *Marketing Research: An Applied Orientation (6/e).* Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Business Research: Definition - need for business research - types of research - exploratory and conclusive - basic and applied research - qualitative research - general research process - identifying and defining research problem - literature survey - identification of key research variables - theoretical framework - formulating research hypothesis	5	20
II	Formulation of research design - sampling design – data collection and data editing - data analysis and interpretation - preparation of research report - research proposal framework - business research applications in marketing - human resource management - financial and accounting decisions - production and operations management - cross-functional areas - case studies	4	20
	First Internal Examination		
III	Measurement and scaling - concepts and operational definitions - nominal, ordinal, interval and ratio scales - comparative scales - paired comparison scales - rank order scaling - constant sum scaling - Q sort technique - non-comparative scales - Likert, Semantic Differential - Staple - criteria for good measurement - reliability - validity - sensitivity	3	20
IV	Data Collection: Sampling design - secondary and primary methods of data collection - probability and non-probability sampling methods - merits and demerits -Review of various sampling methods - determination of sample size - data collection and data editing - coding - categorization - handling unsatisfactory responses and missing values - questionnaire construction - type of questions - guidelines for questionnaire designing - questionnaire testing - other methods of data collection - observation - projective methods - goodness of fit of data -reliability and consistency - Cronbach's Alpha	5	20
	Second Internal Examination		
V	Data Analysis and Reporting: Data analysis – descriptive analysis of uni-variate and bi-variate data – parametric tests for hypotheses testing - z test - t test - ANOVA - introduction to MANOVA and ANCOVA; SEM - non-parametric tests for hypotheses testing - Chi-square - run test for randomness - one and two-sample sign tests - Mann-Whitney U test - Wilcoxon signed-rank test - Kruskal-Wallis test - Correlation and regression analysis - Multivariate analysis - dependency techniques: multiple regression - discriminant analysis - conjoint analysis inter-dependency techniques: Factor Analysis - Cluster Analysis	5	20
	Trimester Examination	22	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
35	Management Information Systems	2-0-0	1.5	2016

Course Objectives

The objective of this course is to acquaint the students with the role, functions and development of information systems at different levels of the organisation and to develop a broader understanding of the management and information technology systems.

Syllabus

Information systems, enterprise systems, types of information systems, E-business, decision making concepts, GDSS, Database concepts, DBMS, data warehousing, data mining, Cyber security, system development cycles.

Expected Outcome

On completion of this course, the students will have an understanding of systems thinking, and ability to analyse business situations from a systems perspective. They also get exposure to the various system concepts and terminologies.

References

1. Behl, Ramesh. *Information Technology for Management.* Tata McGraw Hill Education, 2009.
2. Laudon, Kenneth C and Jane P Laudon. *Management Information Systems: Managing the Digital Firm.* Pearson Education, 2013.
3. O'Brien, James and George Marakas. *Management Information Systems (10/e).* McGraw Hill, 2010.
4. Rainer, R Kelly, Brad Prince and Hugh J Watson. *Introduction to Information Systems (3/e).* Wiley, 2014.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	e-business- e-commerce- e-government e-Commerce models and strategies-Cases of successful e-Commerce companies Ethical and social issues with e-Commerce Impact of IT on business	5	20
II	Database concept, Advantages of DBMS, database types, Database models, data warehousing, data mining, data trends, Data Flow Diagram	4	20
	First Internal Examination		
III	Information Security and Control System Vulnerability-Wireless security challenges-Malwares-Cyber terrorism and Cyber crimes-Spoofing, phishing, sniffing, DOS attacks	4	20
IV	Ensuring wireless security, Encryption and public key infrastructure, Firewalls, Intrusion Detection systems and anti-virus software-Ensuring cloud security and mobile digital platform	4	20
	Second Internal Examination		
V	Enterprise Information systems-SCM, CRM, ERP. ERP-Benefits, Challenges, Trends, Big 5, ERP Implementation life cycle	4	20
	Trimester Examination	21	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
36	Operations Research	4-0-0	3	2016

Course Objectives

The objective of this course is to acquaint the students with the scope and applications of operations research in business and industry problems. This course exposes the students to the use of various scientific tools and models in OR for business analysis and better managerial decision making. Use of software in solving problems is expected.

Syllabus

Introduction, development of OR, Linear programming problems, Allocation models such as transportation, assignment, and travelling salesman problems, Decision theory, Game theory, queuing theory, project management and introduction to simulation.

Expected Outcome

The successful completion of this course will enable the students to generate mathematical models of business scenarios and to analyze the business situations. The students will become able to use different mathematical models and the solution procedures.

References

1. Hillier, F S, et al. *Introduction to Operations Research (9/e).* Tata McGraw Hill, 2011.
2. Ravindran, A and Don T Phillips. *Operations Research: Principles and Practice.* John Wiley & Sons, 1987.
3. Sharma, J K. *Operations Research: Theory and Applications (5/e).* New Delhi: Laxmi Publications, 2013.
4. Taha, Hamdy A. *Operations Research: An Introduction (9/e).* Prentice Hall, 2010.
5. Vohra, N D. *Quantitative Techniques for Management.* Tata McGraw Hill Education, 2015.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Operations Research: Origin and growth of OR, importance of OR in managerial decision making, scope & applications of OR, models and modelling in OR. Linear programming problems: Formulation of the problem, solution by graphical method & simplex algorithm, degeneracy in LPP. Case discussion	7	15
II	Allocation Problem models: Transportation problems: formulation, methods of finding initial solution (North West Corner Rule, Least Cost Method and Vogel's Approximation Method), test for optimality (MODI Method), unbalanced transportation problems, maximization transportation problem. Assignment problems: formulation, methods of solution, Hungarian method, multiple optimal solutions, unbalanced problems, maximization problems. Case analysis	8	20
	First Internal Examination		
III	Duality in LPP, revised simplex method, Sensitivity of optimal LP solutions, Integer programming problems, Gomory's cutting plane algorithm, introduction to branch and bound technique. Sequencing Problem: Johnson's Algorithm for *n* Jobs and Two machines, Two jobs and *m* - Machines Problems and *n* Jobs and *m* Machine problems.	6	10
IV	Decision theory: Concepts of decision making, decision making environments, Decision making under uncertainty - Decision making under risk, decision tree analysis. Case discussion. Dynamic Programming - Concepts, forward and backward recursion, solution to LPP by dynamic programming method.	9	20
	Second Internal Examination		
IV	Concepts of network analysis, project network models, Critical Path Method, PERT, project time-cost trade off, resource scheduling. Case discussion	5	10
V	Game Theory: Two person zero-sum game, saddle point games, principle of dominance, graphical solution. Replacement analysis: items that deteriorate over time, items that fail suddenly, optimum replacement policies for both cases. Stochastic models: Markov process, queuing model structure, Kendall Lee notation - M/M/1 queues - standard problems.	10	25
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
37	Strategic Management	4-0-0	3	2016

Course Objectives

- *Ability to recognize role and functions of Corporate board in strategic management*
- *Deeper understanding of the integrative nature of strategic management*
- *Learn to apply strategic planning models like Porter Model*
- *Understand the importance of environmental scanning in formulating strategy*
- *Identification and evaluation of the role of leadership, organizational structure and change-management in strategy-implementation*
- *Develop an integrated outlook on the role of accounting and finance, operations management and human resource management in developing strategy*

Syllabus

Basic concepts of strategic management, Concept of Strategy and the Strategy formation Pro-cess, Objectives and Goals - Corporate Governance and Social responsibility, Types of strate-gies, strategy formulation, Strategy Choic, Strategy review.

Expected Outcome

On completion of the course acquire the ability to generate and evaluate strategies in relation to a particular problem using real-world scenarios.

References

1. Hill, Charles W L and Gareth R Jones. *Strategic Management: An Integrated Approach.* Cengage Learning, 2012.
2. Kazmi, Azhar. *Strategic Management and Business Policy (3/e).* Tata McGraw Hill, 2008.
3. Parnell, John A. *Strategic Management: Theory and Practice.* SAGE Publications, 2013.
4. Wheelen, Thomas L and J David Hunger. *Strategic Management and Business Policy: Towards Global Sustainability.* Prentice Hall, 2012.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Basic concepts of strategic management - framework for strategic management, the Concept of Strategy and the Strategy formation Process - Stakeholders in business - vision, Mission and Purpose strategic management process - strategic management at the business level, functional level and corporate level - Constitution of Board – Role and functions of corporate board and top management in strategic management.	7	20
II	Objectives and Goals - Corporate Governance and Social responsibility Environmental Scanning- Analysing industry and competition - internal appraisal - External Environment - Porter's Five Forces Model-Strategic Groups Competitive Changes during Industry Evolution- Globalisation and Industry Structure - National Context and Competitive advantage Resources-Capabilities and competencies - core competencies-Low cost and differentiation Generic Building Blocks of Competitive Advantage- Distinctive Competencies Resources and Capabilities durability of competitive Advantage- Avoiding failures and sustaining competitive advantage concepts, techniques and cases.	8	20
	First Internal Examination		
III	Strategy formulation- Types of strategies - Integration, intensive, diversification, and defensive strategies - strategic analysis -The generic strategic alternatives - Stability, Expansion, Retrenchment and Combination strategies - Business level strategy- Strategy in the Global Environment– comparative cost analysis, portfolio analysis, operating and financial analysis. - Building and Re-structuring the corporation- Strategic analysis and choice - Environmental Threat and Opportunity Profile (ETOP) - Organizational Capability Profile - Strategic Advantage Profile - Corporate Portfolio Analysis - SWOT Analysis - GAP Analysis - Mc Kinsey's 7s Framework - GE 9 Cell Model - Distinctive competitiveness - Selection of matrix - Balance Score Card	10	20
IV	Strategy Choice-criteria and process-Routes for executing strategy. The implementation process, Designing organisational structure - Designing Strategic Control Systems, Resource allocation	5	10
	Second Internal Examination		
IV	Matching structure and control to strategy - Implementing Strategic change-Politics-Power and Conflict-Strategy implementation - Role of organizational structure, Culture and Leadership, Strategy and Social Responsibility.	5	10
V	Strategy review, evaluation and control- Auditing - Techniques of strategic evaluation & control-case study Matching structure and control to strategy-Using computers to evaluate strategies; Managing Technology and Innovation-Strategic issues for Non Profit organisations. New Business Models and strategies for Internet Economy	10	20
	Trimester Examination	45	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
38	Soft Skills III	0-2-0	3	2016

Course Objectives

The objective of this course is to enable students understand the importance communication in the corporate life via group discussions and live interviews. Be enabled to write technically adept resumes and cover letters. The course also aims to enable students to combat stress and manage and resolve possible conflicts.

Syllabus

Stress, Conflict management, Resume writing, Group Discussions, Interview skills

Expected Outcome

- *Enhancement of the holistic development of students and improvement of their employability skills.*
- *To develop strategies to manage stress*
- *To develop methods or perspectives to resolve conflicts*
- *To have hands-on group discussion and interview exposure in a simulated corporate environment*
- *To develop adept resume writing skills*

References

1. Bovee, Courtland, John Thill and Mukesh Chaturvedi. *Business Communication Today.* Pearson Education, 2009.
2. Monippally, Matthukutty M. *Business Communication Strategies.* Tata McGraw-Hill Pub-lishing Company Ltd. 2001

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Stress Management - Eustress and Distress - Causes of Stress - Impact of Stress -Managing Stress	4	2
II	Conflict - Goal Conflict - Cognitive Conflict - Intrapersonal and Interpersonal Conflict - Conflict resolution	4	6
III	Resume vs CV vs Biodata writing - Cover letter writing	2	6
IV	Group Discussion - Do's and Don'ts - Interview Skills - Giving and taking Interviews	4	6
V	Hands-on experience of Giving and Taking Interviews	8	10

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF LMCST COLLEGE COUNCIL MEETING		
Subject: Academic and Administrative Matters	Online Google Meet	
	Date**: 15-9-2021**	Time: 14:00 Hrs
Members Present		
1. Dr. P.P Mohanlal. (Principal) 2. Prof.Mohan S (HoD, CE) 3. Dr.Beshiba Wilson, HoD CSE 4. Dr. Retnakumari Amma, HoD, ASH 5. Dr.Johnson Y (HoD, EEE)	6. Prof. Selma Joseph (HoD, MCA) 7. Prof.Soorya (HoD, ECE) 8. Dr Syamnath HoD I/C, MBA 9. Prof Sajith Krishnan, ME Invitee	

Prof. Sajith Krishnan R., NBA Coordinator was the special invitee

Agenda of the program were as follows

- Preparation of contact classes for Final year students from 4th October ,2021
- KTU course class committee
- KTU NBA audit regarding

I. Preparation of contact classes for Final year students from 4th October, 2021

- Considering the number of students in each department, classes can be arranged., either as single batch or two batches
- Timing will be from 8:30 am to 4 pm
- Faculty has to come regularly to college from 4th Oct onwards.
- Faculties having online class should take class from the college
- More importance to Product development activities, startup needs to be focused
- To improve the result of final year students, special attention to be given on the backlog subjects in each department.
- Remedial classes to be arranged for the critical subjects and a special timetable has to be prepared for the same.
- A detailed plan to be presented by the HODs of each department based on the following aspects
  - ✓ How to improve the result of final year students
  - ✓ What methods adopted by the department to achieve the result
- Decided to provide **one hour exclusively for remedial class in the Time table**.
- For all pass students, they have to either undergo additional courses like NPTEL, MOOC or engage in Product Development Initiatives.

II. KTU course class committee

- Chairman for various course and class committees were finalized

III. KTU NBA audit

- Prof. Dr. Beshiba Wilson presented the requirements of NBA audit
- **Files required in Department are as follows (for last 3 years)**
  - ✓ Class Timetable with Tutorial to be published

- ✓ Internal Exam Question Paper must be approved by IQAC
- ✓ Innovating Teaching Methods to be adopted – subjects, faculty and course files are required
- ✓ Tutorial samples with log book is essential (a suggestion came to add Tutorial option in CMS)
- ✓ Student Faculty Ratio

- **Files required in Academics (for last 3 years)**
  - ✓ Course files
  - ✓ CO-PO, CO-PSO mapping
  - ✓ Add on courses-A committee to be formulated and they should design the course structure (for a duration of 30 hrs), minutes of the committee decision is required. Final assessment procedures like test to be conducted and certificated to be distributed, and the whole Summary.
  - ✓ Subject Group (academic groups for core areas in each branch) to be formulated and then identify the Curriculum Gap in each field.

- **Files required by Staff**
  - ✓ Research Funding
  - ✓ Journal Publications
  - ✓ IPR related activities (briefed by Prof. Dr. Johnson)
  - ✓ FDPs / Conferences attended / organized inside and outside
  - ✓ Awards/Honours
  - ✓ Activities conducted based on MoU
  - ✓ Students Roll list
  - ✓ KTU Result Analysis
  - ✓ Success data of passed out batch
  - ✓ Placement/ Higher studies details
  - ✓ Professional Society membership and related activities in each department to be encouraged (Each department should have altleast one professional society membership)
  - ✓ Staff Extension activities (decided to enhance extension activities on behalf of SADP as soon as the offline class starts)
  - ✓ Duties and Responsibilities of Staff
  - ✓ Yearly Department budget to be submitted to Principal

Other Matters:

- Department wise NCs, after second audit, was still pending for a few faculties and they were asked to clear all NCs urgently on or before 18th September 2021.Feedback form link provided in LMCST website to be filled and submitted by all the staffs.

Principal

IQAC LMCST <iqac@lmcst.ac.in>

Fwd: Academics- Syllabus and Minutes of of Curriculum Committee for MCA Bridge Course - approved - orders issued.

LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY Admin <lourdesmatha@ktu.edu.in> Mon, Jan 24, 2022 at 9:24 AM
To: iqac@lmcst.ac.in

---------- Forwarded message ---------
From: **asst academics1** <asstacademics1@ktu.edu.in>
Date: Tue, Nov 3, 2020 at 11:43 AM
Subject: Academics- Syllabus and Minutes of of Curriculum Committee for MCA Bridge Course - approved - orders issued.
To: ACE COLLEGE OF ENGINEERING Admin <ace@ktu.edu.in>, ADI SHANKARA INSTITUTE OF ENGG AND TECHNOLOGY Admin <adishankara@ktu.edu.in>, AHALIA SCHOOL OF ENGINEERING AND TECHNOLOGY Admin <ahalia@ktu.edu.in>, AL-AMEEN ENGINEERING COLLEGE, KULAPPULLY SHORANUR <alameen@ktu.edu.in>, AL AZHAR COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <alazhar@ktu.edu.in>, ALBERTIAN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <albertian@ktu.edu.in>, AMAL JYOTHI COLLEGE OF ENGINEERING Admin <amaljyothi@ktu.edu.in>, Dr.B Maruthu Kannan <[illegible]@ktu.edu.in>, ARCHANA COLLEGE OF ENGINEERING Admin <archana@ktu.edu.in>, ARYANET INSTITUTE OF TECHNOLOGY Admin <aryanet@ktu.edu.in>, AWH ENGINEERING COLLEGE Admin <awh@ktu.edu.in>, AXIS COLLEGE OF ENGINEERING & TECHNOLOGY Admin <axis@ktu.edu.in>, BASELIOS MATHEWS II COLLEGE OF ENGINEERING Admin <baseliousm2@ktu.edu.in>, BASELIOS THOMAS I CATHOLICOSE COLLEGE OF ENGG AND TECH Admin <baseliost1@ktu.edu.in>, BISHOP JEROME INSTITUTE Admin <bishopjerome@ktu.edu.in>, BELIEVERS CHURCH CAARMEL ENGINEERING COLLEGE Admin <believerschurch@ktu.edu.in>, CARMEL COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <carmel@ktu.edu.in>, CHRIST COLLEGE OF ENGINEERING Admin <christ@ktu.edu.in>, CHRIST KNOWLEDGE CITY Admin <christcity@ktu.edu.in>, COCHIN COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <cochincet@ktu.edu.in>, COCHIN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <cochinist@ktu.edu.in>, COLLEGE OF ENGINEERING ARANMULA Admin <cearanmula@ktu.edu.in>, COLLEGE OF ENGINEERING POONJAR Admin <cepoonjar@ktu.edu.in>, COLLEGE OF ENGINEERING ATTINGAL Admin <ceattingal@ktu.edu.in>, COLLEGE OF ENGINEERING AND MANAGEMENT, PUNNAPRA Admin <cepunnapra@ktu.edu.in>, COLLEGE OF ENGINEERING & TECHNOLOGY-PAYYANUR Admin <cepayyannur@ktu.edu.in>, COLLEGE OF ENGINEERING ADOOR Admin <ceadoor@ktu.edu.in>, COLLEGE OF ENGINEERING CHENGANNUR Admin <cechengannur@ktu.edu.in>, COLLEGE OF ENGINEERING CHERTHALA Admin <cecherthala@ktu.edu.in>, COLLEGE OF ENGINEERING KALLOOPPARA Admin <cekallooppara@ktu.edu.in>, COLLEGE OF ENGINEERING KARUNAGAPPALLY Admin <cekarunagappally@ktu.edu.in>, COLLEGE OF ENGINEERING KIDANGOOR Admin <cekidangoor@ktu.edu.in>, COLLEGE OF ENGINEERING KOTTARAKARA Admin <cekottarakara@ktu.edu.in>, COLLEGE OF ENGINEERING MUNNAR Admin <cemunnar@ktu.edu.in>, COLLEGE OF ENGINEERING PATHANAPURAM Admin <cepathanapuram@ktu.edu.in>, COLLEGE OF ENGINEERING PERUMON Admin <ceperumon@ktu.edu.in>, COLLEGE OF ENGINEERING THALASSERY Admin <cethalassery@ktu.edu.in>, COLLEGE OF ENGINEERING TRIKARIPUR Admin <cetrikaripur@ktu.edu.in>, COLLEGE OF ENGINEERING TRIVANDRUM Admin <cet@ktu.edu.in>, COLLEGE OF ENGINEERING VADAKARA Admin <cevadakara@ktu.edu.in>, ER&DCI INSTITUTE OF TECHNOLOGY Admin <erdci@ktu.edu.in>, ERANAD KNOWLEDGE CITY TECHNICAL CAMPUS Admin <eranad@ktu.edu.in>, Federal Institute of Science And Technology (FISAT) Admin <fisat@ktu.edu.in>, FOCUS INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <focus@ktu.edu.in>, GOVERNMENT ENGINEERING COLLEGE SREEKRISHNAPURAM Admin <gecpalakkad@ktu.edu.in>, Govt. Engineering College, Barton Hill Admin <gecbartonhill@ktu.edu.in>, Government Engineering College Idukki Admin <gecidukki@ktu.edu.in>, GOVERNMENT COLLEGE OF ENGINEERING KANNUR KTU-Admin <geckannur@ktu.edu.in>, Govememnt Engineering College Kozhikode Admin <geccalicut@ktu.edu.in>, Government Engineering College, Thrissur Admin <gecthrissur@ktu.edu.in>, Government Engineering College Wayanad Admin <gecwayanad@ktu.edu.in>, GURUDEVA INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <gurudeva@ktu.edu.in>, HEERA COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <heera@ktu.edu.in>, Hindustan College of Engineering Admin <hindustan@ktu.edu.in>, Holy Grace Academy of Engineering Admin <holygrace@ktu.edu.in>, HOLY KINGS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <holykings@ktu.edu.in>, IES COLLEGE OF ENGINEERING Admin <ies@ktu.edu.in>, ILAHIA COLLEGE OF ENGINEERING & TECHNOLOGY Admin <ilahiacet@ktu.edu.in>, ILAHIA SCHOOL OF SCIENCE AND TECHNOLOGY Admin <ilahiaschool@ktu.edu.in>, Principal ILMCET <ilm@ktu.edu.in>, Indira Gandhi Institute of Engineering and Technology Women Admin <[illegible]@ktu.edu.in>,

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Please see the attachment.

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MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 1

April 2016

Subjects and credits in TRIMESTER I

Exam Slot	Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam Duration (hours)	Credits
	11	Quantitative Techniques	4-0-0	40	60	3	3
	12	Organizational Behaviour I	4-0-0	40	60	3	3
	13	Managerial Economics	4-0-0	40	60	3	3
	14	Business Communication	4-0-0	40	60	3	3
	15	Accounting for Managers	4-0-0	40	60	3	3
	16	Business and Society	4-0-0	40	60	3	3
	17	Soft-skills I	0-2-0	20			
	18	Project	0-0-3				
		TOTAL	24-2-3	260	360		18

FIRST TRIMESTER - SYLLABUS

Course No.	Course Name	L-T-P	Credits	Year of Introduction
11	Quantitative Techniques	4-0-0	3	2015

Course Objectives

This subject introduces the methods of statistical analysis for managerial decision making. The subject will provide a concise review of probability, descriptive statistics, random variables, and probability distributions. Application topics include statistical decision theory, confidence intervals, hypothesis testing, simple and multiple regression, correlation analysis and analysis of variance.

Syllabus

Random variables, Descriptive Statistic, Probability Distributions and Estimation, Testing of Hypothesis, Correlation and Regression Analysis

Expected Outcome

The successful completion of this course will impart the basic data analysis skills to the students. This will enable students to model business problems and analyse them with the help of fundamental statistical and theoretical backgrounds.

References

1. Richard I. Levin, David S. Rubin, *Statistics for Management*, Pearson Education, New Delhi 7th Edition, 2011.
2. Aczel A.D. and Sounderpandian J., *Complete Business Statistics*, 6th edition, Tata McGraw – Hill Publishing Company Ltd., New Delhi, 2012.
3. Ken Black, *Applied Business Statistics*, 7th Edition, Wiley India Edition, New Delhi, 2012.
4. Anderson D.R., Sweeney D.J. and Williams T.A., *Statistics for Business and Economics*, 11th edition, Thomson (South – Western) Asia, Singapore, 2012.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	*Random variables:* Random experiment – outcomes - sample space and events - definitions of probability (classical, relative frequency, subjective, and axiomatic) - addition rule - conditional probability - multiplication theorem – Bayes' theorem	9	15
II	*Descriptive Statistics:* Data presentation using tables & charts - measures of central tendency - measures of dispersion – absolute & relative measures – skewness - Karl Pearson's and moment measures of Skewness – Kurtosis	6	15
	First Internal Examination		
III	*Probability Distributions and Estimation:* Discrete and continuous distributions - Binomial, Poisson & Normal distributions - sampling techniques - sampling distribution of means and proportions - central limit theorem – statistical inferences - estimation - point and interval estimates for population parameters of large and small samples – confidence interval - determining the sample size.	8	15
IV	*Testing of Hypothesis:* Null & Alternative Hypotheses - level of significance - Type I & Type II errors - small sample & large sample tests - tests for quantitative & qualitative data - Hypothesis tests for difference of means & proportions for large & small samples.	7	15
	Second Internal Examination		
IV	One way & two way ANOVA for testing the difference of means of more than two samples – chi-square test for several proportions, association of attributes – goodness of fit test.	6	15
V	*Correlation and Regression Analysis:* Correlation - different types of correlation – Karl Pearson's correlation coefficient - Spearman's Rank correlation coefficient – concurrent deviation method – coefficient of determination - regression analysis - line of best fit - least square method - business applications - multiple regression. Use of statistical packages in hypothesis testing, correlation and regression analysis	9	25
	Final Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
12	Organizational Behaviour I	4-0-0	3	2015

Course Objectives

The course focuses on managing individuals at work. The objective is to equip the students with an essential knowledge base on behavioural dynamics of individuals with necessary models,, tools, and techniques, for diagnosing, predicting and controlling human behaviour and to develop the basic human relations skills as a prospective manager.

Syllabus

Fundamentals of Organizational Behaviour, Understanding Organizational Behaviour, Effectiveness in organizations, Social systems and organizational culture, Understanding and Managing Individual Behaviour, Job Design, Work and Motivation, Evaluation, Feedback and Rewards, Stress and Counselling.

Expected Outcome

On completion of the course, the students are expected to enable the students to learn what actions are appropriate for different situations and apply the theory in order to be effective leaders in the context of organisational behaviour theories, models and concepts

References

1. Robbins, Judge & Sanghi, *Organizational Behaviour,* 12th Ed. Prentice Hall India
2. McShane, Glinow, *Organizational Behaviour*, Tata McGraw Hill
3. Don Hellriegel; John W. Slocum; Richard W. Woodman, *Organizational Behavior*, 8th Ed., Thomson South-Western

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	Disciplines contributing to OB - Psychology, Sociology, Anthropology, Social Psychology, Economics & Political Science Approaches to the study of OB - Human Resource Approach, Contingency Approach, Productivity Approach, and System Approach - Fundamental principles, theories and concepts in organization design and development	9	20
II	Understanding Organizational Behaviour - Fundamental Concepts, Organizational processes, Organizational structure, Organizational Change and Innovation processes - Effectiveness in organizations - Models of Organizational Behaviour, Systems theory and time dimension of effectiveness, Developing competencies, Limitations of Organizational Behaviour, Continuing challenges	6	15
First Internal Examination			
III	Individual differences and work behaviour - Why individual differences are important, The basis for understanding Work Behaviour, Individual differences influencing Work Behaviour. Personality - Sources of personality differences, Personality structure, Personality and Behaviour, Measuring Personality Attitudes - The nature of Employee Attitudes, Effects of Employee Attitudes, Studying Job satisfaction, Changing Employee Attitudes. Perceptions, Attributions and Emotions - The perceptual process, Perceptual grouping, Impression management, Emotions, Emotional Intelligence - Motivation - Concept of Motivation, Content approaches, Process approaches, Motivation and psychological contract	15	30
IV	Managing Individuals at Work: Measuring personality attitudes; managing employee attitudes Managing Teams at Work: Definition of Group - group development- group structure - teams -Formal Organization and Informal Groups and their interaction	5	10
Second Internal Examination			
IV	Developing high performance teams - turning individuals into team players developing interpersonal awareness - Johari Window- Transactional Analysis - leadership - theories – developing leadership skills	4	10
V	Managing Power, Politics and Conflict: Power - basis of power - power tactics - Politics – consequences of political behavior - Conflict Management: Different views of conflict - conflict process - levels of conflict - Constructive and Destructive conflict - Conflict process - strategies for encouraging constructive conflict - Conflict resolution strategies	6	15
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
13	Managerial Economics	4-0-0	3	2015

Course Objectives

Managerial economics is a prerequisite course for acquainting students with the various principles of business decision making. This subject provides an introduction to the logic of marginal analysis, the analysis and application of demand, cost analysis, and elements of demand and supply. The subject also provides an introduction to the determination of aggregate income and employment with an analysis of fiscal and monetary policy. Policy issues relating to overall aggregate demand management will be discussed. It will create awareness on the micro and macroeconomic environment and will help to increase decision making skills of the graduates.

Syllabus

Basic Concepts in Managerial Economics, Demand Analysis, production and cost of production, Market Structure and Pricing, Profit, break-even analysis, Budget and Basic Budgeting Concepts

Expected Outcome

The successful completion of the course, the students will have fundamental knowledge in the economic aspects of demand, pricing, and production. The candidates will be able to analyse business systems in terms of the economies it creates to firms. The course will enable them to become efficient managerial decision makers when economic aspects play important role.

References

1. Yogesh, Maheswari, *Management Economics*,PHI learning,NewDelhi,2012
2. D.M. Mithani*,Managerial Economics*, 5/e, Himalaya Publishing House,Mumbai,2011
3. Geethika, Ghosh & Choudhury, *Managerial Economics*, 2/e, McGraw Hill. 2011
4. David K.H. Begg, Rudiger Dornbusch, Stanley Fischer, *Economics,* McGraw-Hill Publishing Co. 2008
5. Uma Kapila*, Indian Economy since Independence*,Accademic Foundation,Gaziyabadh, 2011
6. Koutsoyiannis, *Modern Micro Economics,* 2/e, Macmillan Press Ltd. 2003

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	*Basic Concepts in Managerial Economics:* Definitions, concepts, role of managerial economist in business decision making. *Demand Analysis:* Demand curve and Demand function, laws of demand, elasticity of demand and its estimation, Total and Marginal Revenue, Classification of goods based on income elasticity of demand, Price Elasticity, Income Elasticity and Cross Elasticity, Demand forecasting and forecasting methods.	6	15
II	*Production and Cost of Production:* Production function, cost and output relationship, cost function in the short run and in the long run, cost concepts, practical applications of cost functions. Marginal Costing and applications. Indifference Curves, ISO-Quants & ISO-Cost line. Cost volume Profit analysis: economies of scale, economies of scope, economies and dis-economies of production, business cycle and its implications.	9	20
	First Internal Examination		
III	*Market Structure and Pricing:* Meaning, perfect competition, monopolistic competition, monopoly, oligopoly, cartel, types of cartels. Limit Price Theories of J.S Bain, Sylos-Labni, Behavioral model of Cyrit and March, managerial theories of firm, Baumol's Sales Revenue Maximisation, O. Williamson's model on managerial enterprise, Marri's model of balanced growth, Break even analysis and its implications. Use of a case discussion will enhance the understanding of the students about these topics.	6	15
IV	*Profit:* Determinants of Short-term & Long-term profits. Classification – Measurement of Profit. Break Even Analysis – Meaning, Assumptions, Determination of BEA, Limitations, Uses of BEA in Managerial decisions	9	20
	Second Internal Examination		
V	*Budget and Basic Concepts*: Meaning, basic concepts, plan and non-plan expenditure, fiscal deficit, revenue deficit, inflation and types, bank rate, SLR, CRR, repo, reverse repo, market operations, quantitative credit control, exchange rate management, monetary fiscal policy and practices in India, Quantity theory of money, Fischer – Keynes - Triedman - Tobin Theories. A case discussion is desirable in these topics.	15	30
	End Semester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
14	Business Communications	3-0-1	3	2015

Course Objectives

The objective of this course is to enable students to develop proficiency in the mechanics of writing and oral communication. The course orients at helping the learner improve their English proficiency with specific reference to the organizational communication parlance.

Syllabus

Oral Communication, Written Communication, Crisis Management and Negotiation, Business Letters and Reports, Case Method of Learning.

Expected Outcome

- Be familiar with the basic concepts and mechanics of Oral and Written Communication.
- Students develop English proficiency and paves way for career growth and better employment prospects.
- Learners develop effective crisis management skills juxtaposed with Negotiation tactics and elements of Behaviour and conversation control.

References

1. Chaturvedi P. D, & Mukesh Chaturvedi, *Business Communication: Concepts, Cases And Applications,* 2/e, Pearson Education, 2011
2. Mary Ellen Guffey, *Business Communication: Process and Product,* 3/e, Cengage Learning, 2002.
3. Rayudu C. S, *Communication,* 9/e,Himalaya Publishing House, 2010.
4. Penrose, Rasberry, Myers, *Advanced Business Communication,* 5/e, Cengage Learning, 2004.
5. Madhukar R. K, *Business Communication,* 2/e, Vikas Publishing House, 2010.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	Introduction: Meaning & Definition, Role, Classification – Purpose of communication – Communication Process – Characteristics of successful communication – Importance of communication in Organizations– Communication structure in organization – Application of principles of Communication in conflict resolution, Crisis Management & Negotiation - Communication in a cross-cultural setting	8	20
II	Oral Communication: Meaning – Principles of successful oral communication – Barriers to communication – Conversation control – Reflection and Empathy: two sides of effective oral communication. Modes of Oral Communication. Listening as a Communication Skill, Non-verbal communication.	7	20
	First Internal Examination		
III	Written Communication: Purpose of writing – Clarity in writing – Principles of effective writing – Approaching the writing process systematically: The 3X3 writing process for business communication: Pre writing – Writing – Revising – Specific writing features – Coherence – Electronic writing process.	7	15
IV	Business Letters and Reports: Introduction to business letters – Types of Business Letters - Writing routine and persuasive letters – Positive and Negative messages Writing Reports: Purpose, Kinds and Objectives of reports – Organization & Preparing reports, short and long reports Writing Proposals: Structure & preparation. Writing; Meetings – Planning meetings – objectives – participants – timing – venue of meetings. Meeting Documentation: Notice, Agenda, and Resolution & Minutes.	8	20
	Second Internal Examination		
V	Case Method of Learning: Understanding the case method of learning – Different types of cases – Difficulties and overcoming the difficulties of the case method – Reading a case properly (previewing, skimming, reading, scanning) – Case analysis approaches (Systems, Behavioural, Decision, Strategy) – Analysing the case – Dos and don'ts for case preparation – Discussing and Presenting a Case Study	15	25
	Final Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
15	Accounting for Managers	4-0-0	3	2015

Course Objectives

The objective of this course is to familiarize the students with the accounting practices and to develop analytical and interpretative skills necessary to take managerial decisions

Syllabus

Introduction, Cost, Managerial and Financial accounting, meaning of company, maintenance of book of accounts, analysis of financial statements, fund flow and cash flow statements, ratio analysis, marginal cost analysis techniques

Expected Outcome

After successful completion of the course, the students will be able to understand the accounting practices, able to prepare and analyse financial statements to help managerial decision making.

References

1. Charles T. Horngren, Gary L. Sundem, William O. Stratton, Dave Burgstahler, Jeff Schatzberg, *Introduction to Management Accounting*, 14/e, Pearson Prentice Hall, 2008
2. Gupta R. L. and Radhaswamy M., *Advanced Accounting*, Sultan Chand Publishers, New Delhi
3. Maheshwari S. N., *Accounting for Management*, 3/e, Vikas Publishing House, New Delhi, 2012
4. Jain S. P. and Narang K. L., *Advanced Cost Accounting*, Kalyani Publishers, New Delhi
5. Shashi K. Gupta and R. K. Sharma, *Management Accounting*, Kalyani Publishers, New Delhi

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	**Introduction to Accounting:** Introduction to Financial, Cost and Management Accounting- Generally accepted accounting principles, Conventions and Concepts - Mechanics of Accounting - Double entry system of accounting.	5	10
II	**Meaning of Company** - Maintenance of Books of Account-Statutory Books- Profit or Loss Prior to incorporation- Final Accounts of Company - Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet of companies, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill.	10	20
First Internal Examination			
III	**Analysis of financial statement:** Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios - Inter firm comparison - Common Size Statement - Comparative Statements and Trend Analysis.	10	25
IV	**Analysis of Financial Statements:** Funds Flow Statement – Meaning - Concept of Gross and Net Working Capital - Preparation of Schedule of Changes in Working Capital -	5	15
Second Internal Examination			
IV	Preparation of Funds Flow Statement and its analysis - Cash Flow Statement - Various cash and non-cash transactions - flow of cash - preparation of Cash Flow Statement and its analysis.	5	10
V	Introduction, Meaning of Cost, Objective of Costing, Methods of Costing, Technique of Costing, Classification of Cost, Elements of Cost, Statement of Cost Sheet, Standard costing- organization and establishing a standard costing system, Variance analysis - classification of variances, material cost, labour cost, overhead cost and sales variances. Disposition of variances. Marginal Cost - Marginal Costing - applications of Marginal Costing - advantages of Marginal Costing - break-even analysis - CVP Analysis - margin of safety - key factor.	10	20
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
16	Business and Society	4-0-0	3	2015

Course Objectives

The objectives for this course are the following:

1. To develop broader and more complete understanding of the business and society relationship
2. To help the student perceive and understand the importance of sound business ethics practices in the effective functioning of organizations.
3. To comprehend major stakeholder groups which interact with business organizations and the kinds of expectations they may hold with respect to their role in business enterprise and society.
4. To understand major corporate social responsibilities of business:
5. Impact of the human activities on the environment

Syllabus

Business Environment, Economic Growth, CSR, Public private Partnerships, Privatization, Environmental Management, Sustainable Development

Expected Outcome

The successful completion of this course will impart an understanding of the relationship between business and society. This will enable students to perceive sound business ethics and social responsibilities of business.

References

1. John Steiner, George Steiner, *Business, Government and Society: A Managerial Perspective,* 13/e,McGraw-Hill Higher Education, 2011
2. John F. Steiner, *Business, Government, and Society: A Managerial Perspective, Text and Cases* 12/e, McGraw-Hill/Irwin, 2008.
3. Francis Cherunilam, *Business and Government*, HPH, 2013.
4. Fernando A. C, *Corporate Governance: principles, policies and practices,* 2/e, Pearson Edn., India, 2011.
5. Ghosh B. N, *Business Ethics and Corporate Governance*, McGraw Hill Education (India) Private Limited, 2011.
6. Bala Krishnamurthy, Environmental Management: Text and Cases, PHI, New Delhi.
7. *Arindita Basak, Environmental Studies, Pearson Education, New Delhi.*
8. *Justin Paul, Business Environment -Text and Cases, Tata McGraw Hill Education, New Delhi, 2010*

COURSE PLAN

Unit	Topics	Hours allotted	% of marks In final Exam.
I	Roles of Business, Government, and Society: Interdependence and Conflict, Regulation of Business, Functions of State; Economic roles of government; Government and legal environment; Poverty, Inequality and Economic Growth: Industrial Development, Rural- Urban Dynamics, Population and Development, Finance for Development	9	15
II	Business in a Global Environment: Business as Blending of People Technology and Ethical Behaviour, Achieving Business Success through Social Responsibilities. Trade and Development, State and the Market, Privatization and Regulation, Institutions and Growth.	7	15
First Internal Examination			
III	Public Private Partnerships: The Rationale for Public Private Partnerships, Different Kinds of Public Private Partnerships with a special emphasis on the Build Operate and Transfer Model (BOT). Issues in Regulation that come about with privatization, Pricing mechanisms available to a regulator to ensure universal access and efficiency, Discussion of the privatization experience in different sectors, water, electricity, telecommunication, and railways with a special emphasis on India.	10	25
III	Coping with Global Competition, Conflict with Nation States. Non-Governmental organizations (NGO) - impact on Indian rural development, education and charity. Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Indian perspective	8	15
Second Internal Examination			
IV	Environmental Management - Definition, scope, importance and need - Concept of Ecosystem: Kinds of Resources: Renewable and Non Renewable resources- forests, water, mineral, food, energy, land resources - Role and Impact of Humankind: Population and development- pollution-definition-kinds-effects-climate change	5	15
V	Sustainable Development: Concept, principles- social, economic and environmental dimensions- hurdles, Indicators-Millennium Development Goals- Environment Management Systems: EMS- planning, implementation – environmental audit- environmental labeling- insight into current developments in energy conservation-3Rs	6	15
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
17	Soft Skills I	0-2-0	0	2015

Course Objectives

The objective of this course is to enable students have a basic knowledge of the recent developments in Information technology and its application in effective communication. The course also emphasize on personal grooming and development with due accentuation to soft skills development to transform the learners to employment ready youth.

Syllabus

Personal Grooming & Development, Presentation and Negotiation Skills, Levels of Public Interaction

Expected Outcome

1. Enhancement of the holistic development of students and improvement of their employability skills.
2. To develop inter personal skills and be an effective goal oriented team player.
3. To develop professionals with idealistic, practical and moral values.
4. To develop communication and problem solving skills.
5. To re-engineer attitude and understand its influence on behavior.

References

1. Penrose, Rasberry, Myers, *Advanced Business Communication*, 5/e, Cengage Learning, 2004.
2. Lehman, DuFrene, Sinha, *BCOM,* 2/e, Cengage Learning,2012
3. Madhukar R. K, *Business Communication,* 2/e, Vikas Publishing House.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final (T3) Exam.
I	Self-Management Self Evaluation-Self Discipline-Self Criticism-Recognition of one's own limits and deficiencies - Independency-Self Awareness- Attitude: Factors influencing Attitude, Challenges and lessons from Attitude.	4	2
II	Goal Setting : Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals	3	6
First Internal Examination			
III	Listening Skills : Listening to specific Information, identifying main issues, seeing beyond surface meanings	3	6
IV	Ethics and Etiquette-Business Ethics-Etiquette in social as well as Office settings-Email etiquette-Telephone Etiquette	4	6
Second Internal Examination			
V	Presentation Skills – Book Reviews and Summary writing	8	10
Final Examination			

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF LMCST COLLEGE COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number**: 118**	
Venue:Principal's Chamber	Date**:31.12.2019**	**Time: 1:30 PM**
Members Present		
1. Dr. P.P Mohanlal. (Principal) 2. Dr. RetnakumariAmma (HoD, ASH) 3. Prof.Mohan S (HoD, CE) 4. Prof.Beshiba Wilson(HoD, CSE)	5. Prof.Sreekala Devi K (EEE) 6. Prof. Selma Joseph (HoD , MCA) 7. Dr.Dinakar Das. (HoD, ECE) 8. Prof.Adarsh (ME) 9. Dr Smitha Jose Panackal (HoD MBA)	

<table>
<tr><th colspan="3">Discussion & Decisions</th></tr>
<tr><th>Point No</th><th></th><th>Action Taken</th></tr>
<tr><td>1</td><td>It has been decided to conduct classes for students aspiring for B. Tech (Honors) degree without disturbing normal TT hours. The faculties can avail extra hours including activity hours for the same.</td><td>Staff Advisors/ HoDs</td></tr>
<tr><td>2</td><td>The department wise list of electives and MOOC courses for the students aspiring for B. Tech (Honors) degree are listed below
<table>
<tr><th>Departmnet</th><th>Elective</th><th>MOOC</th></tr>
<tr><td>ECE</td><td>RTOS</td><td>Biomedical Image Processing for cancer detection</td></tr>
<tr><td>CSE</td><td>Mobile Computing</td><td>Joy of computing using Python</td></tr>
<tr><td>CE</td><td>Air-Quality management</td><td>Modern construction materials</td></tr>
<tr><td>EEE</td><td>Data structures and algorithm</td><td>Mathematical methods and techniques in signal processing</td></tr>
<tr><td>ME</td><td>Operations Research</td><td>1. IC Engines and Gas turbines
2. Engineering Mechanics</td></tr>
</table></td><td></td></tr>
<tr><td>3</td><td>The Principal sought suggestions for electives in S7 and MOOC courses in S7 For the Honors students in all branches.</td><td>HoDs</td></tr>
<tr><td>4</td><td>The status of activity points in all the engineering departments has been sought by the Principal and the response is as given below
<table>
<tr><th>Department</th><th>Status of activity points</th></tr>
<tr><td>CSE</td><td>All students attained 100 credits</td></tr>
<tr><td>ECE</td><td>Five students has got less than 100 points</td></tr>
<tr><td>ME</td><td>Fifteen students has got less than 100 points</td></tr>
<tr><td>EEE</td><td>Almost all students have got 100 credits and rest of the students will be credited 50 points in addition to the points which they have already got for NSS activities.</td></tr>
<tr><td>CE</td><td>Almost all students have got 100 credits and rest of the students will be credited 50 points in addition to the points which they have already got for NSS activities.</td></tr>
</table></td><td>Any Concern In attaining minimum of 100 points shall be reported with highest priority for S8 students

Action: HoDs</td></tr>
</table>

<table>
<tr><td>5</td><td>The principal has enquired the readiness of workbooks for the even semester classes and the status of the same is listed below
<table>
<tr><th>Department</th><th>Status of workbooks</th></tr>
<tr><td>CSE</td><td>The workbooks of all courses are ready for printing</td></tr>
<tr><td>ME</td><td>Only 5 out of 24 books are ready for printing</td></tr>
<tr><td>EEE</td><td>The workbooks of all courses except two are ready for printing</td></tr>
<tr><td>ECE</td><td>The workbooks of all courses will be ready by Jan 1, 2020</td></tr>
<tr><td>CE</td><td>Status to be reported</td></tr>
</table></td><td></td></tr>
<tr><td>6</td><td>It has been decided to conduct The inter-collegiate techno-cultural fest EQUINOX-2020 will be conducted in association with LMIHMCT on March 20 and 21. Transportation facilities will be arranged for students for the rehearsals of the programs and three Saturdays will be allotted for the same. Compensatory leave will be given to the faculties for additional duty if performed on these Saturdays</td><td>HoDs And faculties</td></tr>
<tr><td>7</td><td>The Principal has requested suggestions and feedback from the faculties regarding the make –up of loss of classes on the first two hours (specifically for the subjects of first two periods) of the series test.</td><td>HoDs</td></tr>
<tr><td>8</td><td>The Principal has also requested suggestion from the faculties and HoDs in consultation with the faculties for the 4 periods/week for Professional Communication of S2: 2 periods by regular faculty, 2 period for English and special training.</td><td>HoDs/ TT Coordinator</td></tr>
<tr><td>9</td><td>HoDs are requested to ensure the completion of course notes of faculties before Jan 9, 2020.</td><td></td></tr>
<tr><td>10</td><td>The advisory committee meeting should be conducted once in a year. The committee includes FAs, SFAs, faculties and students. The minutes and action taken report of the same must be maintained by the staff advisors.</td><td></td></tr>
<tr><td>11</td><td>The department level advisory committee meeting should be conducted once in a year for all batches. All departments are requested to submit the members of the committee which must include HoD, Senior faculty, an Alumnus and an Industry expert by Jan 6th , 2020.</td><td></td></tr>
<tr><td>12</td><td>All departments are requested to submit the list of activities planned for the upcoming semester by Jan13,2020</td><td></td></tr>
<tr><td>13</td><td>The first internal examination of the even semester will be held from 26.02.2020 to 03.03.2020 (note: 29-2-2020 is working day and series exam scheduled on that day)</td><td></td></tr>
<tr><td>14</td><td>The second internal examination of the even semester will be held from 01.04.2020 to 8.04.2020. (Note: NSS Camp from 8-4-2020 evening to 14-4-2020)</td><td></td></tr>
<tr><td>15</td><td>The first internal examination of the even semester for the students aspiring for Honors degree will be held on 04.03.2020</td><td></td></tr>
<tr><td>16</td><td>The second internal examination of the even semester for the students aspiring for honors degree will be held on 16.04.2020</td><td></td></tr>
<tr><td>17</td><td>The PTA meeting for the even semester will be held on 17.03.2020 and 18.03.2020</td><td></td></tr>
<tr><td>18</td><td>The schedule for the KTU Internal Audit is as follows</td><td></td></tr>
</table>

	KTU First Internal Audit: 05.03.2020 and 06.03.2020 KTU Second Internal Audit: 02.07.2020 and 03.07.2020	
19	The marks of the first and second internal examinations must be sent to parents on or before 09.03.2020 and 21.04.2020 respectively	
20	The PG Coordinator is requested to submit all the important dates for the evaluation	Prof. Dinakar Das
21	All staff advisors are requested to send the monthly attendance to parents on the following dates 31.01.2020 28.02.2020 31.03.2020 28.04.2020	
22	All staff advisors are requested to publish the monthly attendance on the following dates 31.01.2020 14.02.2020 16.03.2020 15.04.2020	
23	The Project Committee for the eighth semester B.Tech is reconstituted with Dr. Johnson Y as the coordinator. The following faculty members are nominated as the committee members from the respective departments CSE: Prof. Priya Sekhar & Prof. Asha Chandran EEE: Prof. Ashima C R ME: Prof. Ananthu ECE: Prof. Bincy Louis & Prof. Binu Chacko CE: Prof. Anupama & Prof. Sneha	
24	The project committee is requested to submit all the important dates and activities for the even semester on or before 06.01.2020	

Principal

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING

Subject: Academic and Administrative Matters | Meeting Number: 46

Venue: Principal's Chamber | Date: 08.12.17 | Time: 12.30 pm

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr. Remakumari Amma (HoD, ASH)
3. Dr.K.Kumarapillai (HoD, MBA)
4. Prof.Mohan S. (HoD, CE)
5. Prof.Ram Prasad Tripathy (HoD, ECE)
6. Prof. Neethu Mohan (HoD, MCA)
7. Prof. Beshiba Wilson (HoD, CSE)
8. Prof.Swapna M. (HoD, EEE)
9. Prof.Resmi V. Prasad (for HoD, ME)

Sl. No.& Date	Subject and Decision	Action by	Action Date
9 10.01.17	Decided to initiate necessary actions for conducting an International Conference in association with the Professional Society IEEE (Institute of Electrical and Electronics Engineers) before June 2018. Amendment on 20.06.17 :The first meeting is scheduled for 28.06.17 (Wednesday) at 10 am. The meeting will be coordinated by Prof. Ram Prasad Tripathy (ECE). Amendment on 30.10.17:It is proposed to conduct the International conference on 23.04.18 and 24.04.18.	Prof. Dinakardas C. N.and Prof. Jayaram. V.	24.04.18
328 19.10.17	Entrusted Prof.Justin G. Russel (MCA) and Prof.Tony Jacob (MBA) to take immediate measures for the campaigning of students for MCA and MBA. Amendment on 14.11.17 : Entrusted the coordinator of MCA to plan and conduct workshop for BCA and BSc Computer Science students. Amendment on 21.11.17 : The detailed proposal must be submitted on or 12.12.17.	Prof.Justin G. Russel (MCA) and Prof.Tony Jacob (MBA)	12.12.17
344 07.11.17	Decided to provide sickrooms in each department for catering the needs of students.	HoDs	20.11.17
348 14.11.17	Staff advisors are entrusted to verify the affidavit submited by students during the start of the semester listing the damages in the classroom and submit a verification report on the last working day of the corresponding batch. The verification must be done in the presence of class representatives. Amendment on 28.11.17 : The consolidated list of damages if any, in classrooms must be submitted to Principal on 29.11.17.	Staff Advisors and HoDs	29.11.17
361 14.11.17	Entrusted HoDs to take measures to segregate the unused items in the department into the following categories: • Can be Used within 1year but may not require its use in department/college (To be auctioned) • Can be Used for future purpose barring time limit.(To be kept) • Cannot be used (To be disposed) The segregated list of unused items must be handed over to Mr.Chandradas S.V.(ME)/Mr.Ajino Philip (ME) /Mr.Aby C. Jacob (PRO) on or before 11.12.17.	Mr.Chandradas S.V.(ME)/ Mr.Ajino Philip(ME) /Mr.Aby C. Jacob (PRO)	11.12.17
363 14.11.17	The idea proposals for Smart India Hackathon 2018 must be submitted to Single Point of Contact (SPOC) of LMCST, Prof.Cibumol Babu (EEE) on or before 23.11.17.	Prof.Cibumol Babu (EEE)	23.11.17
364 14.11.17	Decided to conduct a brain storming session to evaluate Strengths, Weaknesses, Opportunities and Threats - SWOT Analysis (department and college level) and framing the Vison, Mission and Objectives of department on or before 06.12.17.	Prof. Beshiba Wilson	06.12.17

373 28.11.17	Decided that all faculty members must contribute books to Library.	Ms Sunu S. Nair (Librarian)	28.11.17
374 28.11.17	Entrusted Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE) to schedule the visit to Polytechnic institutions and to provide awareness about Lateral Entry Test which is intended for diploma holders. The team must make necessary arrangements for the conduct of KV scholarship examination for diploma holders and LET Coaching for B.Tech aspirants.	Prof.Smitha J.C (CSE) and Prof.Ashima C.R.(EEE)	15.1.2018
376 28.11.17	The second phase of stock verification audit must be completed on or before 15.12.17. The serial numbers of already numbered items is to be provided along with missing sequence number for items in each department.	Prof.Selma Joseph (MCA)	15.12.17
379 28.11.17	Entrused Prof.Beshiba Wilson (CSE) to prepare academic calendar for January to May 2018.	Prof.Beshiba Wilson (CSE)	17.12.17
381 28.11.17	Formulated the timetable committee with following faculty members : • Prof.Daniel C. Ribu (ME) – Coordinator • Prof.Sunitha Rani P.R.(CE) • Prof.Revathy Sasidharan (EEE) • Prof.Nisha O.S. (CSE) • Prof.Sheeba B.S. (MBA) • Prof.Shamny Arun Mathew K.(ECE) • Prof.Priya S.A. (MCA) The final timetable must be published on or before 14.12.17.	Prof.Daniel C. Ribu (ME)	14.12.17
384 05.12.17	A staff meeting with Principal is scheduled for 20.12.17 (Wednesday) at 1.30 pm in LOMAA Hall to discuss the plans and preparations for the upcoming semester. The meeting will provide a forum where ideas and views can be shared for improvement can be exchanged.	Principal	20.12.17
385 05.12.17	The faculty members handling the subject Principles of Management (HS 300) of S6 B.Tech (CE,CSE and EEE) are requested to identify difficult areas if any and seek help from Prof.Ankur A.(ME) and department of Management Studies, if necessary.	Prof.Sarika A.S.(CE), Prof.Divya Christopher (CSE) and Prof.Revathy Sasidharan (EEE)	11.12.17
386 05.12.17	The choice of Electives for all the courses in the department must be collected from students with signature. An elective cannot be offered if it is opted by less than 10 students (Out of 60 students) and HoD must write specific remarks indicating the allocation of electives and has to be approved by the Principal.	HoDs	05.12.17
387 05.12.17	The Annual Inter Collegiate Techno - Cultural fest Equinox is scheduled for 09.02.18 and 10.02.18. The following faculty members are entrusted as coordinators of Equinox 2018. • Prof.Renu V. (EEE) -Coordinator • Prof.Priyanka C.P. (EEE) -Co-coordinator	Prof.Renu V. (EEE) and Prof.Priyanka C.P. (EEE)	10.02.18
388 05.12.17	The placement training for MBA students is scheduled for 07.12.17 and 08.12.17 in LOMAA Hall.	Prof.Alphonse D. (ECE)	08.12.17
389 05.12.17	Prof.Selma Joseph (MCA) is entrusted as Single Point of Contact (SPOC) of Infosys Campus Connect Programme.	Prof.Selma Joseph (MCA)	05.12.17
390 05.12.17	The Soft skill/Pre-Placement/Finishing School training programmes for B.Tech students for even semester is scheduled as follows: • S2 – 04.01.18, 05.01.18 and [illegible]	Prof.Alphonse D. (ECE)	20.01.18

	• S8 - 08.01.18, 09.01.18 and 10.01.18		
391 05.12.17	Entrusted Dr.Retnakumari Amma (ASH) and Prof.Roy K. Varghese (ASH) as Squad members for examinations in Adminstrative block	Dr.Retnakumari Amma (ASH) and Prof.Roy K. Varghese (ASH)	05.12.17
392 05.12.17	Entrusted Dr.Lenin Jothi as Criteria 6 coordinator for NAAC from MBA department.	Dr.Lenin Jothi (MBA)	05.12.17

Actions Taken

334 24.10.17	HoDs must take initiatives to submit proposals for conducting FDPs, STTPs, Workshops or Training programmes during the semester break. Submit it on or before 27.10.17.	HoDs	27.10.17
343 07.11.17	Decided to depute the following number of faculty members as listed below from each department to participate in the FAB lab visit during the first or second week of December. • ECE -10; CSE – 10; EEE -5; ME -5 Amendment on 14.11.17 : The FAB Lab visit is scheduled for 08.12.17 at 10.00 am. The list of faculty members attending the visit along with details of boarding point must be submitted to Principal on or before 17.11.17.	Prof.Angeline Reeba (ECE)	08.12.17
347 14.11.17	The last date for mailing the objective type questions already prepared by faculty members as study material for Comprehensive Examination of sixth semester B.Tech (KTU) to website@lmest.ac.in is 30.11.17. The objective questions must be easily accessible in document directory form (Proper Folders). [Branch -> Semester -> Subject]	Prof.Chithra A.S. (CSE)	30.11.17
349 14.11.17	An FDP on "Mentoring and Counselling Skill for Psychological Change" for faculty members (ASH – 4 Nos, CE -4 Nos, CSE -6 Nos, ECE -6 Nos, EEE- 6 Nos, ME -6 Nos, MBA -2 Nos and MCA - 2 Nos) by ICT Academy is scheduled for 11.12.17, 12.12.17 and 13.12.17. The list of faculty members (Name, Department, Email Id and Contact Number) attending the FDP must be mailed to Prof.Alphonse D.(ECE) on or before 16.11.17.	Prof.Alphonse D.(ECE)	16.11.17
350 14.11.17	Entrusted Prof.AnjanaThampy (CSE) as Single Point Of Contact (SPOC) for Red Hat Academy Programme and to take immediate steps to complete the registration process of free membership (Account Setup) of Red Hat Academy from interested faculty and students of S2 to S8 B.Tech (CSE, ECE and EEE) and MCA. Amendment on 28.11.17 : The process of membership registration (Account setup) must be completed on or before 05.12.17.	Prof.Anjana Thampy (CSE)	05.12.17
351 14.11.17	Formulated the Scholarship and Financial Aid Committee and entrusted the following faculty members to take adequate measures to provide awareness and guide our studentson the availability of loans and various scholarships that an engineering student can avail (AICTE fee waiver, AICTE scholarships, MHRD scholarships,Minority community scholarship and Financial Aid from Infosys foundation, HCL foundation, etc.). • Prof.RetnakumariAmma (ASH) – Mentor • Prof.RevathySasidharan (EEE)- Coordinator • Prof.Nisha R.S. (ASH) - Coordinator The team is expected to be updated with the details through websites and newspapers.	Prof.Retnakumari Amma (ASH), Prof.Revathy Sasidharan (EEE) and Prof.Nisha R.S. (ASH)	14.11.17

	Amendment on 21.11.17 : The following members are also included in the Scholarship and Financial Aid committee : • CE – Prof.Lekshmi Satheesh • CSE – Prof.Sunu Thomas • ECE –Prof.Veena V.U. • ME – Prof.Resmi V. Prasad • MBA –Prof.Sheeba B.S. • MCA – Prof.Sherin Joseph		
353 14.11.17	A meeting of all the members of IQAC is scheduled for 29.11.17 at 11.00 am. Entrusted Prof.Nisha George (ECE) to take appropriate measures. Amendment on 28.11.17 : The meeting is postponed to 2.00 pm on 30.11.17.	Prof.Nisha George (ECE)	30.11.17
355 14.11.17	The venue Drawing hall DH 3 instead of MCA Seminar Hall for Innovation andEntrepreneurship Development Centre (IEDC) suggested by Prof.Cibumol Babu (EEE), IEDC Coordinator is under consideration.	Prof.Cibumol Babu (EEE)	14.11.17
356 14.11.17	The proposals for availing financial assistance through the following AICTE Quality Improvement Schemes (AQIS - 2017-18)must be submitted to Principal on 21.11.17. • Skill and Personality Development Programme Centre for SC/ST students • Prerana (Scheme for preparing SC/ST students for Higher Education) • Samriddhi (Scheme for SC/ST students for setting start-ups) • Faculty Development Programme (FDP) • Grant for organising Conference • Short Term Training Programme (STTP) • E-ShodhSindu – Subscription to E-Resources • AICTE - ISTE Induction Refresher Programmes Amendment on 21.11.17 : The proposals must be uploaded in AICTE website on or before 23.11.17.	HoDs	21.11.17
365 14.11.17	Faculty members (CSE – 20 nos, ECE -4 nos, EEE- 4 nos and MCA-2 nos) must participate in the face to face interaction of IITB FDP on "Machine Learning" from 16.12.17 to 17.12.17.	Prof. Beshiba Wilson	17.12.17
366 14.11.17	Staff club is planning to conduct a refreshing day trip to Mankayam waterfalls and Tropical Botanical Garden and Research Institute (TBGRI), Palode on 28.11.17. Amendment on 28.11.17 : The trip is planned to be conducted after University exams and is posponed to 20.12.17.	Prof. Beshiba Wilson	20.12.17
371 21.11.17	Entrusted Prof.Binu Chacko (ECE) to make necessary arrangements for PMKVY programme including preparation of the application format, awareness to faculty, advertisement for skill development courses, etc. The first course is proposed to commence from 12.12.17.	Prof.Binu Chacko (ECE)	12.12.17
372 21.11.17	The KTU external audit is scheduled for 29.11.17. All faculty members are requested to produce documents completed in all respects for the audit.	Dr.K. Kumara Pillai	29.11.17
375 28.11.17	Decided to allot 2 hours per week for comprehensive examination of S6 B.Tech. Comprehensive examination must commence from third week of January. The schedule must be published prior to exam in college website. The committee which was looking after the Design Project will be regarding the Comprehensive	Prof.Ram Prasad Tripathy (ECE)	17.12.17

	examination		
377 28.11.17	Decided to make arrangements for a LMCST campus visit on 07.12.17 from 10.30 am for VHSE school students attending the OJT programme conducted by MCA department.	Prof.Neetha Mohan (MCA)	07.12.17
378 28.11.17	Formulated the e-Governance Cell of LMCST with the following members: • Ms.Jessy Augustine (Office) – Convenor • Prof.Anjana J. (MCA) • Prof.Prajisha J.P. (CE) • Prof.Sunu Thomas (CSE) – Nodal Officer • Prof. Jobin Jose (ECE) • Prof.Sreedevi R.C. (EEE) • Prof.Adarsh S.J. (ME) • Prof.Tony Jacob (MBA) The committee will be under the Membership of Prof. Beshiba.	Ms.Jessy Augustine (Office)	28.11.17
380 28.11.17	The ISO internal auditing is scheduled for 07.12.17.	Prof.Roy K. Varghese (ASH)	07.12.17
382 28.11.17	Formulated the NAAC name board committee with following faculty members for finalising name boards, sign boards and direction boards in campus and departments: • Prof.Shammy Arun Mathew (ECE) -Coordinator • Prof.Roy K. Varghese (ASH) –Environment club related boards • Mr.Chandradas S.V. (ME) – Campus related boards • Prof.Daniel C. Robu (ME) • Prof.Justin G. Russel (MCA) • Prof.Lekshmy Surendran (ASH) • Prof.Nisha R.S. (ASH) • Prof.Veena V.U. (ECE) • Prof.Haritha Simon (MBA) • Prof.Preethi W. (CSE) • Prof.Madhav S. (CE) • Prof.Cincy Mary Sebastian (EEE) Entrusted CE department to prepare college site plan and building-wise layout plan.	Prof.Shammy Arun Mathew (ECE) and Mr.Chandradas S.V. (ME)	28.11.17
383 28.11.17	Decided to provide Karunya Varsha Scholarship with full fee waiver to Ms Sethu Parvathi, M.E M.Tech CSE for securing first rank in Trivandrum cluster (first and second semester), second rank and third rank in state level in first and second semester respectively.	Principal	28.11.17

Dr. [illegible] Pradeesh V.

PRINCIPAL
LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY
Thiruvananthapuram

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number: **62**	
Venue: Principal's Chamber	Date: **03.04.18**	Time: 1.30 PM

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr.Retnakumari Amma (HoD, ASH)
3. Dr.K. Kumara Pillai (HoD, MBA)
4. Prof.Mohan S. (HoD, CE)
5. Prof. Beshiba Wilson (HoD, CSE)
6. Prof.Swapna M. (HoD, EEE)
7. Prof.Sabarinath A.R.(HoD, ME)
8. Prof.Selma Joseph (HoD, MCA)
9. Dr.Dinakardas C.N. (for HoD, ECE)

Sl. No.& Date	Subject and Decision	Action by	Action Date
9 10.01.17	Decided to initiate necessary actions for conducting International Conference in association with IEEE (Institute of Electrical and Electronics Engineers) before June 2018. Amendment on 20.06.17 :The first meeting is scheduled for 28.06.17 (Wednesday) at 10 am. The meeting will be coordinated by Prof. Ram Prasad Tripathy (ECE). Amendment on 30.10.17:It is proposed to conduct the International conference on 23.04.18 and 24.04.18. Amendment on 03.01.18: The International conference is scheduled for 26.04.18 and 27.04.18. Amendment on 14.02.18: The conference has received a grant of rupees one-lakh from KSCSTE.	Prof. Dinakardas C. N. (ECE) and Prof. Jayaram. V. (ME)	27.04.18
395 12.12.17	In continuation to decision number 374, it is decided to provide coaching for Lateral Entry Test (LET) for students in polytechnic institutions. The following team is entrusted with the conduct of coaching classes: • ASH –Prof.Nisha R.S. and Prof.Carold Wilson Lazer • CE –Prof.Mohan S. • CSE –Prof.Christy Jojy • ECE – Prof.Binu Chacko • EEE – Prof.Sreekala Devi • ME –Prof.Ankur A. Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE) must coordinate the entire process. Amendment on 21.03.18 : The idea proposal for implementation of LET coaching classes including preparation of study materials and scheduling coaching classes must be submitted on or before 28.03.18.	Prof.Smitha J.C (CSE) and Prof.Ashima C.R. (EEE)	28.03.18
410 03.01.18	Entrusted Prof.Ashima C.R. (EEE) and Prof.Anjana Thampy (CSE) with the framing of the Vision, Mission of LMCST and evaluating Strengths, Weaknesses, Opportunities and Threats - SWOT Analysis (College level). The work must be implemented incorporating the core team formulated for this purpose.	Prof.Ashima C.R. (EEE) and Prof.Anjana Thampy (CSE)	23.01.18
445 06.02.18	Decided to implement at least one course in MOODLE (based on a particular topic in the subject being handled in the current semester) where faculty can add resources and activities for students. The implementation must be effectively planned by all faculty members on or before 12.03.18.	Faculty	12.03.18

	Faculty who are in need of training for the same can attend the ICT FDP on "MOODLE" which is scheduled for 16.02.18 and 17.02.18 at LMCST.		
491 06.03.18	HoDs are requested to submit proposals for conducting FDP during the month of May/June /July 2018 on or before 20.03.18.	HoDs	20.03.18
492 06.03.18	The status of the implementation of at least one course in MOODLE is to be reported from all departments to Principal during forthcoming Council meetings.	HoDs	06.03.18
496 14.03.18	02.04.18 (Monday) will be a holiday for LMCST and 07.04.18 (Saturday) will be a regular working day with Monday's timetable.	Principal	07.04.18
497 14.03.18	Lab examinations (internal exam for KU and University exam for KTU) must be conducted on or before 06.04.18 (Friday). KTU examination must be conducted by putting an external.	Faculty	06.04.18
498 14.03.18	The oral comprehensive examination with an industrial expert as external examiner must be conducted on or before 07.04.18 (Saturday)	Comprehensive examination coordinators	07.04.18
505 27.03.18	The internal audit of ISO 9001:2008 (QMS) is scheduled for 20.04.18.	Prof.Roy K. Varghese (ASH)	20.04.18
506 27.03.18	HoDs are requested to give an introduction about electives to be offered by KTU for S5 and S7 B.Tech. The electives opted as per the interest of students must be signed by them and the list of electives offered in the department as per KTU rules must be submitted to Principal on or before 06.04.18	HoDs	06.04.18
507 27.03.18	The third series test of S8 B.Tech is scheduled for 10.04.18, 11.04.18 and 13.04.18. The timetable for the same must be intimated to students and published in department notice board on 28.03.18.	Prof.Jean Dickson (EEE)	13.04.18
512 03.04.18	The fourth course/class committee of KTU courses must be conducted on or before 06.04.18.	Prof.Swapna M. (EEE)	06.04.18
513 03.04.18	The NSS Technical Cell in association with Primary health Centre, Kuttichal is organizing a blood donation camp at our campus on 04.04.18 from 9 am onwards. Staff members willing to donate blood are requested to make use this opportunity.	Prof.Susanth S.G.(ASH) and team	04.04.18
514 03.04.18	The department of Management Studies is organizing a talk on "Future of World Business and Disruptive technologies" for MBA students by Dr.Jebamalai, Former Principal Advisor to Director General UNIDO on 04.04.18 at Conference Hall from 10.30 am.	Dr.K.Kumara Pillai (MBA)	04.04.18
515 03.04.18	The final sessional marks of KTU students must be published on 05.04.18.	Faculty	05.04.18

Actions Taken

495 14.03.18	Details of approved retest requests of students from each department must be informed to series exam cell by concerned department coordinators on or before 19.03.18. Retest of KTU students is scheduled on 03.04.18, 04.04.18, 05.04.18 and 06.04.18. Two tests will be conducted on third and fourth of April. Amendment on 21.03.18: In case of two retests per day, the examination timings are as follows: • 9.15 am to 10.15 am and 11.15 am to 12.15 pm	Prof.Jean Dickson (EEE)	19.03.18
501 21.03.18	Pradhan Mantri YUVA Yojana (YuvaUdyamitaVikasAbhiyan) is a centrally sponsored scheme on entrepreneurship education and training implemented by the Ministry of Skill Development and Entrepreneurship, Government of India. LMCST is a recognized nodal centre for Entrepreneurship education and training. In connection with this, a one-hour training session is arranged for S2 B.Tech students on 24.03.18 (Saturday)	Prof.Cibumol B. Babu (EEE), Prof.Jayaram V. (ME) and Prof.Ashima C.R. (EEE)	24.03.18
502 21.03.18	A session on "Blockchain Technology" organized by FOSS Club (CSE department) and sponsored by ICFOSS is scheduled for 04.04.18 for selected students of CSE department. Remarks : Due to the tight academic schedule at the end of semester, the workshop is postponed to next semester.	Prof.Preethi W. (CSE), Prof.Sumi Maria A (CSE) &Prof.Cibumol B. Babu (EEE)	04.04.18
508 27.03.18	Appreciation to Prof. Renetha J.B (CSE) and Prof.Justin G. Russel (MCA) for receiving the silver partner certificate under Inspire – Campus Connect of Infosys.	Prof.Renetha J.B (CSE) and Prof.Justin G. Russel (MCA)	27.03.18
509 27.03.18	LMCST is recognized as the advanced partner institute of Infosys Campus Connect. Appreciation to Prof.Selma Joseph - SPOC (MCA) for receiving the award.	Prof.Selma Joseph (MCA)	27.03.18
510 27.03.18	Faculty members are requested to enter the marks for Assignment III and Note submission assignment VI in CMS. The sessional marks should be computed by CMS and the final sessional marks generated from CMS must be submitted to Principal on or before 03.04.18.	Faculty members	03.04.18
511 27.03.18	The details of students (KTU) who were absent (medical reasons) for both first and second series tests must be informed to Principal and the retest (Six modules, two hours test) must be conducted on or before 10.04.18.	Prof.Jean Dickson (EEE)	10.04.18

Dr.Syam Prakash V.

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IQAC LMCST <iqac@lmcst.ac.in>

Fwd: Regulation etc

LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY Admin <lourdesmatha@ktu.edu.in> Mon, Jan 24, 2022 at 9:36 AM
To: iqac@lmcst.ac.in

---------- Forwarded message ---------
From: **Director Academics** <directoracademics@ktu.edu.in>
Date: Tue, May 28, 2019 at 10:58 AM
Subject: Regulation etc
To: ICE COLLEGE OF ENGINEERING Admin <ice@ktu.edu.in>, ADI SHANKARA INSTITUTE OF ENGG AND TECHNOLOGY Admin <[illegible]>, AHALIA SCHOOL OF ENGINEERING AND TECHNOLOGY Admin <ahalia@ktu.edu.in>, AL AZHAR COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <alazhar@ktu.edu.in>, AL-AMEEN COLLEGE, KULAPPULLY, SHORANUR-2 Admin <alameen@ktu.edu.in>, ALBERTIAN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <albertian@ktu.edu.in>, Amal Jyothi College of Engineering, Kanjirappally <amaljyothi@ktu.edu.in>, ARCHANA COLLEGE OF ENGINEERING Admin <archana@ktu.edu.in>, ARYANET INSTITUTE OF TECHNOLOGY Admin <aryanet@ktu.edu.in>, AWH ENGINEERING COLLEGE Admin <[illegible]>, AXIS COLLEGE OF ENGINEERING & TECHNOLOGY Admin <axis@ktu.edu.in>, BASELIOS MATHEWS II COLLEGE OF ENGINEERING Admin <[illegible]>, BASELIOS THOMAS I CATHOLICOSE COLLEGE OF ENGG AND TECH Admin <[illegible]@ktu.edu.in>, MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <[illegible]@ktu.edu.in>, BELIEVERS CHURCH CAARMEL ENGINEERING COLLEGE Admin <[illegible]>, BISHOP JEROME INSTITUTE Admin <bishopjerome@ktu.edu.in>, CARMEL COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <carmel@ktu.edu.in>, CE VADAKARA (KTU cell) <cevadakara@ktu.edu.in>, COLLEGE OF ENGINEERING ATTINGAL Admin <ceattingal@ktu.edu.in>, CHANDRASEKHAR . P R Admin <[illegible]@ktu.edu.in>, CHRIST COLLEGE OF ENGINEERING Admin <christ@ktu.edu.in>, CHRIST KNOWLEDGE CITY Admin <christcity@ktu.edu.in>, COCHIN COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <cochincet@ktu.edu.in>, COCHIN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <cochinist@ktu.edu.in>, COLLEGE OF ENGINEERING & TECHNOLOGY-PAYYANUR Admin <cepayyanur@ktu.edu.in>, COLLEGE OF ENGINEERING ADOOR Admin <ceadoor@ktu.edu.in>, COLLEGE OF ENGINEERING AND MANAGEMENT, PUNNAPRA Admin <cepunnapra@ktu.edu.in>, COLLEGE OF ENGINEERING ARANMULA Admin <cearanmula@ktu.edu.in>, COLLEGE OF ENGINEERING CHENGANNUR Admin <cechengannur@ktu.edu.in>, COLLEGE OF ENGINEERING CHERTHALA Admin <cecherthala@ktu.edu.in>, COLLEGE OF ENGINEERING KALLOOPPARA Admin <cekallooppara@ktu.edu.in>, COLLEGE OF ENGINEERING KARUNAGAPPALLY Admin <cekarunagappally@ktu.edu.in>, COLLEGE OF ENGINEERING KIDANGOOR Admin <cekidangoor@ktu.edu.in>, COLLEGE OF ENGINEERING KOTTARAKARA Admin <cekottarakara@ktu.edu.in>, COLLEGE OF ENGINEERING MUNNAR Admin <cemunnar@ktu.edu.in>, COLLEGE OF ENGINEERING PATHANAPURAM Admin <cepathanapuram@ktu.edu.in>, COLLEGE OF ENGINEERING PERUMON Admin <ceperumon@ktu.edu.in>, COLLEGE OF ENGINEERING THALASSERY Admin <cethalassery@ktu.edu.in>, COLLEGE OF ENGINEERING TRIKARIPUR Admin <cetrikaripur@ktu.edu.in>, COLLEGE OF ENGINEERING, POONJAR Admin <cepoonjar@ktu.edu.in>, ERANAD KNOWLEDGE CITY TECHNICAL CAMPUS Admin <eranad@ktu.edu.in>, ER&DCI INSTITUTE OF TECHNOLOGY Admin <erdci@ktu.edu.in>, Federal Institute of Science And Technology (FISAT) Admin <fisat@ktu.edu.in>, FOCUS INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <focus@ktu.edu.in>, Government Engineering College Kozhikode Admin <geccalicut@ktu.edu.in>, GOVERNMENT COLLEGE OF ENGINEERING KANNUR Admin <geckannur@ktu.edu.in>, Government Engineering College Idukki Admin <gecidukki@ktu.edu.in>, GOVERNMENT ENGINEERING COLLEGE SREEKRISHNAPURAM Admin <[illegible]@ktu.edu.in>, Government Engineering College Wayanad Admin <gecwayanad@ktu.edu.in>, Government Engineering College, Thrissur Admin <gecthrissur@ktu.edu.in>, Govt. Engineering College, Barton Hill Admin <gecbartonhill@ktu.edu.in>, GURUDEVA INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <gurudeva@ktu.edu.in>, HEERA COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <heera@ktu.edu.in>, Hindustan College of Engineering Admin <hindustan@ktu.edu.in>, Holy Grace Academy of Engineering Admin <holygrace@ktu.edu.in>, HOLY KINGS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <holykings@ktu.edu.in>, IES COLLEGE OF ENGINEERING Admin <ies@ktu.edu.in>, ILAHIA COLLEGE OF ENGINEERING & TECHNOLOGY Admin <ilahiacet@ktu.edu.in>, ILAHIA SCHOOL OF SCIENCE AND TECHNOLOGY Admin <[illegible]@ktu.edu.in>, ILM College Engineering And Technology Admin <ilm@ktu.edu.in>, Indira Gandhi Institute of Engineering and Technology Women Admin

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Institute of Technology Admin <[illegible]>, JYOTHI ENGINEERING COLLEGE Admin <[illegible]>, K M P College of Engineering Admin <[illegible]>, K R GOURIAMMA COLLEGE OF ENGINEERING FOR WOMEN Admin <[illegible]>, KMCT COLLEGE OF ENGINEERING Admin <[illegible]>, KMCT COLLEGE OF ENGINEERING FOR WOMEN Admin <[illegible]>, KMEA Engineering College Admin <[illegible]>, KOTTAYAM INSTITUTE OF TECHNOLOGY AND SCIENCE Admin <[illegible]>, KVM COLLEGE OF ENGINEERING & IT Admin <[illegible]>, LBS College of Engineering Admin <[illegible]>, LBS Institute of Technology for Women Admin <[illegible]>, LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY Admin <[illegible]>, M Dasan Institute of Technology Admin <[illegible]>, M.G College of Engineering Admin <[illegible]>, MALABAR COLLEGE OF ENGINEERING & TECHNOLOGY Admin <[illegible]>, MALABAR INSTITUTE OF TECHNOLOGY Admin <[illegible]>, Mangalam College of Engineering Admin <[illegible]>, Mar Baselios Christian College of Engineering & Techonlogy Admin <[illegible]>, MARIAN ENGINEERING COLLEGE Admin <[illegible]>, MATHA COLLEGE OF TECHNOLOGY Admin <[illegible]>, MBITS Admin <[illegible]>, MEA ENGINEERING COLLEGE, PERINTHALMANNA Admin <[illegible]>, MES College of Engineering & Technology Admin <[illegible]>, MES INSTITUTE OF TECHNOLOGY AND MANAGEMENT Admin <[illegible]>, MES Kuttippuram <[illegible]>, Model Engineering College Admin <[illegible]>, MOHANDAS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <[illegible]>, MOUNT ZION COLLEGE OF ENGINEERING Admin <[illegible]>, MOUNT ZION COLLEGE OF ENGINEERING FOR WOMEN Admin <[illegible]>, MUSALIAR COLLEGE OF ENGINEERING & TECHNOLOGY, PATHANAMTHITTA Admin <[illegible]>, MUSALIAR COLLEGE OF ENGINEERING Admin <[illegible]>, MUSLIM ASSOCIATION COLLEGE OF ENGG Admin <[illegible]>, MUTHOOT INSTITUTE OF TECHNOLOGY & SCIENCE Admin <[illegible]>, N.S.S College of Engineering Admin <[illegible]>, NARAYANAN T G Admin <[illegible]>, National Institute of Electronics and IT Admin <[illegible]>, NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE Admin <[illegible]>, NIRMALA COLLEGE OF ENGINEERING. 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GREGORIOS COLLEGE OF ENGINEERING Admin <[illegible]>, St.Thomas College of Engineering & Technology Admin <[illegible]>, St Thomas College of Engineering and Technology, mattannur Admin <[illegible]>, ST. THOMAS INSTITUTE FOR SCIENCE & TECHNOLOGY Admin <[illegible]>, THEJUS ENGINEERING COLLEGE Admin <[illegible]>, TKM COLLEGE OF ENGINEERING Admin <[illegible]>, TKM INSTITUTE OF TECHNOLOGY Admin <[illegible]>, Toc H Institute of Science and Technology Admin <[illegible]>, TOMS COLLEGE OF ENGINEERING FOR STARTUPS Admin <[illegible]>, TRAVANCORE ENGINEERING COLLEGE, OYOOR Admin <[illegible]>, TRINITY COLLEGE OF ENGINEERING Admin <[illegible]>, UKF COLLEGE OF ENGINEERING & TECHNOLOGY Admin <[illegible]>, UNIVERSAL ENGINEERING COLLEGE Admin <[illegible]>, Valia Koonambai College of Engg and Tech Admin <[illegible]>, Vedavyasa Institute of Technology Admin <[illegible]>, VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY Admin <[illegible]>, Vidya Academy of Science and Technology Technical Campus Admin <[illegible]>, VIJNAN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <[illegible]>, VIMALJYOTHI ENGINEERING COLLEGE Admin <[illegible]>, Viswajyothi College of Engineering & Technology Admin <[illegible]>, YOUNUS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <[illegible]>, YOUNUS COLLEGE OF ENGINEERING Admin <[illegible]>

Sir/Mam

Pls see the ac council approved

(i) B.Tech regulation for 2019 admission

(ii) Curriculum template from S1 to S8

Director (Academic),

APJ Abdul Kalam Technological University

2 attachments

Regulation.pdf
433K

CURRICULUM TEMPLATE _Final.pdf
661K

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CURRICULUM

B.TECH (2019 SCHEME)

INDEX

CURRICULUM I TO VIII: B.Tech AERONAUTICAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	AOT201	MECHANICS OF MATERIALS AND AIRCRAFT MATERIALS	3-1-0	4	4
C	MET203	MECHANICS OF FLUIDS	3-1-0	4	4
D	AOT205	MECHANICS OF FLIGHT AND AIRCRAFT BASICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	-----
S	AOL201	FLUID MECHANICS LAB	0-0-3	3	2
T	AOL203	MATERIAL TESTING LAB	0-0-3	3	2
R\M	VAC	Remedial/Minor course	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	AOT202	THERMODYNAMICS	3-1-0	4	4
C	AOT204	AERODYNAMICS I	3-1-0	4	4
D	AOT206	AIRCRAFT STRUCTURES I	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	-----
S	AOL202	AERODYNAMICS AND FLIGHT MECHANICS LAB	0-0-3	3	2
T	AOL204	CAD LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	AOT301	AIRCRAFT STRUCTURES II	3-1-0	4	4
B	AOT303	AIRBREATHING PROPULSION	3-1-0	4	4
C	AOT305	AERODYNAMICS II	3-1-0	4	4
D	AOT307	AVIONICS AND AIRCRAFT SYSTEMS	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	----
S	AOL331	PROPULSION LAB	0-0-3	3	2
T	AOL333	AIRCRAFT STRCTURAL ANALYSIS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	AOT302	HEAT TRANSFER	3-1-0	4	4
B	AOT304	VIBRATION AND AERO ELASTICITY	3-1-0	4	4
C	AOT306	NON - AIRBREATHING PROPULSION	3-1-0	4	4
D	AOTXXX	PROGRAME ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	AOT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	AOL332	AIRFRAME PRODUCTION AND MAINTENACE LAB	0-0-3	3	2
T	AOD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	AOT312	ELASTIC ANALYSIS OF PLATES AND SHELLS	2-1-0	3	3
	AOT322	SPACE SCIENCE AND SPACE ENVIRONMENT	2-1-0		
	AOT332	NUMERICAL PROGRAMMING	2-1-0		
	AOT342	DESIGN OF AEROSPACE STRUCTURES	2-1-0		
	AOT352	AERO ACOUSTICS	2-1-0		
	AOT362	FUNDAMENTALS OF COMBUSION	2-1-0		
	AOT372	NON-DESTRUCTIVE TESTING	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks
   Split up for CIE
   Attendance : 10
   Guide : 15
   Project Report : 10
   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	AOT401	COMPUTATIONAL AERODYNAMICS	2-1-0	3	3
B	AOTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	AOTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	----
S	AOL411	ANALYSIS AND SIMULATION LAB	0-0-3	3	2
T	AOQ413	SEMINAR	0-0-3	3	2
U	AOD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	AOT413	EXPERIMENTAL STRESS ANALYSIS	2-1-0	3	3
	AOT423	ADVANCED DYNAMICS AND CONTROL	2-1-0		
	AOT433	ACTUATORS AND CONTROLS IN AIRCRAFT	2-1-0		
	AOT443	FATIQUE AND FRACTURE MECHANICS	2-1-0		
	AOT453	WIND TUNNEL TECHNIQUES	2-1-0		
	AOT463	STRUCTURAL HEALTH MONITORING	2-1-0		
	AOT473	EXPERIMENTAL AERODYNAMICS	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of AERONAUTICAL for students of other undergraduate branches offered in the college.**

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	AOT415	INTRODUCTION TO AERONAUTICS	2-1-0	3	3
	AOT 425	INTRODUCTION TO AERODYNAMICS	2-1-0		
	AOT 435	FLIGHT AGAINST GRAVITY	2-1-0		
	AOT 445	NUMERICAL METHODS AND PROGRAMMING	2-1-0		

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Aeronautical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before the evaluation committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

   The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	AOT402	ROCKETRY AND SPACE MECHANICS	2-1-0	3	3
B	AOTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	AOTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	AOTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
E	AOT404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	AOD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28**	**17/19**

PROGRAM ELECTIVE III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	AOT414	FINITE ELEMENT METHOD	2-1-0	3	3
	AOT424	HYPERSONIC AND HIGH TEMPERATURE AERODYNAMICS	2-1-0		
	AOT434	MICROPROCESSOR AND ITS APPLICATIONS	2-1-0		
	AOT444	INSTRUMENTATION AND MEASUREMENTS	2-1-0		
	AOT454	AEROSPACE GUIDANCE AND CONTROLS	2-1-0		
	AOT464	AUTOMATION AND FEEDBACK CONTROLS IN AEROSPACE	2-1-0		
	AOT474	MACHINE LEARNING IN AEROSPACE ENGINEERING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	AOT416	AIRTRANSPORTATION AND AIRLINE MANAGEMENT	2-1-0	3	3
	AOT426	AIRTRAFIC CONTROL AND MANAGEMENT	2-1-0		
	AOT436	ENERGY METHODS IN STRUCTURAL MECHANICS	2-1-0		
	AOT446	AIRCRAFT GENERAL MAINTANCE AND PRACTICES	2-1-0		
	AOT456	ROTORY WING THEORY AND HELICOPTER AERODYNAMICS	2-1-0		
	AOT466	INDUSTRIAL AERODYNAMICS	2-1-0		
	AOT476	CIVIL AVIATION REGULATIONS	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	AOT418	STABILITY AND CONTROL IN AIRCRAFT	2-1-0	3	3
	AOT428	AIRCRAFT PRODUCTION TECHNOLOGY	2-1-0		
	AOT438	THEORY OF ELASTICITY	2-1-0		
	AOT448	INTRODUCTION TO FLOW INSTABILITY	2-1-0		
	AOT458	AIRFRAME MAINTANCE AND REPAIR	2-1-0		
	AOT468	HIGH TEMPERATURE MATERIALS	2-1-0		
	AOT478	MECHANICS OF COMPOSITES	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;
    - Preparing a paper for Conference presentation/Publication in Journals, if possible;

- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct Comprehensive Course Viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do Miniproject either in S7 or S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in AERONAUTICAL Branch** can opt to study the courses listed below.

Semester	BASKET I				BASKET II				BASKET III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	AOT281	FUNDAMENTALS OF AERONAUTICS	4	4	AOT 281	FUNDAMENTALS OF AERONAUTICS	4	4	AOT 281	FUNDAMENTALS OF AERONAUTICS	4	4
S4	AOT 282	FUNDAMENTALS OF AERODYNAMICS	4	4	AOT 284	APPLIED THERMODYNAMICS	4	4	AOT 286	MECHANICS OF MATERIALS AND STRUCTURES	4	4
S5	AOT 381	HIGHSPEED AERODYNAMICS	4	4	AOT 383	BASICS OF AERO ENGINES	4	4	AOT 385	AIRCRAFT STRUCTURAL ANALYSIS	4	4
S6	AOT 382	EXPERIMENTAL AERODYNAMICS AND FLOW VISUALISATION	4	4	AOT 384	ROCKET PROPULSION	4	4	AOT 386	STRUCTURAL DYNAMICS AND AERO ELASTICITY	4	4
S7	AOD 481	MINIPROJECT	4	4	AOD481	MINIPROJECT	4	4	AOD 481	MINIPROJECT	4	4
S8	AOD 482	MINIPROJECT	4	4	AOD 482	MINIPROJECT	4	4	AOD 482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in AERONAUTICAL ENGINEERING** can opt to study the courses listed below.

Semester	GROUP I				GROUP II				GROUP III			
	Course No	COURSE NAME	HOURS	CREDIT	Course No	COURSE NAME	HOURS	CREDIT	Course No	COURSE NAME	HOURS	CREDIT
S4	AOT 292	ADVANCED FLUID MECHANICS	4	4	AOT 294	GAS DYNAMICS	4	4	AOT 296	ADVANCED MECHANICS OF MATERIALS	4	4
S5	AOT 393	Advanced Numerical techniques	4	4	AOT 395	HIGH SPEED PROPULSION SYSTEMS	4	4	AOT 397	ADVANCED CONCEPTS IN AIRCRAFT STRUCTURES	4	4
S6	AOT 394	RAREFIED GAS DYNAMICS AND INTERPLANETARY SPACE TRAVEL	4	4	AOT 396	ADVANCED PROPULSION SYSTEMS	4	4	AOT 398	COMPUTATIONAL STRUCTURAL MECHANICS	4	4
S7	AOT 495	BOUNDAARY LAYER THEORY	4	4	AOT 497	ADVANCED HEAT TRANSFER	4	4	AOT 499	DESIGN OF COMPOSITE STRUCTURES	4	4
S8	AOD 496	MINIPROJECT	4	4	AOD 496	MINIPROJECT	4		AOD 496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech APPLIED ELECTRONICS & INSTRUMENTATION

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	162	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Semester	1	2	3	4	5	6	7	8	Total
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
Grand.Total									162

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like E C L 2 0 1. The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	ECT201	SOLID STATE DEVICES	3-1-0	4	4
C	ECT203	LOGIC CIRCUIT DESIGN	3-1-0	4	4
D	ECT205	NETWORK THEORY	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	ECL201	SCIENTIFIC COMPUTING LAB	0-0-3	3	2
T	ECL203	LOGIC DESIGN LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT204	PROBABILITY, RANDOM PROCESS AND NUMERICAL METHODS	3-1-0	4	4
B	ECT202	ANALOG CIRCUITS	3-1-0	4	4
C	ECT204	SIGNALS AND SYSTEMS	3-1-0	4	4
D	AET206	MEASUREMENTS AND INSTRUMENTATION	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	ECL202	ANALOG CIRCUITS AND SIMULATION LAB	0-0-3	3	2
T	AEL204	TRANSDUCERS AND MEASUREMENTS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AET301	CONTROL SYSTEMS	3-1-0	4	4
B	AET303	INDUSTRIAL INSTRUMENTATION	3-1-0	4	4
C	AET305	COMPUTER ARCHITECTURE AND EMBEDDED SYSTEMS	3-1-0	4	4
D	AET307	ANALOG INTEGRATED CIRCUITS	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	AEL331	ANALOG INTEGRATED CIRCUITS AND INSTRUMENTATION LAB	0-0-3	3	2
T	AEL333	EMBEDDED SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AET302	DIGITAL SIGNAL PROCESSING	3-1-0	4	4
B	AET304	PROCESS DYNAMICS AND CONTROL	3-1-0	4	4
C	AET306	POWER ELECTRONICS	3-1-0	4	4
D	AETXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	AET308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	AEL332	POWER ELECTRONICS LAB	0-0-3	3	2
T	AED334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ECT312	DIGITAL SYSTEM DESIGN	2-1-0	3	3
	AET322	DIGITAL IMAGE PROCESSING	2-1-0		
	AET332	COMPUTER NETWORKS	2-1-0		
	AET342	BIOMEDICAL INSTRUMENTATION	2-1-0		
	AET352	REAL TIME OPERATING SYSTEMS	2-1-0		
	AET362	OPTOELECTRONIC DEVICES	2-1-0		
	AET372	INTERNET OF THINGS	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AET401	COMMUNICATION ENGINEERING	2-1-0	3	3
B	AETXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	AETXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	AEL411	PROCESS CONTROL LAB	0-0-3	3	2
T	AEQ413	SEMINAR	0-0-3	3	2
U	AED415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	AET413	NONLINEAR AND ADAPTIVE CONTROL SYSTEMS	2-1-0	3	3
	AET423	SCADA AND DISTRIBUTED CONTROL SYSTEM	2-1-0		
	AET433	ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY	2-1-0		
	AET443	FPGA BASED SYSTEM DESIGN	2-1-0		
	AET453	PYTHON FOR SIGNAL AND IMAGE PROCESSING	2-1-0		
	AET463	COMPUTER NUMERICAL CONTROL	2-1-0		
	AET473	DATA STRUCTURES AND ALGORITHMS	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of AEI for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	AET415	INSTRUMENTATION SYSTEMS	2-1-0	3	3
	AET425	BIOMEDICAL ENGINEERING	2-1-0		
	AET435	MEMS	2-1-0		
	AET445	ROBOTICS AND INDUSTRIAL AUTOMATION	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10

   Guide : 20

   Technical Content of the Report : 30

   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative

study in the broad field of Applied Electronics & Instrumentation Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30

Interim evaluation by the evaluation committee : 20

Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AET402	VLSI CIRCUIT DESIGN	2-1-0	3	3
B	AETXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	AETXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	AETXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	AET404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	AED416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	AET414	ANN AND DEEP LEARNING	2-1-0	3	3
	AET424	SOFT COMPUTING	2-1-0		
	AET434	BIOINFORMATICS	2-1-0		
	AET444	SPEECH AND AUDIO PROCESSING	2-1-0		
	AET454	WIRELESS SENSOR NETWORKS	2-1-0		
	AET464	NANOELECTRONICS	2-1-0		
	AET474	INTEGRATED OPTICS AND PHOTONIC SYSTEMS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	AET416	INDUSTRIAL DRIVES AND CONTROL	2-1-0	3	3
	AET426	CONTROL OF POWER CONVERTERS	2-1-0		
	AET436	AVIATION ELECTRONICS	2-1-0		
	AET446	DIGITAL CONTROL SYSTEM	2-1-0		
	AET456	POWER PLANT INSTRUMENTATION	2-1-0		
	AET466	MEMS	2-1-0		
	AET476	ROBOTICS AND INDUSTRIAL AUTOMATION	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ECT418	MECHATRONICS	2-1-0	3	3
	AET428	AUTOMOTIVE ELECTRONICS	2-1-0		
	AET438	CYBER SECURITY	2-1-0		
	AET448	INSTRUMENTATION AND CONTROL FOR PETROCHEMICAL INDUSTRIES	2-1-0		
	AET458	WIRELESS COMMUNICATION	2-1-0		
	AET468	OPTICAL INSTRUMENTATION	2-1-0		
	AET478	RENEWABLE ENERGY TECHNOLOGY	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. Project Phase II: The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv)There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi)The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered for B.Tech Minor in **Applied Electronics and Instrumentation** can opt to study the courses listed below:

Semester	**Basket I**				**Basket II**				**Basket III**			
	COURSE NO.	**COURSE NAME**	**HOURS**	**CREDIT**	**COURSE NO.**	**COURSE NAME**	**HOURS**	**CREDIT**	**COURSE NO.**	**COURSE NAME**	**HOURS**	**CREDIT**
S3	AET281	INTRODUCTION TO SIGNALS & SYSTEMS	4	4	AET283	DIGITAL CIRCUIT DESIGN	4	4	AET285	INTRODUCTION TO MEASUREMENTS AND INSTRUMENTATION	4	4
S4	AET282	INTRODUCTION TO DIGITAL SIGNAL PROCESSING	4	4	AET284	INTRODUCTION TO ANALOG CIRCUITS	4	4	AET286	INTRODUCTION TO INDUSTRIAL INSTRUMENTATION	4	4

S5	AET381	DIGITAL IMAGE PROCESSING	4	4	AET383	POWER ELECTRONICS	4	4	AET385	CONTROL SYSTEMS	4	4
S6	AET382	SOFT COMPUTING	4	4	AET384	MEMS	4	4	AET386	PROCESS CONTROL	4	4
S7	AED481	MINIPROJECT	4	4	AED481	MINIPROJECT	4	4	AED481	MINIPROJECT	4	4
S8	AED482	MINIPROJECT	4	4	AED482	MINIPROJECT	4	4	AED482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a

mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for Honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for B.Tech Honours in **APPLIED ELECTRONICS AND INSTRUMENTATION** can opt to study the courses listed below:

Semester	Group I				Group II				Group III			
	COURSE NO.	COURSE NAME	HOURS	CREDIT	COURSE NO.	COURSE NAME	HOURS	CREDIT	COURSE NO.	COURSE NAME	HOURS	CREDIT
S4	AET292	INSTRUMENTATION SYSTEM DESIGN	4	4	AET294	SYSTEM DESIGN USING VERILOG	4	4	AET296	LINEAR ALGEBRA	4	4
S5	AET393	OPTIMIZATION TECHNIQUES	4	4	AET395	ARM ARCHITECTURE DESIGN	4	4	AET397	WAVELETS	4	4
S6	AET394	PWM SCHEME FOR POWER CONVERTERS	4	4	AET396	MIXED CIRCUIT DESIGN	4	4	AET398	COMPUTER VISION	4	4
S7	AET495	ADVANCED CONTROL THEORY	4	4	AET497	VLSI STRUCTURES FOR SIGNAL PROCESSING	4	4	AET499	ESTIMATION AND DETECTION	4	4

S8	AED496	MINIPROJECT	4	4	AED496	MINIPROJECT	4	4	AED496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. TECH AUTOMOBILE ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Sem	1	2	3	4	5	6	7	8	Total
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									162

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.
2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MET201	MECHANICS OF SOLIDS	3-1-0	4	4
C	AUT201	AUTOMOTIVE CHASSIS	3-1-0	4	4
D	AUT203	ENGINEERING THERMODYNAMICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	AUL201	AUTOMOBILE LAB I	0-0-3	3	2
T	MEL203	MATERIALS TESTING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	AUT202	FLUID MECHANICS AND MACHINERY	3-1-0	4	4
C	AUT204	AUTO POWER PLANT	3-1-0	4	4
D	AUT206	AUTOMOTIVE TRANSMISSION	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MEL202	FM & HM LAB	0-0-3	3	2
T	AUL202	AUTOMOBILE LAB II	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesn't opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AUT301	THEORY OF MACHINES	3-1-0	4	4
B	AUT303	MANUFACTURING PROCESS	3-1-0	4	4
C	AUT305	HYBRID AND FUEL CELL VEHICLES	3-1-0	4	4
D	AUT307	MATERIAL SCIENCE AND METALLURGY	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MUL331	PRODUCTION ENGINEERING LAB	0-0-3	3	2
T	MEL333	THERMAL ENGINEERING LAB-I	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade-in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET302	HEAT & MASS TRANSFER	3-1-0	4	4
B	AUT304	AUTOMOTIVE ELECTRICAL AND ELECTRONICS	3-1-0	4	4
C	AUT306	AUTOMOTIVE COMPONENTS DESIGN	3-1-0	4	4
D	AUTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	AUT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	MEL332	COMPUTER AIDED DESIGN & ANALYSIS LAB	0-0-3	3	2
T	AUL334	AUTOMOBILE LAB III	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	AUT312	TWO AND THREE WHEELED VEHICLE	2-1-0	3	3
	AUT322	NUMERICAL METHODS	2-1-0		
	AUT332	VEHICLE INSPECTION AND MAINTENANCE	2-1-0		
	AUT342	VEHICLE PERFORMANCE AND TESTING	2-1-0		
	AUT352	AUTOMOTIVE POLLUTION AND TESTING	2-1-0		
	AUT362	MECHATRONICS AND CONTROL SYSTEMS	2-1-0		
	AUT372	CAD /CAM	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AUT401	ADVANCED IC ENGINES	2-1-0	3	3
B	AUTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	AUTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	AUL411	AUTOMOBILE LAB IV	0-0-3	3	2
T	AUQ413	SEMINAR	0-0-3	3	2
U	AUD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	AUT413	ALETERNATE ENERGY SOURCES FOR AUTOMOBILE	2-1-0	3	3
	AUT423	VEHICLE AERODYNAMICS	2-1-0		
	AUT433	THEORY OF VIBRATIONS	2-1-0		
	AUT443	MARKETING MANAGEMENT	2-1-0		
	AUT453	DESIGN OF MACHINE ELEMENTS	2-1-0		
	AUT463	VEHICLE DESIGN DATA CHARACTERISTICS	2-1-0		
	AUT473	HEATING VENTILATION AND AIRCONDITIONING	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of AUTOMOBILE ENGINEERING for students of other undergraduate branches offered in the college.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	AUT415	MODERN AUTOMOTIVE TECHNOLOGY	2-1-0	3	3
	AUT425	HYBRID AND ELECTRIC VEHICLES	2-1-0		
	AUT435	AUTOMOTIVE ERGONOMICS AND SAFETY	2-1-0		
	AUT445	AVG AND AUTONOMOUS VEHICLES	2-1-0		
	AUT455	COMPUTER SIMULATION AND ANALYSIS OF AUTOMOTIVE SYSTEMS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Automobile Engineering, either fully theoretical/practical

or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AUT402	VEHICLE DYNAMICS	2-1-0	3	3
B	AUTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	AUTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	AUTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	AUT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	AUD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	AUT414	SPECIAL TYPES OF VEHICLES	2-1-0	3	3
	AUT424	ENGINE AND VEHICLE MANAGEMENT SYSTEM	2-1-0		
	AUT434	ADVANCED METAL JOINING TECHNIQUES	2-1-0		
	AUT444	AGV AND AUTONOMOUS VEHICLE	2-1-0		
	AUT454	SUPPLY CHAIN MANAGEMENT	2-1-0		
	AUT464	AEROSPACE ENGINEERING	2-1-0		
	AUT474	METROLOGY AND MEASUREMENTS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	AUT416	OPERATIONS MANAGEMENT IN AUTO INDUSTRY	2-1-0	3	3
	AUT426	AUTOMOTIVE COMFORT AND SAFETY ENGINEERING	2-1-0		
	AUT436	PRODUCT DESIGN AND LIFECYCLE	2-1-0		

		MANAGEMENT			
	AUT446	ADVANCED AUTOMOTIVE MANUFACTURING MATERIALS	2-1-0		
	AUT456	TOTAL QUALITY MANAGEMENT	2-1-0		
	AUT466	VEHICLE MAINTENANCE	2-1-0		
	AUT476	MACHINE LEARNING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	AUT418	VEHICLE TRANSPORT AND FLEET MANAGEMENT	2-1-0	3	3
	AUT428	VEHICLE BODY ENGINEERING AND SSFETY	2-1-0		
	AUT438	POWER PLANT ENGINEERING	2-1-0		
	AUT448	ADVANCED METAL JOINING TECHNIQUES	2-1-0		
	AUT458	SIMULATION AND ANALYSIS OF AUTO COMPONENTS	2-1-0		
	AUT468	HYDRAULICS AND PNEUMATICS	2-1-0		
	AUT478	ADVANCED METAL CASTING	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for

the student(s) in R&D work and technical leadership. The assignment to normally include:

- In depth study of the topic assigned in the light of the Report prepared under Phase I;
- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required

courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in AUTOMOBILE ENGINEERING Branch** can opt to study the courses listed below:

SEMESTER	BASKET I			
	COURSE NO.	COURSE NAME	HOURS	CREDIT
S3	AUT281	FUNDAMENTALS OF AUTOMOBILES ENGINEERING	4	4
S4	AUT282	AUTOMOTIVE CHASSIS AND ENGINE COMPONENTS	4	4
S5	AUT381	DYNAMICS OF AUTOMOBILES	4	4

S6	AUT382	MODERN AUTOMOTIVE TECHNOLOGY	4	4
S7	AUD481	MINIPROJECT	4	4
S8	AUD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in AUTOMOBILE** can opt to study the courses listed below:

SEMESTER	GROUP I			
	Course No.	Course Name	HOURS	CREDIT
S4	AUT292	INCOMPRESSIBLE AND COMPRESSIBLE FLOWS	4	4
S5	AUT393	ADVANCED THEORY OF VIBRATIONS	4	4
S6	AUT394	IC ENGINES AND ADVANCED COMBUSTION STRATEGIES	4	4
S7	AUT495	SIMULATION AND ANALYSIS OF IC ENGINE PROCESS	4	4
S8	AUD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.

- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech BIOMEDICAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA & CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS & TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.
4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.
5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS	3-1-0	4	4
B	BMT201	BASIC ANATOMY & PHYSIOLOGY FOR BIOMEDICAL ENGINEERS	3-1-0	4	4
C	BMT203	DIGITAL ELECTRONICS	3-1-0	4	4
D	BMT205	ANALOG ELECTRONICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	BML201	DIGITAL ELECTRONICS LAB	0-0-3	3	2
T	BML203	ANALOG ELECTRONICS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	BMT202	MICROCONTROLLERS & INTERFACING	4-0-0	4	4
C	BMT204	ELECTRICAL & ELECTRONIC INSTRUMENTATION	4-0-0	4	4
D	BMT206	BIOPHYSICS	4-0-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	BML202	MICROCONTROLLERS & INTERFACING LAB	0-0-3	3	2
T	BML204	BIOMEDICAL ELECTRONICS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BMT301	ANALYTICAL & DIAGNOSTIC EQUIPMENTS	4-0-0	4	4
B	BMT303	BIOMEDICAL SIGNAL PROCESSING	3-1-0	4	4
C	BMT305	BIOSENSORS & TRANSDUCERS	4-0-0	4	4
D	BMT307	SOFT COMPUTING TECHNIQUES	4-0-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	BML331	MEDICAL COMPUTING & VIRTUAL INSTRUMENTATION LAB	0-0-3	3	2
T	BML333	CLINICAL INSTRUMENTATION LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BMT302	BIOMECHANICS	4-0-0	4	4
B	BMT304	THERAPEUTIC EQUIPMENTS	4-0-0	4	4
C	BMT306	PRINCIPLES OF MEDICAL IMAGING	4-0-0	4	4
D	BMTXXX	PROGRAM ELECTIVE I	3-0-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	BMT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	BML332	BIOMEDICAL EQUIPMENT DISSECTION LAB	0-0-3	3	2
T	BMD334	MINI PROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	BMT312	CONTROL SYSTEMS	2-1-0	3	3
	BMT322	MEDICAL INFORMATICS	3-0-0		
	BMT332	ADVANCED MICROPROCESSORS & MICROCONTROLLERS	3-0-0		
	BMT342	DESIGN OF BIOMEDICAL DEVICES	3-0-0		
	BMT352	BIOSTATISTICS	3-0-0		
	BMT362	NETWORK ANALYSIS	2-1-0		
	BMT372	COMMUNICATION TECHNIQUES	3-0-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BOS choosing any 5 core courses studied from semester 3 to 5**. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HOD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

Total marks: 150, CIE 75 marks and ESE 75 marks

Split up for CIE

Attendance : 10

Guide : 15

Project Report : 10

Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BMT401	PRINCIPLES OF MEDICAL IMAGE PROCESSING	3-0-0	3	3
B	BMTXXX	PROGRAM ELECTIVE II	3-0-0	3	3
C	BMTXXX	OPEN ELECTIVE	3-0-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	BML411	BIOMEDICAL SIGNAL & IMAGE PROCESSING LAB	0-0-3	3	2
T	BMQ413	SEMINAR	0-0-3	3	2
U	BMD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	BMT413	ADVANCES IN BIOMEDICAL SIGNAL PROCESSING	3-0-0	3	3
	BMT423	DESIGN OF LOGIC SYSTEMS	2-1-0		
	BMT433	COMPUTER ORGANIZATION & ARCHITECTURE	3-0-0		
	BMT443	CLINICAL ENGINEERING	3-0-0		
	BMT453	BIO FLUID MECHANICS	3-0-0		
	BMT463	ARTIFICIAL NEURAL NETWORKS	3-0-0		
	BMT473	BIOMEDICAL OPTICS & BIOPHOTONICS	3-0-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of BIOMEDICAL ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	BMT415	BIOMEDICAL INSTRUMENTATION	2-1-0	3	3
	BMT425	MEDICAL IMAGING & IMAGE PROCESSING	2-1-0		
	BMT435	ARTIFICIAL ORGANS & IMPLANTS	2-1-0		
	BMT445	ASSISTIVE MEDICAL DEVICES	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance : 10
Guide : 20
Technical Content of the Report : 30
Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Biomedical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;

- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	:30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BMT402	BIOMATERIALS	2-1-0	3	3
B	BMTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	BMTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	BMTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	BMT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	BMD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	BMT414	POWER ELECTRONICS & APPLICATIONS	3-0-0	3	3
	BMT424	ARTIFICIAL ORGANS & IMPLANTS	3-0-0		
	BMT434	COMPUTATIONAL TECHNIQUES FOR BIOMEDICAL SCIENCES	2-1-0		
	BMT444	MEDICAL ROBOTICS	3-0-0		
	BMT454	FUNDAMENTALS OF BIOMEMS & MICROFLUIDICS	3-0-0		
	BMT464	QUANTITATIVE PHYSIOLOGY	3-0-0		
	BMT474	ADVANCED MEDICAL IMAGING & IMAGE PROCESSING TECHNIQUES	3-0-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	BMT416	VLSI DESIGN	3-0-0	3	3
	BMT426	IMPLANTS & PROSTHETIC ENGINEERING	3-0-0		
	BMT436	RADIOLOGICAL EQUIPMENTS	3-0-0		
	BMT446	BIOMEDICAL TRANSPORT PHENOMENA	3-0-0		
	BMT456	PATTERN RECOGNITION	3-0-0		
	BMT466	MECHATRONICS	3-0-0		
	BMT476	MEDICAL DEVICES, REGULATIONS & QUALITY ASSURANCE	3-0-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	BMT418	EMBEDDED SYSTEM DESIGN	3-0-0	3	3
	BMT428	ASSISTIVE MEDICAL DEVICES	3-0-0		
	BMT438	REHABILITATION ENGINEERING	3-0-0		
	BMT448	INTRODUCTION TO BIONANOTECHNOLOGY	3-0-0		
	BMT458	RELIABILITY ENGINEERING	3-0-0		
	BMT468	MODELLING OF PHYSIOLOGICAL SYSTEMS	3-0-0		
	BMT478	HUMAN FACTORS IN ENGINEERING & DESIGN	3-0-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based

on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;
   - Preparing a paper for Conference presentation/Publication in Journals, if possible;
   - Preparing a Dissertation in the standard format for being evaluated by the Department;
   - Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv)There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in BIOMEDICAL ENGINEERING** can opt to study the courses listed below:

Semester	Basket I (BIOMEDICAL IMAGING)				Basket II (REHABILITATION ENGINEERING)				Basket III (BIOMEDICAL COMPUTATIONAL METHODS)			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDITS
S3	BMT281	MEDICAL PHYSICS	4	4	BMT283	BIOMATERIALS	4	4	BMT285	BASIC MEDICAL SCIENCES FOR ENGINEERS	4	4
S4	BMT282	PRINCIPLES OF RADIODIAGNOSIS & RADIOTHERAPY	4	4	BMT284	ARTIFICIAL ORGANS & IMPALNTS	4	4	BMT286	NUMERICAL TECHNIQUES IN BIOMEDICAL ENGINEERING	4	4
S5	BMT381	MEDICAL IMAGING TECHNIQUES	4	4	BMT383	REHABILITATION ENGINEERING	4	4	BMT385	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING TECHNIQUES	4	4
S6	BMT382	MEDICAL IMAGE PROCESSING	4	4	BMT384	IMPLANTS & PROSTHETICS ENGINEERING	4	4	BMT386	PHYSIOLOGICAL SYSTEM MODELLING	4	4
S7	BMD481	MINIPROJECT	4	4	BMD481	MINIPROJECT	4	4	BMD481	MINIPROJECT	4	4
S8	BMD482	MINIPROJECT	4		BMD482	MINIPROJECT	4		BMD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with

Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in BIOMEDICAL ENGINEERING** can opt to study the courses listed below:

	Group I				Group II				Group III			
Semester	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	BMT292	BASIC SIGNALS & SYSTEMS	4	4	BMT294	BIOSENSORS	4	4	BMT296	OBJECT ORIENTED PROGRAMING	4	4
S5	BMT393	BIOSIGNAL PROCESSING	4	4	BMT395	BIOMEDICAL NANO TECHNOLOGY IN SENSOR DEVELOPMENT	4	4	BMT397	PROGRAMING USING PYTHON	4	4
S6	BMT394	DIGITAL SIGNAL PROCESSORS	4	4	BMT396	ELECTRO ANALYTICAL TECHNIQUES	4	4	BMT398	DATA SCIENCE	4	4
S7	BMT495	IMAGE & VIDEO PROCESSING	4	4	BMT497	MEMS	4	4	BMT499	ARTIFICIAL INTELLEGENCE& MACHINE LEARNING	4	4
S8	BMD496	MINIPROJECT	4	4	BMD496	MINIPROJECT	4	4	BMD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.

- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech BIOTECHNOLOGY

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	BTT201	BIOPROCESS CALCULATIONS	3-1-0	4	4
C	BTT203	MICROBIOLOGY	3-1-0	4	4
D	BTT205	FLUID FLOW AND PARTICLE TECHNOLOGY	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	BTL201	MICROBIOLOGY LAB	0-0-3	3	2
T	BTL203	FLUID FLOW AND PARTICLE TECHNOLOGY LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	BTT202	CHEMICAL AND BIOLOGICAL REACTION ENGINEERING	3-1-0	4	4
C	BTT204	PRINCIPLES OF BIOCHEMISTRY	3-1-0	4	4
D	BTT206	BIOPROCESS ENGINEERING	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	BTL202	BIOCHEMISTRY LAB	0-0-3	3	2
T	BTL204	ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BTT301	INDUSTRIAL BIOPROCESS TECHNOLOGY	3-1-0	4	4
B	BTT303	MASS TRANSFER OPERATIONS	3-1-0	4	4
C	BTT305	MOLECULAR BIOLOGY	3-1-0	4	4
D	BTT307	THERMODYNAMICS AND HEAT TRANSFER	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	BTL331	BIOPROCESS ENGINEERING LAB	0-0-3	3	2
T	BTL333	MOLECULAR BIOLOGY LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BTT302	BIOINFORMATICS	2-0-2	4	4
B	BTT304	DOWNSTREAM PROCESSING	3-1-0	4	4
C	BTT306	BIOREACTOR CONTROL AND INSTRUMENTATION	3-1-0	4	4
D	BTTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	BTT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	BTL332	DOWNSTREAM PROCESSING LAB	0-0-3	3	2
T	BTL334	HEAT AND MASS TRANSFER LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	BTT312	ANIMAL & PLANT CELL TECHNOLOGY	2-1-0	3	3
	BTT322	ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY	2-1-0		
	BTT332	CELL BIOLOGY	2-1-0		
	BTT342	PROJECT ENGINEERING AND PROCESS PLANT ECONOMICS	2-1-0		
	BTT352	BASICS IN IMMUNOLOGY	2-1-0		
	BTT362	BIOSTATISTICS	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BTT401	PROCESS EQUIPMENT AND PLANT DESIGN	2-1-0	3	3
B	BTTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	BTTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	BTL411	REACTION ENGINEERING AND PROCESS CONTROL LAB	0-0-3	3	2
T	BTQ413	SEMINAR	0-0-3	3	2
U	BTD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	BTT413	ENERGY ENGINEERING	2-1-0	3	3
	BTT423	GENETIC ENGINEERING	2-1-0		
	BTT433	PROTEOMICS & PROTEIN ENGINEERING	2-1-0		
	BTT443	BIO NANOTECHNOLOGY	2-1-0		
	BTT453	MODELING OF TRANSFER PROCESSES	2-1-0		
	BTT463	APPLIED MICROBIAL TECHNOLOGY	2-1-0		

1. **OPEN ELECTIVE (OE)**

   The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of BT for students of other undergraduate branches offered in the college.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	BTT415	INDUSTRIAL BIOTECHNOLOGY	2-1-0	3	3
	BTT425	BASICS IN BIOINFORMATICS & DRUG DESIGN	2-1-0		
	BTT435	SUSTAINABLE ENERGY PROCESS	2-1-0		
	BTT445	OCCUPATIONAL HEALTH AND GENERAL SAFETY	2-1-0		
	BTT455	WASTE WATER ENGINEERING	2-1-0		

1.*All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.

2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10

   Guide : 20

   Technical Content of the Report : 30

   Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Bio Technology either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before the evaluation committee.

   Total marks: 100, only CIE, minimum required to pass 50

   Guide : 30

   Interim evaluation by the evaluation committee : 20

   Final Seminar : 30

   The report evaluated by the evaluation committee : 20

   The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BTT402	ENVIRONMENTAL BIOTECHNOLOGY	2-1-0	3	3
B	BTTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	BTTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	BTTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	BTT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	BTD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	BTT414	FOOD PROCESS TECHNOLOGY	2-1-0	3	3
	BTT424	BIOREFINERY ENGINEERING	2-1-0		
	BTT434	BIOPHARMACEUTICAL TECHNOLOGY	2-1-0		
	BTT444	EFFLUENT/ WASTE WATER TREATMENT	2-1-0		
	BTT454	DAIRY PROCESS TECHNOLOGY	2-1-0		
	BTT464	OPERATIONAL RESEARCH	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	BTT416	CANCER BIOLOGY	2-1-0	3	3
	BTT426	ADVANCED SEPARATION PROCESSES	2-1-0		
	BTT436	BIOMATERIALS , TISSUE ENGINEERING & STEM CELLS	2-1-0		
	BTT446	BIOPROCESS INSTRUMENTATION	2-1-0		
	BTT456	DRUG DESIGN AND DEVELOPMENT	2-1-0		
	BTT466	CLINICAL RESEARCH & DRUG TESTING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	BTT418	PROCESS SAFETY AND BIOETHICS	2-1-0	3	3
	BTT428	BIOBUSINESS	2-1-0		
	BTT438	ENTREPRENEURSHIP & IPR	2-1-0		
	BTT448	BIOPHYSICS & BIOSENSORS	2-1-0		
	BTT458	BIOPROCESS QUALITY CONTROL	2-1-0		
	BTT468	MODELLING AND SCALE UP OF BIOREACTORS	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified **by M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in BIOTECHNOLOGY branch** can opt to study the courses listed below:

Semester	BASKET I				BASKET II				BASKET III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	BTT281	UPSTREAM PROCESSING	4	4	BTT283	CELL BIOLOGY AND BIOMOLECULES	4	4	BTT285	HEALTH SAFETY ENVIRONMENT	4	4
S4	BTT282	FERMENTATION TECHNOLOGY	4	4	BTT284	INTRODUCTION TO MOLECULAR BIOLOGY	4	4	BTT286	PROCESS SAFETY	4	4
S5	BTT381	DOWN STREAM PROCESSING	4	4	BTT383	BIOINFORMATICS & GENOMICS TECHNOLOGY	4	4	BTT385	INDUSTRIAL SAFETY MANAGEMENT	4	4
S6	BTT382	PROCESS VALIDATION AND QUALITY CONTROL	4	4	BTT384	MOLECULAR DIAGNOSTICS & DRUG DESIGN	4	4	BTT386	ACCIDENT INVESTIGATION	4	4
S7	BTD481	MINIPROJECT	4	4	BTD481	MINIPROJECT	4	4	BTD481	MINIPROJECT	4	4
S8	BTD482	MINIPROJECT	4	4	BTD482	MINIPROJECT	4	4	BTD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in Biotechnology** can opt to study the courses listed below

Semester	GROUP I				GROUP II				GROUP III			
	Course No	COURSE NAME	HOURS	CREDIT	Course No	COURSE NAME	HOURS	CREDIT	Course No	COURSE NAME	HOURS	CREDIT
S4	BTT292	CELL SIGNALLING	4	4	BTT294	BIORESOURCE TECHNOLOGY	4	4	BTT296	BIOPROCESS INSTRUMENTATION	4	4
S5	BTT393	IMMUNO TECHNOLOGY	4	4	BTT395	ENVIRONMENTAL POLLUTION MONITORING AND CONTROL	4	4	BTT397	MODELING OF BIOREACTORS	4	4
S6	BTT394	CLINICAL IMMUNOLOGY/ MOLECULAR MEDICINE	4	4	BTT396	HAZARDOUS WASTE MANAGEMENT	4	4	BTT398	NUMERICAL TECHNIQUES IN BIOPROCESSES	4	4
S7	BTT495	MOLECULAR MODELING AND SIMULATION	4	4	BTT497	BIOPROCESS SAFETY AND HAZARD ASSESSMENT	4	4	BTT499	DESIGN AND ANALYSIS OF BIOREACTORS	4	4
S8	BTD496	MINIPROJECT	4	4	BTD496	MINIPROJECT	4	4	BTD496	MINIPROJECT	4	4

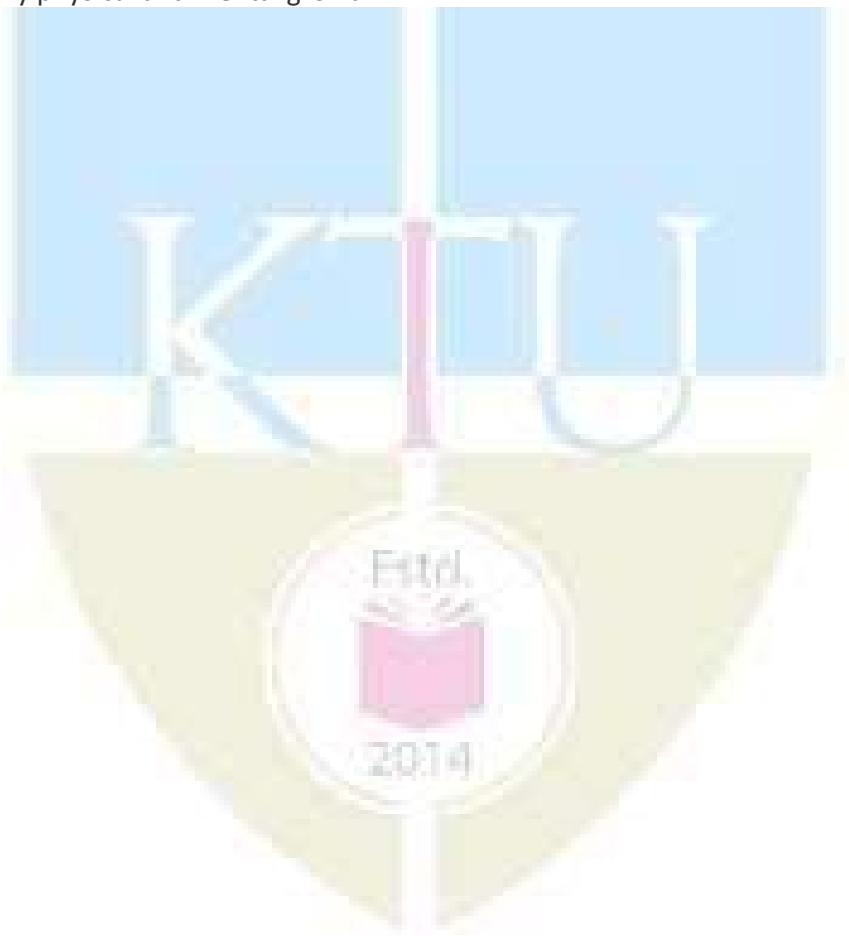
INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their

batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.



CURRICULUM I TO VIII: B.Tech CHEMICAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT	ENGINEERING MATHEMATICS	3-1-0	4	4
B	CHT 201	CHEMISTRY FOR PROCESS ENGINEERING	3-1-0	4	4
C	CHT 203	CHEMICAL PROCESS PRINCIPLES	3-1-0	4	4
D	CHT 205	FLUID AND PARTICLE MECHANICS	3-1-0	4	4
E 1/2	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN 201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	CHL 201	CHEMICAL TECHNOLOGY & ENVIRONMENTAL ENGINEERING LAB	0-0-3	3	2
T	CHL 203	CHEMISTRY LAB FOR PROCESS ENGINEERING	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT	ENGINEERING MATHEMATICS	3-1-0	4	4
B	CHT 202	CHEMICAL ENGINEERING THERMODYNAMICS	3-1-0	4	4
C	CHT 204	HEAT TRANSFER OPERATIONS	3-1-0	4	4
D	CHT 206	PARTICLE TECHNOLOGY	3-1-0	4	4
E 1/2	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN 202	CONSTITUTION OF INDIA	2-0-0	2	--
S	CHL 202	FLUID AND PARTICLE MECHANICS LAB	0-0-3	3	2
T	CHL 204	PARTICLE TECHNOLOGY LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CHT 301	MASS TRANSFER OPERATIONS-I	3-1-0	4	4
B	CHT 303	ENVIRONMENTAL ENGINEERING	3-1-0	4	4
C	CHT 305	CHEMICAL REACTION ENGINEERING	3-1-0	4	4
D	CHT 307	INSTRUMENTATION AND PROCESS CONTROL	3-1-0	4	4
E 1/2	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT 310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN 301	DISASTER MANAGEMENT	2-0-0	2	--
S	CHL 331	HEAT TRANSFER OPERATIONS LAB	0-0-3	3	2
T	CHL 333	PROCESS CONTROL LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CHT 302	MASS TRANSFER OPERATIONS-II	3-1-0	4	4
B	CHT 304	TRANSPORT PHENOMENA	3-1-0	4	4
C	CHT 306	CHEMICAL TECHNOLOGY	3-1-0	4	4
D	CHT XXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT 310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	CHT 308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	CHL 332	MASS TRANSFER OPERATIONS LAB	0-0-3	3	2
T	CHL 334	CHEMICAL REACTION ENGINEERING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CHT312	BIOCHEMICAL ENGINEERING	2-1-0	3	3
	CHT322	ENERGY ENGINEERING	2-1-0		
	CHT332	NUMERICAL METHODS FOR PROCESS ENGINEERS	2-1-0		
	CHT342	MATERIAL SCIENCE AND ENGINEERING	2-1-0		
	CHT352	OPERATIONS RESEARCH	2-1-0		
	CHT362	PROCESS INSTRUMENTATION	2-1-0		
	CHT372	CATALYST SCIENCE AND CATALYTIC PROCESSES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CHT 401	CHEMICAL PROCESS EQUIPMENT DESIGN I	2-1-0	3	3
B	CHT XXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	CHT XXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN 401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	CHL 411	PROCESS SIMULATION LAB	0-0-3	3	2
T	CHQ 413	SEMINAR	0-0-3	3	2
U	CHD 415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CHT413	FOOD PROCESSING AND TECHNOLOGY	2-1-0	3	3
	CHT423	OIL AND NATURAL GAS ENGINEERING	2-1-0		
	CHT433	PROCESS MODELLING AND SIMULATION	2-1-0		
	CHT443	CORROSION ENGINEERING	2-1-0		
	CHT453	PROJECT ENGINEERING	2-1-0		
	CHT463	INTRODUCTION TO DATA ANALYSIS	2-1-0		
	CHT473	FLUIDIZATION ENGINEERING	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of CHEMICAL ENGINEERING for students of other undergraduate branches offered in the college under KTU**.

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	CHT415	ENERGY TECHNOLOGY AND ENERGY MANAGEMENT	2-1-0	3	3
	CHT 425	PETROLEUM RESOURCES AND PETROCHEMICALS	2-1-0		
	CHT 435	PROCESS SAFETY ENGINEERING	2-1-0		
	CHT 445	PIPING AND PIPELINE DESIGN FOR PROCESS INDUSTRIES	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10

   Guide : 20

   Technical Content of the Report : 30

   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Chemical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;

- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30

Interim evaluation by the evaluation committee : 20

Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CHT 402	CHEMICAL PROCESS EQUIPMENT DESIGN II	2-1-0	3	3
B	CHT XXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	CHT XXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	CHT XXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	CHT 404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	CHD 416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CHT414	AIR POLLUTION MONITORING & CONTROL	2-1-0	3	3
	CHT424	PETROLEUM REFINERY ENGINEERING	2-1-0		
	CHT434	COMPUTATIONAL FLUID DYNAMICS	2-1-0		
	CHT444	POLYMER TECHNOLOGY	2-1-0		
	CHT454	PROCESS UTILITY AND PIPING ENGINEERING	2-1-0		
	CHT464	DRUGS AND PHARMACEUTICALS TECHNOLOGY	2-1-0		
	CHT474	ELECTROCHEMICAL ENGINEERING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	CHT416	ECONOMICS & MANAGEMENT OF CHEMICAL INDUSTRIES	2-1-0	3	3
	CHT426	PETROCHEMICALS AND FERTILIZERS	2-1-0		
	CHT436	MATHEMATICAL METHODS IN PROCESS ENGINEERING	2-1-0		
	CHT446	COMPOSITE MATERIALS	2-1-0		
	CHT456	CERAMIC TECHNOLOGY	2-1-0		
	CHT466	TOTAL QUALITY MANAGEMENT	2-1-0		
	CHT476	ENZYME ENGINEERING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CHT418	SOLID WASTE MANAGEMENT	2-1-0	3	3
	CHT428	NONCONVENTIONAL PETROLEUM RESOURCES	2-1-0		
	CHT438	PROCESS OPTIMIZATION	2-1-0		
	CHT448	NANOMATERIALS AND NANOTECHNOLOGY	2-1-0		
	CHT458	SAFETY ENGINEERING OF PROCESS PLANTS	2-1-0		
	CHT468	NOVEL SEPARATION TECHNIQUES	2-1-0		
	CHT478	FUEL CELL TECHNOLOGY	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in CHEMICAL ENGINEERING** can opt to study the courses listed below:

Semester	**BASKET I** Minor in Chemical Engineering (Process Safety)				**BASKET II** Minor in Chemical Engineering (Petroleum and Petrochemicals)				**BASKET III** Minor in Chemical Engineering (Materials Science and Engineering)			
	Course No.	**Course Name**	**HOURS**	**CREDIT**	**Course No.**	**Course Name**	**HOURS**	**CREDIT**	**Course No.**	**Course Name**	**HOURS**	**CREDIT**
S3	CHT281	INTRODUCTION TO CHEMICAL ENGINEERING	4	4	CHT281	INTRODUCTION TO CHEMICAL ENGINEERING	4	4	CHT281	INTRODUCTION TO CHEMICAL ENGINEERING	4	4
S4	CHT 282	SAFETY ENGINEERING OF PROCESS PLANTS	4	4	CHT 284	FUNDAMENTALS OF OIL AND NATURAL GAS ENGINEERING	4	4	CHT 286	MATERIAL SCIENCE AND ENGINEERING	4	4
S5	CHT 381	OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE	4	4	CHT 383	PETROLEUM REFINERY ENGINEERING	4	4	CHT 385	POLYMER TECHNOLOGY	4	4
S6	CHT 382	HAZARD AND RISK ASSESSMENT	4	4	CHT 384	PETROCHEMICAL TECHNOLOGY	4	4	CHT 386	NANO MATERIALS AND NANO TECHNOLOGY	4	4
S7	CHD 481	MINI PROJECT	4	4	CHD 481	MINI PROJECT	4	4	CHD 481	MINI PROJECT	4	4
S8	CHD 482	MINI PROJECT	4	4	CHD 482	MINI PROJECT	4	4	CHD 482	MINI PROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in CHEMICAL ENGINEERING** can opt to study the courses listed below:

Semester	GROUP I				GROUP II				GROUP III			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	CHT292	COMPUTATIONAL METHODS IN CHEMICAL ENGINEERING	4	4	CHT 294	INSTRUMENTAL METHODS FOR ENVIRONMENTAL ENGINEERING	4	4	CHT 296	MODERN METHODS OF INSTRUMENTATION	4	4
S5	CHT393	ADVANCED HEAT TRANSFER	4	4	CHT 395	PHYSICO CHEMICAL METHODS IN ENVIRONMENTAL ENGINEERING	4	4	CHT 397	SOFT COMPUTING TECHNIQUES	4	4
S6	CHT394	CHEMICAL REACTION ENGINEERING II	4	4	CHT 396	ADVANCED WASTEWATER TREATMENT TECHNIQUES	4	4	CHT 398	MODERN CONTROL THEORY	4	4
S7	CHT495	PROCESS INTEGRATION	4	4	CHT 497	PROCESS DESIGN FOR WASTEWATER TREATMENT	4	4	CHT 499	ADVANCED PROCESS CONTROL	4	4
S8	CHD496	MINI PROJECT	4	4	CHD 496	MINI PROJECT	4		CHD 496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their

batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.TECH CIVIL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, , Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Communication, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc.

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
		TOTAL		**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	CET201	MECHANICS OF SOLIDS	3-1-0	4	4
C	CET203	FLUID MECHANICS& HYDRAULICS	3-1-0	4	4
D	CET205	SURVEYING & GEOMATICS	4-0-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	CEL201	CIVIL ENGINEERING PLANNING &DRAFTING LAB	0-0-3	3	2
T	CEL203	SURVEY LAB	0-0-3	3	2
R/M	VAC	Remedial/Minor course	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	CET202	ENGINEERING GEOLOGY	3-0-1	4	4
C	CET204	GEOTECHNICAL ENGINEERING – I	4-0-0	4	4
D	CET206	TRANSPORTATION ENGINEERING	4-0-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	CEL202	MATERIAL TESTING LAB– I	0-0-3	3	2
T	CEL204	FLUID MECHANICS LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CET301	STRUCTURAL ANALYSIS – I	3-1-0	4	4
B	CET303	DESIGN OF CONCRETE STRUCTURES	3-1-0	4	4
C	CET305	GEOTECHNICAL ENGINEERING – II	4-0-0	4	4
D	CET307	HYDROLOGY & WATER RESOURCES ENGINEERING	4-0-0	4	4
E	CET309	CONSTRUCTION TECHNOLOGY& MANAGEMENT	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	CEL331	MATERIAL TESTING LAB – II	0-0-3	3	2
T	CEL333	GEOTECHNICAL ENGINEERING LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
		TOTAL		**27/31**	**23/27**

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CET302	STRUCTURAL ANALYSIS – II	3-1-0	4	4
B	CET304	ENVIRONMENTAL ENGINEERING	4-0-0	4	4
C	CET306	DESIGN OF HYDRAULIC STRUCTURES	4-0-0	4	4
D	CETXXX	PROGRAM ELECTIVE I	3-0-0	3	3
E	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
F	CET308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	CEL332	TRANSPORTATION ENGINEERING LAB	0-0-3	3	2
T	CEL334	CIVIL ENGINEERING SOFTWARE LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CET312	ADVANCED COMPUTATIONAL METHODS	3-0-0	3	3
	CET322	GEOTECHNICAL INVESTIGATION	3-0-0		
	CET332	TRAFFIC ENGINEERING & MANAGEMENT	3-0-0		
	CET342	MECHANICS OF FLUID FLOW	3-0-0		
	CET352	ADVANCED CONCRETE TECHNOLOGY	3-0-0		
	CET362	ENVIRONMENTAL IMPACT ASSESSMENT	3-0-0		
	CET372	FUNCTIONAL DESIGN OF BUILDINGS	3-0-0		

NOTE:

1. **All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 2 to 4 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honors programme, he/she can be given remedial class.
2. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted online by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CET401	DESIGN OF STEEL STRUCTURES	3-0-0	3	3
B	CETXXX	PROGRAM ELECTIVE II	3-0-0	3	3
C	CETXXX	OPEN ELECTIVE	3-0-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	CEL411	ENVIRONMENTAL ENGG LAB	0-0-3	3	2
T	CEQ413	SEMINAR	0-0-3	3	2
U	CED415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CET413	PRESTRESSED CONCRETE	3-0-0	3	3
	CET423	GROUND IMPROVEMENT TECHNIQUES	3-0-0		
	CET433	HIGHWAY MATERIALS AND DESIGN	3-0-0		
	CET443	APPLIED HYDROLOGY	3-0-0		
	CET453	CONSTRUCTION PLANNING & MANAGEMENT	3-0-0		
	CET463	ADVANCED ENVIRONMENTAL ENGINEERING	3-0-0		
	CET473	OPTIMISATION TECHNIQUES IN CIVIL ENGINEERING	3-0-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of CIVIL ENGINEERING for students of other undergraduate branches offered in the college.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	CET415	ENVIRONMENTAL IMPACT ASSESSMENT	2-1-0	3	3
	CET425	APPLIED EARTH SYSTEMS	2-1-0		
	CET435	INFORMATICS FOR INFRASTRUCTURE MANAGEMENT	2-1-0		
	CET445	DISASTER MAAGEMENT	2-1-0		
	CET455	ENVIRONMENTAL HEALTH AND SAFETY	2-1-0		
	CET465	GEOINFORMATICS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance : 10
Guide : 20
Technical Content of the Report : 30
Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Civil Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
    - Survey and study of published literature on the assigned topic;
    - Preparing an Action Plan for conducting the investigation, including team work;
    - Working out a preliminary Approach to the Problem relating to the assigned topic;
    - Block level design documentation
    - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
    - Preparing a Written Report on the Study conducted for presentation to the Department;
    - Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30

Interim evaluation by the evaluation committee : 20

Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CET402	QUANTITY SURVEYING & VALUATION	3-0-0	3	3
B	CETXXX	PROGRAM ELECTIVE III	3-0-0	3	3
C	CETXXX	PROGRAM ELECTIVE IV	3-0-0	3	3
D	CETXXX	PROGRAM ELECTIVE V	3-0-0	3	3
E	CET404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	CED416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CET414	ADVANCED STRUCTURAL DESIGN	3-0-0	3	3
	CET424	GEOENVIRONMENTAL ENGINEERING	3-0-0		
	CET434	RAILWAY AND TUNNEL ENGINEERING	3-0-0		
	CET444	IRRIGATION & DRAINAGE ENGINEERING	3-0-0		
	CET454	CONSTRUCTION METHODS & EQUIPMENT	3-0-0		
	CET464	AIRQUALITY MANAGEMENT	3-0-0		
	CET474	URBAN PLANNING & ARCHITECTURE	3-0-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	CET416	BRIDGE ENGINEERING	3-0-0	3	3
	CET426	ADVANCED FOUNDATION DESIGN	3-0-0		
	CET436	TRANSPORTATION PLANNING	3-0-0		
	CET446	INFORMATICS FOR INFRASTRUCTURE MANAGEMENT	3-0-0		
	CET456	REPAIR AND REHABILITATION OF BUILDINGS	3-0-0		
	CET466	ENVIRONMENTAL REMOTESENSING	3-0-0		
	CET476	BULDING SERVICES	3-0-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CET418	EARTHQUAKERESISTANT DESIGN	3-0-0	3	3
	CET428	SOIL STRUCTURE INTERACTION	3-0-0		
	CET438	AIRPORT, SEAPORT AND HARBOUR ENGINEERING	3-0-0		
	CET448	HYDROCLIMATOLOGY	3-0-0		
	CET458	SUSTAINABLE CONSTRUCTION	3-0-0		
	CET468	CLIMATE CHANGE & SUSTAINABILITY	3-0-0		
	CET478	BUILDING INFORMATION MODELLING	3-0-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honors programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the syllabus mentioned for comprehensive course work in the sixth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/ Modelling/ Simulation/ Design/ Problem Solving/ Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;
    - Preparing a paper for Conference presentation/Publication in Journals, if possible;
    - Preparing a Dissertation in the standard format for being evaluated by the Department;
    - Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute

and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in CIVIL ENGINEERING Branch** can opt to study the courses listed below:

Semester	BASKET I				BASKET II				BASKET III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	CET281	Building construction & structural systems	4	4	CET283	Introduction to Geotechnical Engineering	4	4	CET285	Informatics for Infrastructure Management	4	4
S4	CET282	Building drawing	4	4	CET284	Introduction to Transportation Engineering	4	4	CET286	Climate change & hazard mitigation	4	4
S5	CET381	Structural mechanics	4	4	CET383	Eco-friendly transportation systems	4	4	CET385	Sustainability analysis & design	4	4
S6	CET382	Estimation & costing	4	4	CET384	Geotechnical investigation & ground improvement techniques	4	4	CET386	Environmental health& safety	4	4
S7	CED481	MINI PROJECT	4	4	CED481	MINI PROJECT	4	4	CED481	MINI PROJECT	4	4
S8	CED482	MINI PROJECT	4	4	CED482	MINI PROJECT	4	4	CED482	MINI PROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in CIVIL ENGINEERING** can opt to study the courses listed below:

Semester	GROUP I				GROUP II				GROUP III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S 4	CET292	ADVANCED MECHANICS OF SOLIDS	4	4	CET294	PAVEMENT CONSTRUCTION AND MANAGEMENT	4	4	CET296	GEOGRAPHICAL INFORMATION SYSTEMS	4	4
S 5	CET393	STRUCTURAL DYNAMICS	4	4	CET395	TRANSPORTATION SYSTEMS MANAGEMENT	4	4	CET397	GROUND WATER HYDROLOGY	4	4
S 6	CET394	FINITE ELEMENT METHODS	4	4	CET396	EARTH DAMS AND EARTH RETAINING STRUCTURES	4	4	CET398	ENVIRONMENTAL POLLUTION MODELLING	4	4
S 7	CET495	MODERN CONSTRUCTION MATERIALS	4	4	CET497	SOIL DYNAMICS AND MACHINE FOUNDATIONS	4	4	CET499	ENVIRONMENTAL POLLUTION CONTROL TECHNIQUES	4	4
S 8	CED496	MINI PROJECT	4	4	CED496	MINI PROJECT	4	4	CED496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

Computer Science and Engineering

CURRICULUM FROM SEMESTERS I TO VIII

Every course of B. Tech. Programme shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	5
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	79
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	--
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits		**162**
10	Value Added Course (Optional)	VAC	20

No semester shall have more than five lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering Science Courses: Engineering Graphics, Programming in C, Basics of Electrical and Electronics Engineering, Basics of Civil and Mechanical Engineering,

Engineering Mechanics, Thermodynamics, Design Engineering, Materials Engineering, Workshops etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory Non-credit Courses: Environmental Science, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, Disaster Management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **CSL 201.** The first two letter code refers to the department offering the course. CS stands for course in Computer Science & Engineering, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other than lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major-, Mini- Projects)
Q	Seminar courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (non-zero even number) or in both the semesters (zero). The middle number could be any digit. CSL 201 is a laboratory course offered in Computer Science and Engineering department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a theory course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments in the second semester. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Sl. No.	Department	Course Prefix	Sl. No.	Department	Course Prefix
1	Aeronautical Engg	AO	16	Information Technology	IT
2	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
3	Automobile	AU	18	Mandatory Courses	MC
4	Biomedical Engg	BM	19	Mathematics	MA
5	Biotechnology	BT	20	Mechanical Engg	ME
6	Chemical Engg	CH	21	Mechatronics	MR
7	Chemistry	CY	22	Metallurgy	MT
8	Civil Engg	CE	23	Mechanical (Auto)	MU
9	Computer Science	CS	24	Mechanical (Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24**	**17**

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in S1 and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in S1 and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METALLURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening

practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 203	DISCRETE MATHEMATICAL STRUCTURES	3-1-0	4	4
B	CST 201	DATA STRUCTURES	3-1-0	4	4
C	CST 203	LOGIC SYSTEM DESIGN	3-1-0	4	4
D	CST 205	OBJECT ORIENTED PROGRAMMING USING JAVA	3-1-0	4	4
E (1/2)	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC 201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	CSL 201	DATA STRUCTURES LAB	0-0-3	3	2
T	CSL 203	OBJECT ORIENTED PROGRAMMING LAB (IN JAVA)	0-0-3	3	2
R/M	VAC	Remedial/Minor course	3-1-0	4	4
TOTAL				**26***	**22/26**

* Excluding Hours to be engaged for Remedial/Minor course.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 206	GRAPH THEORY	3-1-0	4	4
B	CST 202	COMPUTER ORGANISATION AND ARCHITECTURE	3-1-0	4	4
C	CST 204	DATABASE MANAGEMENT SYSTEMS	3-1-0	4	4
D	CST 206	OPERATING SYSTEMS	3-1-0	4	4
E (1/2)	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC 202	CONSTITUTION OF INDIA	2-0-0	2	--
S	CSL 202	DIGITAL LAB	0-0-3	3	2
T	CSL204	OPERATING SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honors course	3-1-0	4	4
TOTAL				**26***	**22/26**
* Excluding Hours to be engaged for Remedial/Minor/Honors course.					

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CST 301	FORMAL LANGUAGES AND AUTOMATA THEORY	3-1-0	4	4
B	CST 303	COMPUTER NETWORKS	3-1-0	4	4
C	CST 305	SYSTEM SOFTWARE	3-1-0	4	4
D	CST 307	MICROPROCESSORS AND MICROCONTROLLERS	3-1-0	4	4
E	CST 309	MANAGEMENT OF SOFTWARE SYSTEMS	3-0-0	3	3
F	MNC 301	DISASTER MANAGEMENT	2-0-0	2	--
S	CSL 331	SYSTEM SOFTWARE AND MICROPROCESSORS LAB	0-0-4	4	2
T	CSL 333	DATABASE MANAGEMENT SYSTEMS LAB	0-0-4	4	2
R/M/H	VAC	Remedial/Minor/Honors course*	2-0-0	4	4
TOTAL				**29***	**23/27**
* Excluding Hours to be engaged for Remedial/Minor/Honors course.					

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/ Honors course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honors programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CST 302	COMPILER DESIGN	3-1-0	4	4
B	CST 304	COMPUTER GRAPHICS AND IMAGE PROCESSING	3-1-0	4	4
C	CST 306	ALGORITHM ANA LYSIS AND DESIGN	3-1-0	4	4
D	CST ---	PROGRAM ELECTIVE I	2-1-0	3	3
E	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
F	CST 308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	CSL 332	NETWORKING LAB	0-0-3	3	2
T	CSD 334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honors course*	3-1-0	4	4
TOTAL				25*	**23/27**

* Excluding Hours to be engaged for Remedial/Minor/Honors course.

Note:

Electives: This curriculum envisages to offer a learner an opportunity to earn proficiency in one of the five trending areas in Computer Science, namely Machine Learning, Data Science, Security in Computing, Formal Methods in Software Engineering and Hardware Technologies. Three courses each from the above areas are included through Elective Courses in different Elective Buckets. For example, a learner who is interested in the ***Machine Learning*** area may opt to take the elective courses - ***Foundations of Machine Learning*** from Elective-I in S6, ***Machine Learning*** from Elective-II in S7 and ***Deep Learning*** from Elective-III in S8. The Department may offer Elective Courses to enable students to utilize this opportunity, depending on the availability of faculty. The courses included from these areas under various Elective Buckets are shown in the table below.

Different Specializations introduced through various Elective Buckets				
Bucket	Specialisation	Semester		
		S6	S7	S8
1	Machine Learning	FOUNDATIONS OF MACHINE LEARNING (E-I)	MACHINE LEARNING (E-II)	DEEP LEARNING (E-III)
2	Data Science	DATA ANALYTICS (E-I)	CLOUD COMPUTING (E-II)	BLOCK CHAIN TECHNOLOGIES (E-V)
3	Security in Computing	FOUNDATIONS OF SECURITY IN COMPUTING (E-I)	SECURITY IN COMPUTING (E-II)	CRYPTOGRAPHY (E-III)
4	Formal Methods in Software Engineering	AUTOMATED VERIFICATION (E-I)	MODEL BASED SOFTWARE DEVELOPMENT (E-II)	SOFTWARE TESTING (E-V)
5	Hardware Technologies	INTRODUCTION TO IA32 ARCHITECTURE (E-I)	ADVANCED TOPICS IN IA32 ARCHITECTURE (E-II)	UNIFIED EXTENDED FIRMWARE INTERFACE (E-IV)

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CST 312	i FOUNDATIONS OF MACHINE LEARNING	2-1-0	3	3
	CST 322	ii DATA ANALYTICS	2-1-0		
	CST 332	iii FOUNDATIONS OF SECURITY IN COMPUTING	2-1-0		
	CST 342	iv AUTOMATED VERIFICATION	2-1-0		
	CST 352	v INTRODUCTION TO IA32 ARCHITECTURE	2-1-0		
	CST 362	vi PROGRAMMING IN PYTHON	2-1-0		
	CST 372	vii DATA AND COMPUTER COMMUNICATION	2-1-0		

COURSES TO BE CONSIDERED FOR COMPREHENSIVE COURSE WORK

I DISCRETE MATHEMATICAL STRUCTURES
ii DATA STRUCTURES
iii OPERATING SYSTEMS
iv COMPUTER ORGANIZATION AND ARCHITECTURE
v DATABASE MANAGEMENT SYSTEMS
vi FORMAL LANGUAGES AND AUTOMATA THEORY

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honors programme, he/she can be given remedial class.

2. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. Syllabus for comprehensive examination shall be prepared by the respective BoS choosing the above listed 6 core courses studied from semesters 3 to 5. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practicing questions based on the core courses listed in the curriculum.

3. Mini project: It is introduced in the sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Student Groups with 3 or 4 members should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be

demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva-voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Mini Project coordinator for that program and project guide.

Total marks: 150 - CIE 75 marks and ESE 75 marks

Split up for CIE

Attendance	10
Project Guide	15
Project Report	10
Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement)	40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CST 401	ARTIFICIAL INTELLIGENCE	2-1-0	3	3
B	CST ---	PROGRAM ELECTIVE II	2-1-0	3	3
C	CST ---	OPEN ELECTIVE	2-1-0	3	3
D	MNC 401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	CSL 411	COMPILER LAB	0-0-3	3	2
T	CSQ 413	SEMINAR	0-0-3	3	2
U	CSD 415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honors course*	3-1-0	4	4
TOTAL				**24***	**15/19**

* Excluding Hours to be engaged for Remedial/Minor/Honors course.

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CST 413	i MACHINE LEARNING	2-1-0	3	3
	CST 423	ii CLOUD COMPUTING	2-1-0		
	CST 433	iii SECURITY IN COMPUTING	2-1-0		
	CST 443	iv MODEL BASED SOFTWARE DEVELOPMENT	2-1-0		
	CST 453	v ADVANCED TOPICS IN IA32 ARCHITECTURE	2-1-0		
	CST 463	vi WEB PROGRAMMING	2-1-0		
	CST 473	vii NATURAL LANGUAGE PROCESSING	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by the Department of **COMPUTER SCIENCE & ENGINEERING** for students of other undergraduate branches except Computer Science & Engineering and Information Technology, offered in the colleges under KTU.

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CST 415	i INTRODUCTION TO MOBILE COMPUTING	2-1-0	3	3
	CST 425	ii INTRODUCTION TO DEEP LEARNING	2-1-0		
	CST 435	iii COMPUTER GRAPHICS	2-1-0		
	CST 445	iv PYTHON FOR ENGINEERS	2-1-0		
	CST 455	v OBJECT ORIENTED CONCEPTS	2-1-0		

NOTE:

1. All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honors programme, he/she can be given remedial class.

2. Seminar: To encourage and motivate the students to read and collect recent and reliable information about their area of interest confined to the relevant discipline, from technical publications including peer reviewed journals, conferences, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	10
Seminar Guide	20
Technical Content of the Report	30
Presentation	40

3. Project Phase-I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The objective of Project Work Phase-I is to enable the student to take up investigative study in the broad field of Computer Science and Engineering, either fully theoretical/ practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the mentoring of a Project Guide(s). This is expected to provide a good initiation for the student(s) in R&D work. The assignment shall normally include:

   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;

- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final project presentation before the concerned departmental committee.

Total marks: 100, only CIE, minimum required to pass 50

Project Guide(s)	30
Interim evaluation by the evaluation committee	20
Final project presentation	30
Final evaluation by the evaluation committee	20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project guide(s).

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	CST 402	DISTRIBUTED COMPUTING	2-1-0	3	3
B	CST ---	PROGRAM ELECTIVE III	2-1-0	3	3
C	CST ---	PROGRAM ELECTIVE IV	2-1-0	3	3
D	CST ---	PROGRAM ELECTIVE V	2-1-0	3	3
T	CST 404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	CSD 416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honors course	3-1-0	4	4
TOTAL				**25***	**17/21**
* Excluding Hours to be engaged for Remedial/Minor/Honors course.					

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	CST 414	i DEEP LEARNING	2-1-0	3	3
	CST 424	i i PROGRAMMING PARADIGMS	2-1-0		
	CST 434	iii CRYPTOGRAPHY	2-1-0		
	CST 444	iv SOFT COMPUTING	2-1-0		
	CST 454	v FUZZY SET THEORY AND APPLICATIONS	2-1-0		
	CST 464	vi EMBEDDED SYSTEMS	2-1-0		
	CST 474	vii COMPUTER VISION	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	CST 416	i FORMAL METHODS AND TOOLS IN SOFTWARE ENGINEERING	2-1-0	3	3
	CST 426	i i CLIENT SERVER ARCHITECTURE	2-1-0		
	CST 436	iii PARALLEL COMPUTING	2-1-0		
	CST 446	iv DATA COMPRESSION TECHNIQUES	2-1-0		
	CST 456	v UNIFIED EXTENDED FIRMWARE INTERFACE	2-1-0		
	CST 466	vi DATA MINING	2-1-0		
	CST 476	vii MOBILE COMPUTING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	CST 418	i HIGH PERFORMANCE COMPUTING	2-1-0	3	3
	CST 428	ii BLOCK CHAIN TECHNOLOGIES	2-1-0		
	CST 438	iii IMAGE PROCESSING TECHNIQUE	2-1-0		
	CST 448	iv INTERNET OF THINGS	2-1-0		
	CST 458	v SOFTWARE TESTING	2-1-0		
	CST 468	vi BIOINFORMATICS	2-1-0		
	CST 478	vii COMPUTATIONAL LINGUISTICS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honors programme, he/she can be given remedial class.

2. Comprehensive Viva Voce: The comprehensive viva voce in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semesters. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practicing questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The objective of Project Work Phase II & Dissertation is to enable the student to extend further the investigative study taken up in Project Phase I, either fully theoretical/practical or involving both theoretical and practical work, under the mentoring of a Project Guide from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment shall normally include:

- In depth study of the topic assigned in the light of the Report prepared in Phase I;
- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modeling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before the concerned evaluation committee

Total marks: 150, only CIE, minimum required to pass 75

Project Guide	30
Interim evaluation, twice in the semester by the evaluation committee	70
Quality of the report evaluated by the above committee	10

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project guide).

Final evaluation by a three member committee	40

(The final evaluation committee comprises Project coordinator, expert from Industry/ research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if she/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist bucket of 3-6 courses is identified for each Minor. Each bucket may rest on one or more

foundation courses. A bucket may have sequences within it, i.e., advanced courses may rest on basic courses in the bucket. She/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by M slot courses.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required to award B.tech with Minor is 182 (162 + 20)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of Studies and approved by the Academic Council or 2 courses from the minor buckets listed here. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded if the registrant earn 20 credits form the minor courses.

(vi) The registration for minor program will commence from semester 3 and all the academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 5 buckets. The bucket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the bucket. Reshuffling of courses between various buckets will not be allowed. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. In any case, they should carry out a mini project based on the chosen area in S7 or S8. For example: Students who have registered **for B.Tech Minor in Computer Science & Engineering** can opt to study the courses listed below:

MINOR BUCKETS												
SEMESTER	BUCKET-1				BUCKET-2				BUCKET-3			
	Specialization - **Software Engineering**				Specialization - **Machine Learning**				Specialization - **Networking**			
	COURSE NO	**COURSE NAME**	**HOURS**	**CREDIT**	**COURSE NO**	**COURSE NAME**	**HOURS**	**CREDIT**	**COURSE NO**	**COURSE NAME**	**HOURS**	**CREDIT**
S3	CST 281	OBJECT ORIENTED PROGRAMMING	4	4	CST 283	PYTHON FOR MACHINE LEARNING	4	4	CST 285	DATA COMMUNICATION	4	4
S4	CST 282	PROGRAMMING METHODOLOGIES	4	4	CST 284	MATHEMATICS FOR MACHINE LEARNING	4	4	CST 286	INTRODUCTION TO COMPUTER NETWORKS	4	4
S5	CST 381	CONCEPTS IN SOFTWARE ENGINEERING	4	4	CST 383	CONCEPTS IN MACHINE LEARNING	4	4	CST 385	CLIENT SERVER SYSTEMS	4	4
S6	CST 382	INTRODUCTION TO SOFTWARE TESTING	4	4	CST 384	CONCEPTS IN DEEP LEARNING	4	4	CST 386	WIRELESS NETWORKS AND IOT APPLICATIONS	4	4
S7	CSD 481	Miniproject	4	4	CSD 481	Miniproject	4	4	CSD 481	Miniproject	4	4
S8	CSD 482	Miniproject	4	4	CSD 482	Miniproject	4	4	CSD 482	Miniproject	4	4
Note-1: Name of the specialization shall be mentioned in the Minor Degree to be awarded												
Note-2: Any B.Tech students from non-Computer Science/non-IT streams can register for the courses in the minor buckets.												

HONORS

Honors is an additional credential a student may earn if she/he opts for the extra 20 credits needed for this in her/his own discipline. Honors is not indicative of a class. The University is providing this option for academically extra brilliant students to acquire Honors. Honors is intended for a student to *gain expertise*/get *specialized* in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the concerned branch of engineering. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honors, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honors." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If a student is not earning credits for any one of the specified course for getting Honors, she/he is not entitled to get Honors. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 buckets, each bucket representing a particular specialization in the branch. The students shall select only the courses from same bucket in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honors courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The Honors courses shall be identified by H slot courses.

(ii) Registration is permitted for Honors at the beginning of fourth semester. Total credits required is 182 (162 + 20).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council or 2 courses from the same bucket as the above 3 courses. The classes for Honors shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under Honors.

(iv) There won't be any supplementary examination for the courses chosen for Honors.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honors" will be awarded if overall CGPA is greater than

or equal to 8.5, earned a grade of 'C' or better for all courses chosen for Honors and there is no history of 'F' Grade in the entire span of the BTech Course.

(vi) The registration for Honors program will commence from semester 4 and the all academic units offering Honors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 5 buckets, each bucket representing a particular specialization in the branch. The students shall select only the courses from same bucket in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. There is option to skip any two courses listed here if required, and to opt for equivalent MOOC courses approved by the Academic Council. In any case, they should carry out a mini project based on the chosen area in S8. For example: Students who have registered for **B.Tech in Computer Science and Engineering with Honors** can opt to study the courses listed in one of the buckets shown below:

HONORS BUCKETS												
SEMESTER	BUCKET-1				BUCKET-2				BUCKET-3			
	Specialization - **Security in Computing**				Specialization - **Machine Learning**				Specialization - **Formal Methods**			
	COURSE NO	COURSE NAME	HOURS	CREDIT	COURSE NO	COURSE NAME	HOURS	CREDIT	COURSE NO	COURSE NAME	HOURS	CREDIT
S4	CST 292	NUMBER THEORY	4	4	CST 294	COMPUTATIONAL FUNDAMENTALS FOR MACHINE LEARNING	4	4	CST 296	PRINCIPLES OF PROGRAM ANALYSIS AND VERIFICATION	4	4
S5	CST 393	CRYPTOGRAPHIC ALGORITHMS	4	4	CST 395	NEURAL NETWORKS AND DEEP LEARNING	4	4	CST 397	PRINCIPLES OF MODEL CHECKING	4	4
S6	CST 394	NETWORK SECURITY	4	4	CST 396	ADVANCED TOPICS IN MACHINE LEARNING	4	4	CST 398	THEORY OF COMPUTABILITY AND COMPLEXITY	4	4
S7	CST 495	CYBER FORENSICS	4	4	CST 497	ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE	4	4	CST 499	LOGIC FOR COMPUTER SCIENCE	4	4
S8	CSD 496	Miniproject	4	4	CSD 496	Miniproject	4	4	CSD 496	Miniproject	4	4
Note: Name of the specialization shall be mentioned in the Honors Degree to be awarded												

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed specifically for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social works and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch-mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. Tech. ELECTRONICS & BIOMEDICAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G. Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical (Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA & CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS & TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION & COMPLEX ANALYSIS	3-1-0	4	4
B	EBT201	ANATOMY & PHYSIOLOGY FOR BIOMEDICAL ENGINEERS	4-0-0	4	4
C	EBT203	ELECTRONIC DEVICES & CIRCUITS	3-1-0	4	4
D	EBT205	LOGIC CIRCUITS & DESIGN	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	EBL201	ELECTRONIC DEVICES & CIRCUITS LAB	0-0-3	3	2
T	EBL203	LOGIC CIRCUITS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT204	PROBABILITY, RANDOM PROCESSES & NUMERICAL METHODS	3-1-0	4	4
B	EBT202	BIOMEDICAL SIGNALS & TRANSDUCERS	4-0-0	4	4
C	EBT204	LINEAR INTEGRATED CIRCUITS	3-1-0	4	4
D	EBT206	MICROCONTROLLERS & APPLICATIONS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	EBL202	LINEAR INTEGRATED CIRCUITS LAB	0-0-3	3	2
T	EBL204	MICROCONTROLLERS & APPLICATIONS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	EBT301	ANALYTICAL & DIAGNOSTIC EQUIPMENTS	4-0-0	4	4
B	EBT303	HOSPITAL ENGINEERING	3-1-0	4	4
C	EBT305	MEDICAL IMAGING TECHNIQUES	4-0-0	4	4
D	EBT307	INTRODUCTION TO BIOMEDICAL SIGNAL PROCESSING	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	EBL331	MEDICAL ELECTRONICS LAB	0-0-3	3	2
T	EBL333	BIOMEDICAL SIGNAL PROCESSING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	EBT302	MEDICAL IMAGE PROCESSING	3-1-0	4	4
B	EBT304	THERAPEUTIC EQUIPMENTS	4-0-0	4	4
C	EBT306	ARTIFICIAL NEURAL NETWORKS & APPLICATIONS	3-1-0	4	4
D	EBTXXX	PROGRAM ELECTIVE I	3-0-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	EBT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	EBL332	BIOENGINEERING LAB	0-0-3	3	2
T	EBD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	EBT312	ELECTRICAL NETWORKS & ANALYSIS	2-1-0	3	3
	EBT322	MEDICAL INFORMATICS	3-0-0		
	EBT332	ADVANCED MICROPROCESSORS & MICROCONTROLLERS	3-0-0		
	EBT342	DESIGN OF BIOMEDICAL DEVICES	3-0-0		
	EBT352	BIOSTATISTICS	2-1-0		
	EBT362	BIOMEDICAL SIGNAL PROCESSING & APPLICATIONS	3-0-0		
	EBT372	COMMUNICATION TECHNIQUES	3-0-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5**. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee

appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

Total marks: 150, CIE 75 marks and ESE 75 marks

Split up for CIE

Attendance	: 10
Guide	: 15
Project Report	: 10
Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement)	: 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	EBT401	CONTROL SYSTEMS ENGINEERING	2-1-0	3	3
B	EBTXXX	PROGRAM ELECTIVE II	3-0-0	3	3
C	EBTXXX	OPEN ELECTIVE	3-0-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	EBL411	MEDICAL SYSTEMS LAB	0-0-3	3	2
T	EBQ413	SEMINAR	0-0-3	3	2
U	EBD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	EBT413	ELECTRICAL TECHNOLOGY FOR BIOMEDICAL ENGINEERS	2-1-0	3	3
	EBT423	DESIGN OF LOGIC SYSTEMS	2-1-0		
	EBT433	TELEMEDICINE	3-0-0		
	EBT443	BIOMATERIALS & APPLICATIONS	3-0-0		
	EBT453	BIO FLUID MECHANICS	3-0-0		
	EBT463	COMPUTATIONAL METHODS IN BIOMEDICAL ENGINEERING	2-1-0		
	EBT473	BIOMEDICAL OPTICS & BIOPHOTONICS	3-0-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses

listed below are offered by **the Department of ELECTRONICS & BIOMEDICAL for students of other undergraduate branches offered in the college under KTU**.

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	EBT415	BIOMEDICAL INSTRUMENTATION	3-0-0	3	3
	EBT425	MEDICAL IMAGING & IMAGE PROCESSING	2-1-0		
	EBT435	BIOSIGNALS & SIGNAL PROCESSING	2-1-0		
	EBT445	BIOMATERIALS & BIOMECHANICS	3-0-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10

   Guide : 20

   Technical Content of the Report : 30

   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Biomedical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	:30
Interim evaluation by the evaluation committee	:20
Final Seminar	:30
The report evaluated by the evaluation committee	:20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	EBT402	BIOMECHANICS & DESIGN OF PROSTHETIC DEVICES	3-0-0	3	3
B	EBTXXX	PROGRAM ELECTIVE III	3-0-0	3	3
C	EBTXXX	PROGRAM ELECTIVE IV	3-0-0	3	3
D	EBTXXX	PROGRAM ELECTIVE V	3-0-0	3	3
T	EBT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	EBD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	EBT414	POWER ELECTRONICS & APPLICATIONS	3-0-0	3	3
	EBT424	ARTIFICIAL ORGANS & IMPLANTS	3-0-0		
	EBT434	ADVANCED COMPUTER PROGRAMMING TECHNIQUES	3-0-0		
	EBT444	MEDICAL ROBOTICS	3-0-0		
	EBT454	FUNDAMENTALS OF BIOMEMS & MICROFLUIDICS	3-0-0		
	EBT464	PRINCIPLES OF RADIO DIAGNOSIS & RADIOTHERAPY	3-0-0		
	EBT474	ADVANCED MEDICAL IMAGING & IMAGE PROCESSING TECHNIQUES	3-0-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
	EBT416	VLSI DESIGN	3-0-0		
	EBT426	ADVANCED BIOMEDICAL SIGNAL	3-0-0		

		PROCESSING		3	3
C	EBT436	IOT & BIOMEDICAL APPLICATIONS	3-0-0		
	EBT446	BIOMEDICAL TRANSPORT PHENOMENA	3-0-0		
	EBT456	PATTERN RECOGNITION	3-0-0		
	BMT466	MECHATRONICS	3-0-0		
	EBT476	DEEP LEARNING TECHNIQUES	3-0-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	EBT418	EMBEDDED SYSTEM DESIGN	3-0-0	3	3
	EBT428	ASSISTIVE MEDICAL DEVICES	3-0-0		
	EBT438	REHABILITATION ENGINEERING	3-0-0		
	EBT448	INTRODUCTION TO BIONANOTECHNOLOGY	3-0-0		
	EBT458	RELIABILITY ENGINEERING	3-0-0		
	EBT468	MODELLING OF PHYSIOLOGICAL SYSTEMS	3-0-0		
	EBT478	HUMAN FACTORS IN ENGINEERING AND DESIGN	3-0-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for

the student(s) in R&D work and technical leadership. The assignment to normally include:

- In depth study of the topic assigned in the light of the Report prepared under PhaseI;
- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more

foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed.In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in ELECTRONICS & BIOMEDICAL ENGINEERING** can opt to study the courses listed below:

Semester	Basket I (Biomedical Signal & Image Processing)				Basket II (Biomedical Instrumentation)				Basket III (Computing in Biomedical Engineering)			
	Course No.	Course Name	Credit	Hours	Course No.	Course Name	Credit	Hours	Course No.	Course Name	Credit	Hours
S3	EBT281	BIOMEDICAL SYSTEMS & SIGNALS	4	4	EBT283	BASIC ANATOMY & PHYSIOLOGY FOR ENGINEERS	4	4	EBT285	BASIC MEDICAL SCIENCES FOR ENGINEERS	4	4
S4	EBT282	PHYSICS OF BIOMEDICAL IMAGING	4	4	EBT284	BIOSIGNAL ACQUISITION SYSTEMS	4	4	EBT286	NUMERICAL TECHNIQUES IN BIOMEDICAL ENGINEERING	4	4
S5	EBT381	BIOMEDICAL SIGNAL PROCESSING	4	4	EBT383	PRINCIPLES OF BIOMEDICAL IMAGING	4	4	EBT385	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING TECHNIQUES	4	4
S6	EBT382	BIOMEDICAL IMAGE PROCESSING	4	4	EBT384	THERAPEUTIC DEVICES	4	4	EBT386	PHYSIOLOGICAL SYSTEM MODELLING	4	4
S7	EBD481	MINIPROJECT	4	4	EBD481	MINIPROJECT	4	4	EBD481	MINIPROJECT	4	4
S8	EBD482	MINIPROJECT	4	4	EBD482	MINIPROJECT	4	4	EBD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same

group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through course listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in ELECTRONICS & BIOMEDICAL Branch** can opt to study the courses listed below:

Semester	Group I				Group II				Group III			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	EBT292	BIOMEDICAL SIGNALS &	4	4	EBT294	SOLID STATE ELECTRONIC	4	4	EBT296	CELLULAR PHYSIOLOGY &	4	4

		SYSTEMS				DEVICES				BIOPOTENTIALS		
S5	EBT393	SPEECH & AUDIO SIGNAL PROCESSING	4	4	EBT395	ANALOG INTEGRATED CIRCUIT DESIGN	4	4	EBT397	MATHEMATICAL METHODS IN BIOMEDICAL ENGINEERING	4	4
S6	EBT394	ADAPTIVE SIGNAL PROCESSING	4	4	EBT396	DIGITAL INTEGRATED CIRCUITS	4	4	EBT398	STATISTICAL METHODS IN BIOMEDICAL ENGINEERING	4	4
S7	EBT495	IMAGE & VIDEO PROCESSING	4	4	EBT497	CMOS DIGITAL DESIGN	4	4	EBT499	COMPUTATIONAL PHYSIOLOGY	4	4
S8	EBD496	MINI PROJECT	4	4	EBD496	MINI PROJECT	4	4	EBD496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech ELECTRONICS & COMMUNICATION ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	162	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Semester	1	2	3	4	5	6	7	8	Total
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
Grand.Total									162

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like E C L 2 0 1. The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for

Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

Semester III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	ECT 201	SOLID STATE DEVICES	3-1-0	4	4
C	ECT 203	LOGIC CIRCUIT DESIGN	3-1-0	4	4
D	ECT 205	NETWORK THEORY	3-1-0	4	4
E 1/2	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	ECL 201	SCIENTIFIC COMPUTING LAB	0-0-3	3	2
T	ECL 203	LOGIC DESIGN LAB	0-0-3	3	2
R/M	VAC	Remedial/Minor course	3-1-0	4**	4
		TOTAL		26/30	22/26

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

Semester IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 204	PROBABILITY, RANDOM PROCESS AND NUMERICAL METHODS	3-1-0	4	4
B	ECT 202	ANALOG CIRCUITS	3-1-0	4	4
C	ECT 204	SIGNALS AND SYSTEMS	3-1-0	4	4
D	ECT 206	COMPUTER ARCHITECTURE AND MICROCONTROLLERS	3-1-0	4	4
E 1/2	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	ECL 202	ANALOG CIRCUITS AND SIMULATION LAB	0-0-3	3	2
T	ECL 204	MICROCONTROLLER LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4**	4
		TOTAL		26/30	22/26

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

Semester V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ECT 301	LINEAR INTEGRATED CIRCUITS	3-1-0	4	4
B	ECT 303	DIGITAL SIGNAL PROCESSING	3-1-0	4	4
C	ECT 305	ANALOG AND DIGITAL COMMUNICATION	3-1-0	4	4
D	ECT 307	CONTROL SYSTEMS	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	ECL 331	ANALOG INTEGRATED CIRCUITS AND SIMULATION LAB	0-0-3	3	2
T	ECL 333	DIGITAL SIGNAL PROCESSING LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4**	4
		TOTAL		**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

Semester VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ECT 302	ELECTROMAGNETICS	3-1-0	4	4
B	ECT 304	VLSI CIRCUIT DESIGN	3-1-0	4	4
C	ECT 306	INFORMATION THEORY AND CODING	3-1-0	4	4
D	ECTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E ½	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	ECT 308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	ECL 332	COMMUNICATION LAB	0-0-3	3	2
T	ECD 334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4**	4
TOTAL				25/29	23/27

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ECT 312	Digital System Design	2-1-0	3	3
	ECT 322	Power Electronics	2-1-0		
	ECT 332	Data Analysis	2-1-0		
	ECT 342	Embedded Systems	2-1-0		
	ECT 352	Digital Image Processing	2-1-0		
	ECT 362	Introduction to MEMS	2-1-0		
	ECT 372	Quantum Computing	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

Semester VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ECT 401	WIRELESS COMMUNICATION	2-1-0	3	3
B	ECTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	ECTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	ECL 411	ELECTROMAGNETICS LAB	0-0-3	3	2
T	ECQ 413	SEMINAR	0-0-3	3	2
U	ECD 415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honors course	3-1-0	4*	4
TOTAL				24/28	15/19

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	ECT 413	Optical Fiber Communication	2-1-0	3	3
	ECT 423	Computer Networks	2-1-0		
	ECT 433	Opto-electronic Devices	2-1-0		
	ECT 443	Antenna and Wave propagration	2-1-0		
	ECT 453	Error Control Codes	2-1-0		
	ECT 463	Machine Learning	2-1-0		
	ECT 473	DSP Architectures	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of ELECTRONICS AND COMMUNICATION ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	ECT 415	Mechatronics	2-1-0	3	3
	ECT 425	Biomedical Instrumentation	2-1-0		
	ECT 435	Electronic Hardware for Engineers	2-1-0		
	ECT 445	IoT and Applications	2-1-0		
	ECT 455	Entertainment Electronics	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics and Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;

- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30

Interim evaluation by the evaluation committee : 20

Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

Semester VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ECT 402	INSTRUMENTATION	2-1-0	3	3
B	ECTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	ECTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	ECTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
E	ECT 404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	ECD 416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honors course	3-1-0	4*	4
TOTAL				25/28	17/21

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	ECT 414	Biomedical Engineering	2-1-0	3	3
	ECT 424	Satellite Communication	2-1-0		
	ECT 434	Secure Communication	2-1-0		
	ECT 444	Pattern Recognition	2-1-0		
	ECT 454	RF Circuit Design	2-1-0		
	ECT 464	Mixed Signal Circuit Design	2-1-0		
	ECT 474	Entrepreneurship	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	ECT 416	Modern Communication Systems	2-1-0	3	3
	ECT 426	Real Time Operating Systems	2-1-0		
	ECT 436	Adaptive Signal Processing	2-1-0		
	ECT 446	Microwave Devices and Circuits	2-1-0		
	ECT 456	Speech and Audio Processing	2-1-0		
	ECT 466	Analog CMOS Design	2-1-0		
	ECT 476	Robotics	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ECT 418	Mechatronics	2-1-0	3	3
	ECT 428	Optimization Techniques	2-1-0		
	ECT 438	Computer Vision	2-1-0		
	ECT 448	Low Power VLSI	2-1-0		
	ECT 458	Internet of Things	2-1-0		
	ECT 468	Renewable Energy Systems	2-1-0		
	ECT 478	Organic Electronics	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. Project Phase II: The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;
   - Preparing a paper for Conference presentation/Publication in Journals, if possible;
   - Preparing a Dissertation in the standard format for being evaluated by the Department;
   - Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide	: 30
Interim evaluation, 2 times in the semester by the evaluation committee	: 50
Quality of the report evaluated by the above committee	: 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv)There won’t be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, “Bachelor of Technology in xxx with Minor in yyy” will be awarded.

(vi)The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered for B.Tech Minor in **ELECTRONICS AND COMMUNICATION** can opt to study the courses listed below:

SEMESTER	BASKET I				BASKET II					BASKET III			
	COURSE NO.	COURSE NAME	HOURS	CREDIT	HOURS	COURSE NO.	COURSE NAME	HOURS	CREDIT	COURSE NO.	COURSE NAME	HOURS	CREDIT
S3	ECT281	ELECTRONIC CIRCUITS	4	4		ECT283	ANALOG COMMUNICATION	4	4	ECT285	INTRODUCTION TO SIGNALS AND SYSTEMS	4	4
S4	ECT282	MICROCONTROLLERS	4	4		ECT284	DIGITAL COMMUNICATION	4	4	ECT286	INTRODUCTION TO DIGITAL SIGNAL PROCESSING	4	4
S5	ECT381	EMBEDDED SYSTEM DESIGN	4	4		ECT383	COMMUNICATION SYSTEMS	4	4	ECT385	TOPICS IN DIGITAL IMAGE PROCESSING	4	4
S6	ECT382	VLSI CIRCUITS	4	4		ECT384	DATA NETWORKS	4	4	ECT386	TOPICS IN COMPUTER VISION	4	4
S7	ECD481	MINIPROJECT	4	4		ECD481	MINIPROJECT	4	4	ECD481	MINIPROJECT	4	4
S8	ECD482	MINIPROJECT	4	4		ECD482	MINIPROJECT	4	4	ECD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for Honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for B.Tech Honours in **ELECTRONICS AND COMMUNICATION ENGINEERING** can opt to study the courses listed below:

	GROUP I				GROUP II				GROUP III			
SEMESTER	COURSE NO.	COURSE NAME	HOURS	CREDIT	COURSE NO.	COURSE NAME	HOURS	CREDIT	COURSE NO.	COURSE NAME	HOURS	CREDIT
S4	ECT292	NANOELECTRONICS	4	4	ECT294	STOCHASTIC PROCESSES FOR COMMUNICATION	4	4	ECT296	STOCHASTIC SIGNAL PROCESSING	4	4
S5	ECT393	FPGA BASED SYSTEM DESIGN	4	4	ECT395	DETECTION AND ESTIMATION THEORY	4	4	ECT397	COMPUTATIONAL TOOLS FOR SIGNAL PROCESSING	4	4
S6	ECT394	ELECTRONIC DESIGN AND AUTOMATION TOOLS	4	4	ECT396	MIMO AND MULTIUSER COMMUNICATION SYSTEMS	4	4	ECT398	DETECTION AND ESTIMATION THEORY	4	4
S7	ECT495	RF MEMS	4	4	ECT497	DESIGN AND ANALYSIS OF ANTENNAS	4	4	ECT499	MULTIRATE SIGNAL PROCESSING AND WAVELETS	4	4
S8	ECD496	MINIPROJECT	4	4	ECD496	MINIPROJECT	4	4	ECD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.

- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: ELECTRICAL & ELECTRONICS ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICSA	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	EET201	CIRCUITS AND NETWORKS	2-2-0	4	4
C	EET203	MEASUREMENTS AND INSTRUMENTATION	3-1-0	4	4
D	EET205	ANALOG ELECTRONICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	EEL201	CIRCUITS AND MEASUREMENTS LAB	0-0-3	3	2
T	EEL203	ANALOG ELECTRONICS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT 204	PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS	3-1-0	4	4
B	EET202	DC MACHINES AND TRANSFORMERS	2-2-0	4	4
C	EET204	ELECTROMAGNETIC THEORY	3-1-0	4	4
D	EET206	DIGITAL ELECTRONICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	EEL202	ELECTRICAL MACHINES LAB I	0-0-3	3	2
T	EEL204	DIGITAL ELECTRONICS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	EET301	POWER SYSTEMS I	3-1-0	4	4
B	EET303	MICROPROCESSORS AND MICROCONTROLLERS	3-1-0	4	4
C	EET305	SIGNALS AND SYSTEMS	3-1-0	4	4
D	EET307	SYNCHRONOUS AND INDUCTION MACHINES	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	EEL331	MICROPROCESSORS AND MICROCONTROLLERS LAB	0-0-3	3	2
T	EEL333	ELECTRICAL MACHINES LAB II	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	EET302	LINEAR CONTROL SYSTEMS	2-2-0	4	4
B	EET304	POWER SYSTEMS II	3-1-0	4	4
C	EET306	POWER ELECTRONICS	3-1-0	4	4
D	EETXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	EET308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	EEL332	POWER SYSTEMS LAB	0-0-3	3	2
T	EEL334	POWER ELECTRONICS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28/32**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	EET312	BIOMEDICAL INSTRUMENTATION	2-1-0	3	3
	EET322	RENEWABLE ENERGY SYSTEMS	2-1-0		
	EET332	COMPUTER ORGANIZATION	2-1-0		
	EET342	HIGH VOLTAGE ENGINEERING	2-1-0		
	EET352	OBJECT ORIENTED PROGRAMMING	2-1-0		
	EET362	MATERIAL SCIENCE	2-1-0		
	EET372	SOFT COMPUTING	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	EET401	ADVANCED CONTROL SYSTEMS	2-1-0	3	3
B	EETXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	EETXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	EEL411	CONTROL SYSTEMS LAB	0-0-3	3	2
T	EEQ413	SEMINAR	0-0-3	3	2
U	EED415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	EET413	ELECTRIC DRIVES	2-1-0	3	3
	EET423	DIGITAL CONTROL SYSTEMS	2-1-0		
	EET433	MODERN OPERATING SYSTEMS	2-1-0		
	EET443	DATA STRUCTURES	2-1-0		
	EET453	DIGITAL SIGNAL PROCESSING	2-1-0		
	EET463	ILLUMINATION TECHNOLOGY	2-1-0		
	EET473	DIGITAL PROTECTION OF POWER SYSTEMS	2-1-0		

OPEN ELECTIVES

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. For example the courses listed below are offered by **the Department of ELECTRICAL & ELECTRONICS ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	EET415	CONTROL SYSTEMS ENGINEERING	2-1-0	3	3
	EET425	INTRODUCTION TO POWER PROCESSING	2-1-0		
	EET435	RENEWABLE ENERGY SYSTEMS	2-1-0		
	EET445	ELECTRIC VEHICLES	2-1-0		
	EET455	ENERGY MANAGEMENT	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Electrical &Electronics Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation

- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide :30

Interim evaluation by the evaluation committee :20

Final Seminar :30

The report evaluated by the evaluation committee :20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	EET402	ELECTRICAL SYSTEM DESIGN AND ESTIMATION	2-1-0	3	3
B	EETXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	EETXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	EETXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	EET404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	EED416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	EET414	ROBOTICS	2-1-0	3	3
	EET424	ENERGY MANAGEMENT	2-1-0		
	EET434	SMART GRID TECHNOLOGIES	2-1-0		
	EET444	ELECTRICAL MACHINE DESIGN	2-1-0		
	EET454	SWITCHED MODE POWER CONVERTERS	2-1-0		
	EET464	COMPUTER AIDED POWER SYSTEM ANALYSIS	2-1-0		
	EET474	MACHINE LEARNING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	EET416	NONLINEAR SYSTEMS	2-1-0	3	3
	EET426	SPECIAL ELECTRIC MACHINES	2-1-0		
	EET436	POWER QUALITY	2-1-0		
	EET446	COMPUTER NETWORKS	2-1-0		
	EET456	DESIGN OF POWER ELECTRONIC SYSTEMS	2-1-0		
	EET466	HVDC & FACTS	2-1-0		
	EET476	ADVANCED ELECTRONIC DESIGN	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	EET418	ELECTRIC AND HYBRID VEHICLES	2-1-0	3	3
	EET428	INTERNET OF THINGS	2-1-0		
	EET438	ENERGY STORAGE SYSTEMS	2-1-0		
	EET448	ROBUST AND ADAPTIVE CONTROL	2-1-0		
	EET458	SOLAR PV SYSTEMS	2-1-0		
	EET468	INDUSTRIAL INSTRUMENTATION &AUTOMATION	2-1-0		
	EET478	BIG DATA ANALYTICS	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three-member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B. Tech Minor in ELECTRICAL & ELECTRONICS ENGINEERING** can opt to study the courses listed below:

Semester	BASKET I				BASKET II				BASKET III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	EET281	ELECTRIC CIRCUITS	4	4	EET 283	INTRODUCTION TO POWER ENGINEERING	4	4	EET 285	DYNAMIC CIRCUITS AND SYSTEMS	4	4
S4	EET 282	ELECTRICAL MACHINES	4	4	EET 284	ENERGY SYSTEMS	4	4	EET 286	PRINCIPLES OF INSTRUMENTATION	4	4
S5	EET 381	SOLID STATE POWER CONVERSION	4	4	EET 383	SOLAR AND WINDENERGY CONVERSION SYSTEMS	4	4	EET 385	CONTROL SYSTEMS	4	4
S6	EET 382	POWER SEMICONDUCTOR DRIVES	4	4	EET 384	INSTRUMENTATION AND AUTOMATION OF POWER PLANTS	4	4	EET 386	DIGITAL CONTROL	4	4
S7	EED 481	MINIPROJECT	4	4	EED 481	MINIPROJECT	4	4	EED 481	MINIPROJECT	4	4

S8	EED 482	MINIPROJECT	4	4	EED 482	MINIPROJECT	4	4	EED 482	MINIPROJECT	4	4

Notes on Minor from Electrical Engineering Department:

Students have to credit additional 5 courses (20 credits) to receive minor in Electrical and Electronics Engineering. While choosing the minor basket, at least two courses in the selected basket should have contents different from the courses in the curriculum of the parent branch. (This is necessary in the case of related branches like Electronics and Communication, Electronics and Instrumentation, Applied Electronics and Instrumentation, Electronics and Biomedical, Computer Science and Engineering etc.) In case where the student chooses a basket with only two courses different from their parent curriculum, the remaining courses have to be selected from the approved MOOC courses. This restriction may be incorporated in the regulations/curriculum.

HONOURS

Honours is an additional credential a student may earn if she/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. For example: Students who have registered for **B.Tech Honours in ELECTRICAL & ELECTRONICS ENGINEERING** can opt to study the courses listed below:

Semester	GROUP I				GROUP II				GROUP III			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	EET292	NETWORK ANALYSIS AND SYNTHESIS	4	4	EET 294	NETWORK ANALYSIS AND SYNTHESIS	4	4	EET 296	NETWORK ANALYSIS AND SYNTHESIS	4	4
S5	EET393	DIGITAL SIMULATION	4	4	EET 395	DIGITAL SIMULATION	4	4	EET 397	DIGITAL SIMULATION	4	4
S6	EET394	GENERALISED MACHINE THEORY	4	4	EET 396	ANALYSIS OF POWER ELECTRONIC CIRCUITS	4	4	EET 398	OPERATION AND CONTROL OF POWER SYSTEMS	4	4
S7	EET495	OPERATION AND CONTROL OF GENERATORS	4	4	EET 497	DYNAMICS OF POWER CONVERTERS	4	4	EET 499	CONTROL AND DYNAMICS OF MICROGRIDS	4	4
S8	EED496	MINIPROJECT	4	4	EED 496	MINIPROJECT	4		EED 496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech FOOD TECHNOLOGY

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Sem	1	2	3	4	5	6	7	8	Total
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.
2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	FTT 201	PRINCIPLES OF CHEMICAL ENGINEERING	3-1-0	4	4
C	FTT 203	FOOD MICROBIOLOGY	3-1-0	4	4
D	FTT 205	FOOD CHEMISTRY	3-1-0	4	4
E 1/2	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN 201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	FTL 201	FOOD MICROBIOLOGY LAB I	0-0-3	3	2
T	FTL 203	FOOD CHEMISTRY LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	FTT 202	FUNDAMENTALS OF HEAT AND MASS TRANSFER	3-1-0	4	4
C	FTT 204	ENGINEERING PROPERTIES OF FOOD MATERIALS	3-1-0	4	4
D	FTT 206	FOOD ENGINEERING THERMODYNAMICS AND REACTION KINETICS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	FTL 202	FOOD MICROBIOLOGY LAB II	0-0-3	3	2
T	FTL 204	ENGINEERING PROPERTIES OF FOOD MATERIALS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FTT 301	FOOD PROCESS ENGINEERING	3-1-0	4	4
B	FTT 303	UNIT OPERATIONS IN FOOD PROCESSING	3-1-0	4	4
C	FTT 305	FOOD ANALYSIS	3-1-0	4	4
D	FTT 307	CEREAL AND LEGUME TECHNOLOGY	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	FTL 331	UNIT OPERATIONS IN FOOD LAB	0-0-3	3	2
T	FTL 333	FOOD ANALYSIS AND QUALITY EVALUATION LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FTT 302	DAIRY TECHNOLOGY	3-1-0	4	4
B	FTT 304	FOOD PROCESS EQUIPMENT AND DESIGN	3-1-0	4	4
C	FTT 306	FOOD ADDITIVES AND FLAVOURINGS	3-1-0	4	4
D	FTTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	FTT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	FTL 332	FOOD PROCESSING LAB	0-0-3	3	2
T	FTD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	FTT 312	FRUITS AND VEGETABLE PROCESSING	2-1-0	3	3
	FTT 322	FOOD PRODUCT DESIGN AND DEVELOPMENT	2-1-0		
	FTT 332	BAKERY AND CONFECTIONERY	2-1-0		
	FTT 342	FOOD BIOTECHNOLOGY	2-1-0		
	FTT 352	REFRIGERATION AND COLD CHAIN	2-1-0		
	FTT 362	MODELLING AND SIMULATION IN FOOD PROCESSING	2-1-0		
	FTT 372	NANOTECHNOLOGY IN FOOD	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FTT 401	FOOD PROCESSING AND PRESERVATION	2-1-0	3	3
B	FTTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	FTTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	FTL 411	FOOD PRESERVATION LAB	0-0-3	3	2
T	FTQ413	SEMINAR	0-0-3	3	2
U	FTD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	FTT 413	FOOD PACKAGING TECHNOLOGY	2-1-0	3	3
	FTT 423	TECHNOLOGY OF FOOD EMULSIONS,FOAMS AND GELS	2-1-0		
	FTT 433	NON THERMAL PROCESSING	2-1-0		
	FTT 443	SPICES AND PLANTATION CROPS TECHNOLOGY	2-1-0		
	FTT 453	MEAT AND FISH PROCESSING TECHNOLOGY	2-1-0		
	FTT 463	POST HARVEST PHYSIOLOGY AND SPOILAGE IN FOOD	2-1-0		
	FTT 473	INSTRUMENTATION AND PROCESS CONTROL IN FOOD INDUSTRY	2-1-0		

1. OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by the **the Department of FOOD TECHNOLOGY for students of other undergraduate branches offered in the college.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	FTT 415	FOOD PROCESS ENGINEERING	2-1-0	3	3
	FTT 425	INSTRUMENTAL METHODS IN FOOD ANALYSIS	2-1-0		
	FTT 435	UNIT OPERATIONS IN FOOD TECHNOLOGY	2-1-0		
	FTT 445	NON THERMAL PROCESSING	2-1-0		

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance : 10
Guide : 20
Technical Content of the Report : 30
Presentation : 40

4. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Food Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30
Interim evaluation by the evaluation committee : 20
Final Seminar : 30
The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FTT 402	FOOD PLANT LAYOUT AND DESIGN	2-1-0	3	3
B	FTTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	FTTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	FTTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	FTT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	FTD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	FTT 414	FAT AND OIL PROCESSING TECHNOLOGY	2-1-0	3	3
	FTT 424	FOOD STORAGE ENGINEERING	2-1-0		
	FTT 434	FOOD SUPPLY CHAIN MANAGEMENT	2-1-0		
	FTT 444	EXTENSION AND TRANSFER OF TECHNOLOGY	2-1-0		
	FTT 454	NEUTRACEUTICALS AND FUNCTIONAL FOODS	2-1-0		
	FTT 464	FOOD TOXICOLOGY	2-1-0		
	FTT 474	BEVERAGE PROCESSING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	FTT 416	FOOD QUALITY, SAFETY AND REGULATIONS	2-1-0	3	3
	FTT 426	ENTREPRENEURSHIP DEVELOPMENT IN FOOD TECHNOLOGY	2-1-0		
	FTT 436	BYE-PRODUCT UTILIZATION IN FOOD INDUSTRY	2-1-0		
	FTT 446	FOOD PLANT UTILITIES, MAINTENANCE AND SAFETY	2-1-0		
	FTT 456	FERMENTATION AND ENZYME TECHNOLOGY	2-1-0		
	FTT 466	BIOPROCESS ENGINEERING	2-1-0		
	FTT 476	MEMBRANE TECHNOLOGY IN FOOD ENGINEERING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	FTT 418	FOOD LAWS AND REGULATIONS	2-1-0	3	3
	FTT 428	ICT APPLICATIONS IN FOOD INDUSTRY	2-1-0		
	FTT 438	FOOD INDUSTRY WASTE MANAGEMENT	2-1-0		
	FTT 448	PHYTOCHEMICALS IN FOOD	2-1-0		
	FTT 458	FOOD INFORMATICS	2-1-0		
	FTT 468	AUTOMATION IN FOOD INDUSTRY	2-1-0		
	FTT 478	MANAGEMENT OF FOOD PROCESSING INDUSTRY	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;
   - Preparing a paper for Conference presentation/Publication in Journals, if possible;

- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum, of which one course shall be a mini project based on the

chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in FOOD TECHNOLOGY** can opt to study the courses listed below:

Semester	Basket I				Basket II				Basket III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	FTT281	PRINCIPLES OF FOOD TECHNOLOGY	4	4	FTT283	FOOD SCIENCE AND TECHNOLOGY	4	4	FTT285	INTRODUCTORY FOOD TECHNOLOGY	4	4
S4	FTT 282	FOOD PROCESS ENGINEERING	4	4	FTT284	UNIT OPERATIONS IN FOOD PROCESSING	4	4	FTT286	FOOD PRESERVATION AND PROCESSING TECHNOLOGY	4	4
S5	FTT381	FOOD PACKAGING TECHNOLOGY	4	4	FTT383	FOOD PLANT LAYOUT AND DESIGN	4	4	FTT385	FOOD PRODUCT DESIGN AND DEVELOPMENT	4	4
S6	FTT382	FOOD ANALYSIS	4	4	FTT384	FOOD QUALITY, SAFETY AND REGULATION	4	4	FTT386	ENTREPRENEURSHIP DEVELOPMENT IN FOOD INDUSTRY	4	4
S7	FTD481	MINIPROJECT	4	4	FTD481	MINIPROJECT	4	4	FTD481	MINIPROJECT	4	4
S8	FTD482	MINIPROJECT	4	4	FTD482	MINIPROJECT	4	4	FTD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses lited in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such

courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in FOOD TECHNOLOGY** can opt to study the courses listed below:

Semester	Group I				Group III				Group III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S4	FTT292	ADVANCED FOOD MICROBIOLOGY	4	4	FTT294	ADVANCED SEPARATION PROCESSES IN FOOD PROCESSING	4	4	FTT296	NOVEL FOOD PROCESSING TECHNOLOGY	4	4
S5	FTT393	ADVANCED FLUID MECHANICS	4	4	FTT395	COMPUTER AIDED DESIGN OF FOOD PLANT, MACHINERY AND EQUIPMENT	4	4	FTT397	ADVANCES IN FOOD PACKAGING	4	4
S6	FTT394	EMERGING TECHNIQUES IN FOOD QUALITY AND SAFETY	4	4	FTT396	FOOD RHEOLOGY AND MICROSTRUCTURE	4	4	FTT398	FOOD PRODUCTS MONITORING AND CONTROL	4	4
S7	FTT495	RESEARCH METHODOLOGY AND STATISTICS	4	4	FTT497	FOOD BUSINESS LAWS AND LEGISLATION	4	4	FTT499	AGRO INDUSTRIAL PROJECT PLANNING AND MANAGEMENT	4	4
S8	FTD496	MINIPROJECT	4	4	FTD496	MINIPROJECT	4	4	FTD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech INDUSTRIAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G. Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three-digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four-year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical (Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.
   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS
   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION
   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive

thinking, improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO:	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	IET201	THEORY OF MACHINES AND DESIGN	3-1-0	4	4
C	IET203	FLUID MECHANICS AND HYDRAULIC MACHINES	3-1-0	4	4
D	IET205	MATERIALS AND MANUFACTURING PROCESSES	3-1-0	4	4
E	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
1/2	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	IEL201	FLUID MECHANICS AND HYDRAULICMACHINES LAB	0-0-3	3	2
T	MEL203	MATERIAL TESTING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4*	4
Total				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO:	COURSES	L-T-P	HOURS	CREDIT
A	MAT212	INTRODUCTION TO STOCHASTIC MODELS	3-1-0	4	4
B	IET202	WORK SYSTEM DESIGN	3-1-0	4	4
C	IET204	OPERATIONS MANAGEMENT	3-1-0	4	4
D	IET206	MACHINE TOOLS AND DIGITAL MANUFACTURING	3-1-0	4	4
E 1/2	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	IEL202	WORK SYSTEM DESIGN LAB	0-0-3	3	2
T	IEL204	MACHINE TOOLS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	IET 301	SUPPLY CHAIN AND LOGISTICS MANAGEMENT	3-1-0	4	4
B	IET 303	OPERATIONS RESEARCH	3-1-0	4	4
C	IET 305	THERMAL ENGINEERING	3-1-0	4	4
D	IET 307	OBJECT ORIENTED PROGRAMMING	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	IEL 331	THERMAL ENGINEERING LAB	0-0-3	3	2
T	IEL 333	OBJECT ORIENTED PROGRAMMING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	IET302	SYSTEM MODELLING AND SIMULATION	3-1-0	4	4
B	IET304	ADVANCED OPERATIONS RESEARCH	3-1-0	4	4
C	IET306	DATA ANALYSIS	3-1-0	4	4
D	IETXXX	PROGRAMELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	IET308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	IEL332	SIMULATION LAB	0-0-3	3	2
T	IEL334	DATA ANALYSIS AND OPTIMISATION LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	MET312	NONDESTRUCTIVE TESTING	2-1-0	3	3
	IET322	MANAGEMENT OF PROJECTS	2-1-0		
	MET332	ADVANCED MECHANICS OF SOLIDS	2-1-0		
	MET342	IC ENGINE COMBUSTION AND POLLUTION	2-1-0		
	MET352	AUTOMOBILE ENGINEERING	2-1-0		
	MET362	PRODUCT DESIGN AND DEVELOPMENT	2-1-0		
	MET372	ADVANCED METAL JOINING TECHNIQUES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO:	COURSES	L-T-P	HOURS	CREDIT
A	IET401	QUALITY ENGINEERING	2-1-0	3	3
B	IETXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	IETXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	--
S	IEL411	QUALITY CONTROL LAB	0-0-3	3	2
T	IEQ413	SEMINAR	0-0-3	3	2
U	IED415	PROJECT PHASE 1	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	MET413	ADVANCED METHODS IN NONDESTRUCTIVE TESTING	2-1-0	3	3
	IET423	ENTERPRISE RESOURCE PLANNING	2-1-0		
	MET433	FINITE ELEMENT METHOD	2-1-0		
	IET443	DATA ANALYTICS USING R AND PYTHON	2-1-0		
	MET453	HYBRID AND ELECTRIC VEHICLES	2-1-0		
	IET463	DESIGN AND ANALYSIS OF ALGORITHMS	2-1-0		
	IET473	BLOCK CHAIN TECHNOLOGY	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered to the **students of all undergraduate branches offered in the college other than Industrial Engineering program under KTU**

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	IET415	TOTAL QUALITY MANAGEMENT	2-1-0		
	IET425	MAINTENANCE ENGINEERING AND MANAGEMENT	2-1-0	3	3
	IET435	SYSTEM SIMULATION	2-1-0		
	IET445	SUPPLY CHAIN MANAGEMENT	2-1-0		
	IET455	FACILITIES PLANNING AND MATERIAL HANDLING	2-1-0		

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Industrial Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
    - Survey and study of published literature on the assigned topic;
    - Preparing an Action Plan for conducting the investigation, including team work;
    - Working out a preliminary Approach to the Problem relating to the assigned topic;
    - Block level design documentation
    - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
    - Preparing a Written Report on the Study conducted for presentation to the Department;
    - Final Seminar, as oral Presentation before a departmental committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	IET402	APPLIED ERGONOMICS	2-1-0	3	3
B	IETXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	IETXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	IETXXX	PROGRAM ELECTIVE V	2-1-0	3	3
E	IET404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	IED416	PROJECT PHASE 2	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO:	COURSES	L-T-P	HOURS	CREDIT
B	IET414	BIOMATERIALS	2-1-0		
	MET424	DECISIONS WITH METAHEURISTICS	2-1-0	3	3
	IET434	TIME SERIES ANALYSIS	2-1-0		
	IET444	MULTIVARIATE DATA ANALYSIS	2-1-0		
	IET454	DESIGN AND ANALYSIS OF EXPERIMENTS	2-1-0		
	MET464	MICRO AND NANO MANUFACTURING	2-1-0		
	IET474	TOTAL QUALITY MANAGEMENT AND SIX SIGMA	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO:	COURSES	L-T-P	HOURS	CREDIT
C	MET 416	COMPOSITE MATERIALS	2-1-0	3	3
	MET 426	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	2-1-0		
	IET436	FINANCIAL AND MANAGERIAL ACCOUNTING	2-1-0		
	IET446	MULTI-CRITERIA DECISION MAKING TECHNIQUES	2-1-0		
	MET 456	ROBOTICS AND AUTOMATION	2-1-0		
	MET 466	TECHNOLOGY MANAGEMENT	2-1-0		
	IET476	GROUP TECHNOLOGY AND FLEXIBLE MANUFACTURING SYSTEMS	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	MET 418	RELIABILITY ENGINEERING	2-1-0	3	3
	MET 428	INDUSTRIAL INTERNET OF THINGS	2-1-0		
	IET438	FINANCIAL ENGINEERING	2-1-0		
	IET448	BIG DATA ANALYTICS	2-1-0		
	IET458	INDUSTRIAL SCHEDULING	2-1-0		
	MET 468	ADDITIVE MANUFACTURING	2-1-0		
	IET478	RISK ANALYSIS IN DECISION MAKING	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;
   - Preparing a paper for Conference presentation/Publication in Journals, if possible;
   - Preparing a Dissertation in the standard format for being evaluated by the Department;
   - Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three-member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2

MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in INDUSTRIAL ENGINEERING** can opt to study the courses listed below:

SEMESTER	**BASKET-1**			
	COURSE NO.	**COURSES**	**HOURS**	**CREDIT**
S3	IET281	WORK STUDY AND ERGONOMICS	4	4
S4	IET282	PRODUCTION AND OPERATIONS MANAGEMENT	4	4
S5	IET381	DECISION SCIENCES	4	4
S6	IET382	INSPECTION AND QUALITY CONTROL	4	4
S7	IED481	MINI PROJECT	4	4
S8	IED482	MINI PROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses.The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in INDUSTRIAL ENGINEERING** can opt to study the courses listed below:

SEMESTER	**GROUP I**			
	COURSE NO.	**COURSES**	**HOURS**	**CREDIT**
S4	IET292	BASICS OF FINANCIAL MARKET	4	4
S5	IET393	FINANCIAL REPORTING AND ANALYSIS	4	4
S6	IET394	DERIVATIVES AND ALTERNATIVE INVESTMENTS	4	4

S7	IET495	QUANTITATIVE TRADING	4	4
S8	IED496	MINI PROJECT	4	4

SEMESTER	GROUP II			
	COURSE NO.	**COURSES**	**HOURS**	**CREDIT**
S4	IET294	ORGANIZATIONAL BEHAVIOUR AND PERSONNEL MANAGEMENT	4	4
S5	IET395	MARKETING MANAGEMENT	4	4
S6	IET396	FINANCIAL MANAGEMENT	4	4
S7	IET497	MANAGEMENT INFORMATION SYSTEMS	4	4
S8	IED496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the freshers to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech INSTRUMENTATION AND CONTROL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLYcan choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	ICT201	BASICS OF INSTRUMENTATION ENGINEERING & TRANSDUCER	3-1-0	4	4
C	ICT203	DESIGN OF LOGIC CIRCUITS	3-1-0	4	4
D	ICT205	ELECTRONIC CIRCUITS AND NETWORKS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	ICL201	LOGIC CIRCUITS LAB	0-0-3	3	2
T	ICL203	ELECTRONIC DEVICES AND CIRCUITS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	ICT202	MEASUREMENTS AND INSTRUMENTATION	3-1-0	4	4
C	ICT204	INTEGRATED CIRCUITS AND SYSTEMS	3-1-0	4	4
D	ICT206	CONTROL ENGINEERING I	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	ICL202	TRANSDUCERS AND MEASUREMENTS LAB	0-0-3	3	2
T	ICL204	ANALOG CIRCUITS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ICT301	INDUSTRIAL INSTRUMENTATION 1	3-1-0	4	4
B	ICT303	CONTROL ENGINEERING II	3-1-0	4	4
C	ICT305	MICROCONTROLLERS	3-1-0	4	4
D	ICT307	SIGNALS & SYSTEMS	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	ICL331	SYSTEM SIMULATION LAB	0-0-3	3	2
T	ICL333	MICROCONTROLLERS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ICT302	INDUSTRIAL INSTRUMENTATION 2	3-1-0	4	4
B	ICT304	PROCESS CONTROL	3-1-0	4	4
C	ICT306	DISCRETE-TIME SIGNAL PROCESSING	3-1-0	4	4
D	ICTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	ICT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	ICL332	INDUSTRIAL INSTRUMENTATION LAB	0-0-3	3	2
T	ICD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ICT312	NONLINEAR DYNAMICS AND CHAOS	2-1-0	3	3
	ICT322	VIRTUAL INSTRUMENTATION	2-1-0		
	ICT332	SOFT COMPUTING	2-1-0		
	ICT342	ANALYTICAL INSTRUMENTATION	2-1-0		
	ICT352	NUMERICAL METHODS	2-1-0		
	ICT362	BIOMEDICAL INSTRUMENTATION	2-1-0		
	ICT372	TOTAL QUALITY MANAGEMENT	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.**The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ICT401	PLC AND DCS	2-1-0	3	3
B	ICTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	ICTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	ICL411	PROCESS CONTROL LAB	0-0-3	3	2
T	ICQ413	SEMINAR	0-0-3	3	2
U	ICD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	ICT413	DIGITAL CONTROL	2-1-0	3	3
	ICT423	INDUSTRIAL PROCESS CONTROL	2-1-0		
	ICT433	DATA ACQUISITION AND SIGNAL CONDITIONING	2-1-0		
	ICT443	REFINERY INSTRUMENTATION	2-1-0		
	ICT453	DESIGN OF DIGITAL SYSTEMS	2-1-0		
	ICT463	BIOMEDICAL IMAGING SYSTEMS	2-1-0		
	ICT473	CORROSION CONTROL	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by the **Department of INSTRUMENTATION &CONTROL ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	ICT 415	ENVIRONMENTAL INSTRUMENTATION	2-1-0	3	3
	ICT 425	INDUSTRIAL INSTRUMENTATION	2-1-0		
	ICT 435	AUTOMOBILE INSTRUMENTATION	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Instrumentation and Control , either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before the evaluation committee.

   Total marks: 100, only CIE, minimum required to pass 50

   Guide : 30
   Interim evaluation by the evaluation committee : 20
   Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	ICT402	INSTRUMENTATION SYSTEM DESIGN	2-1-0	3	3
B	ICTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	ICTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	ICTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	ICT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	ICD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	ICT414	NUMERICAL COMPUTATION USING PYTHON	2-1-0	3	3
	ICT424	INDUSTRIAL NETWORKS	2-1-0		
	ICT434	ARTIFICIAL INTELLIGENCE	2-1-0		
	ICT444	POWER PLANT INSTRUMENTATION	2-1-0		
	ICT454	IoT AND APPLICATIONS	2-1-0		
	ICT464	IMAGE PROCESSING	2-1-0		
	ICT474	REMOTE SENSING AND CONTROL	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	ICT416	SYSTEM IDENTIFICATION AND ADAPTIVE CONTROL	2-1-0	3	3
	ICT426	INSTRUMENTATION AND CONTROL IN LARGE SCALE INDUSTRIES	2-1-0		
	ICT436	MEMS	2-1-0		
	ICT446	AUTOMOBILE INSTRUMENTATION	2-1-0		
	ICT456	VHDL PROGRAMMING	2-1-0		
	ICT466	BIOMEDICAL SIGNAL PROCESSING	2-1-0		
	ICT476	AEROSPACE ENGINEERING AND NAVIGATION INSTRUMENTATION	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	ICT418	MODERN METHODS OF INSTRUMENT ANALYSIS	2-1-0	3	3
	ICT428	HYDRAULICS AND PNEUMATICS	2-1-0		
	ICT438	INDUSTRIAL DRIVES AND CONTROL	2-1-0		
	ICT448	INSTRUMENTATION FOR AGRICULTURE	2-1-0		
	ICT458	EMBEDDED SYSTEM DESIGN	2-1-0		
	ICT468	BIOMECHANICS	2-1-0		
	ICT478	OPTO ELECTRONICS AND INSTRUMENTATION	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;
    - Preparing a paper for Conference presentation/Publication in Journals, if possible;

- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based

on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum.The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed.In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in INSTRUMENTATION & CONTROL** can opt to study the courses listed below: Also mention the programs that are eligible for registering the minor.

Specialisation	**Minor in Process Control and Automation**				**Minor in Data Acquisition and Signal Conditioning**			
Eligible	**AE, BM, CH, EE, EC, FT, IE, SB, FS**				**AO, AE, AU, BM, CH, EE, EB, EC, FT, ME, MR**			
Semester	**BASKET I**				**BASKET II**			
	Course No.	**Course Name**	**HOURS**	**CREDIT**	**Course No.**	**Course Name**	**HOURS**	**CREDIT**
S3	ICT 281	INTRODUCTION TO SENSORS AND TRANSDUCERS	4	4	ICT 283	CIRCUIT DESIGN ANALYSIS FOR INSTRUMENTATION	4	4
S4	ICT 282	LINEAR SYSTEM ANALYSIS	4	4	ICT 284	INTRODUCTION TO VIRTUAL INSTRUMENTATION	4	4
S5	ICT 381	PROCESS AUTOMATION	4	4	ICT 383	DATA ACQUISITION AND SIGNAL CONDITIONINGFOR INSTRUMENTATION	4	4
S6	ICT 382	PRINCIPLES OF PROCESS CONTROL	4	4	ICT 384	ROLE OF IoTIN DATA ACQUISITION AND AUTOMATION	4	4

S7	ICD 481	MINIPROJECT	4	4	ICD 481	MINIPROJECT	4	4
S8	ICD 482	MINIPROJECT	4	4	ICD 482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if she/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum.The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than

or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in INSTRUMENTATION & CONTROL ENGINEERING** can opt to study the courses listed below:

Semester	GROUP I				GROUP II			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	ICT292	ENGINEERING OPTIMIZATION	4	4	ICT 294	MECHATRONIC SYSTEMS	4	4
S5	ICT 393	PROCESS DYNAMICS	4	4	ICT 395	PRINCIPLES OF ROBOTICS	4	4
S6	ICT 394	ADVANCED PROCESS CONTROL	4	4	ICT 396	FIELD AND SERVICE ROBOTICS	4	4
S7	ICT 495	INTELLIGENT CONTROL	4	4	ICT 497	MACHINE VISION SYSTEMS	4	4
S8	ICD 496	MINIPROJECT	4	4	ICD 496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.Tech INFORMATION TECHNOLOGY

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other than the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 100	ENGINEERING PHYSICS A	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.
2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in S1 and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, and POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT203	DISCRETE MATHEMATICAL STRUCTURES	3-1-0	4	4
B	ITT201	DATA STRUCTURES	3-1-0	4	4
C	ITT203	DIGITAL SYSTEM DESIGN	3-1-0	4	4
D	ITT205	PROBLEM SOLVING USING PYTHON	3-1-0	4	4
E 1\2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	-----
S	ITL201	DATA STRUCTURES LAB	0-0-3	3	2
T	ITL203	PROGRAMMING AND SYSTEM UTILITIES LAB	0-0-3	3	2
R\M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	MAT208	PROBABILITY, STATISTICS AND ADVANCED GRAPH THEORY	3-1-0	4	4
B	ITT202	PRINCIPLES OF OBJECT ORIENTED TECHNIQUES	3-1-0	4	4
C	ITT204	COMPUTER ORGANIZATION	3-1-0	4	4
D	ITT206	DATABASE MANAGEMENT SYSTEMS	3-1-0	4	4
E 1\2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	-----
S	ITL202	OBJECT ORIENTED TECHNIQUES LAB	0-0-3	3	2
T	ITL204	DATABASE MANAGEMENT SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	ITT301	WEB APPLICATION DEVELOPMENT	3-1-0	4	4
B	ITT303	OPERATING SYSTEM CONCEPTS	3-1-0	4	4
C	ITT305	DATA COMMUNICATION AND NETWORKING	3-1-0	4	4
D	ITT307	FORMAL LANGUAGES AND AUTOMATA THEORY	3-1-0	4	4
E	ITT309	MANAGEMENT FOR SOFTWARE ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	----
S	ITL331	OPERATING SYSTEM AND NETWORK PROGRAMMING LAB	0-0-3	3	2
T	ITL333	WEB APPLICATION DEVELOPMENT LAB	0-0-3	3	2
R\M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**31**	**23/27**

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	ITT302	INTERNETWORKING WITH TCP/IP	3-1-0	4	4
B	ITT304	ALGORITHM ANALYSIS AND DESIGN	3-1-0	4	4
C	ITT306	DATA SCIENCE	3-1-0	4	4
D	ITTXXX	PROGRAME ELECTIVE I	2-1-0	3	3
E	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
F	ITT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	ITL332	COMPUTER NETWORKS LAB	0-0-3	3	2
T	ITD334	MINIPROJECT	0-0-3	3	2
R\M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	ITT312	USER INTERFACE AND USER EXPERIENCE DESIGN	2-1-0	3	3
	ITT322	COMPILER DESIGN	2-1-0		
	ITT332	SOFT COMPUTING	2-1-0		
	ITT342	MICROPROCESSORS	2-1-0		
	ITT352	DISTRIBUTED SYSTEMS	2-1-0		
	ITT362	DIGITAL IMAGE PROCESSING	2-1-0		
	ITT372	SEMANTIC WEB	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and

classes shall be arranged for practising questions based on the core courses listed in the curriculum.

3. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks
   Split up for CIE
   Attendance : 10
   Guide : 15
   Project Report : 10
   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	ITT401	DATA ANALYTICS	2-1-0	3	3
B	ITTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	ITTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	----
S	ITL411	DATA ANALYTICS LAB	0-0-3	3	2
T	ITQ413	SEMINAR	0-0-3	3	2
U	ITD415	PROJECT PHASE I	0-0-6	6	2
R\M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	ITT413	MOBILE COMPUTING	2-1-0	3	3
	ITT423	ARTIFICIAL INTELLIGENCE	2-1-0		
	ITT433	OBJECT ORIENTED MODELING AND DESIGN	2-1-0		
	ITT443	ADVANCED DATABASE MANAGEMENT SYSTEMS	2-1-0		
	ITT453	MACHINE LEARNING	2-1-0		
	ITT463	OPTIMIZATION AND METAHEURISTICS	2-1-0		
	ITT473	PROBABILISTIC AND STOCHASTIC MODELLING	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. For example The courses listed below are offered by **the Department of INFORMATION TECHNOLOGY for students of other undergraduate branches except Computer science & Engineering and Information Technology, offered in the colleges under KTU** .

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	ITT415	WEB DESIGNING	2-1-0	3	3
	ITT 425	MULTIMEDIA TECHNIQUES	2-1-0		
	ITT 435	FREE AND OPEN SOURCE SOFTWARE	2-1-0		
	ITT 445	MOBILE APPLICATION DEVELOPMENT	2-1-0		

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Information Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before the evaluation committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

   The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
A	ITT402	CRYPTOGRAPHY AND NETWORK SECURITY	2-1-0	3	3
B	ITTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	ITTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	ITTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
E	ITT404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	ITD416	PROJECT PHASE II	0-0-12	12	4
R\M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
B	ITT414	COMPUTER VISION	2-1-0	3	3
	ITT424	CYBER AND NETWORK FORENSICS	2-1-0		
	ITT434	CLOUD COMPUTING	2-1-0		
	ITT444	DATA MINING AND WAREHOUSING	2-1-0		
	ITT454	SEARCH ENGINE OPTIMISATION	2-1-0		
	ITT464	COMPUTER GRAPHICS	2-1-0		
	IIT474	BLOCK CHAIN TECHNOLOGY	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
C	ITT416	SOCIAL NETWORKS ANALYSIS	2-1-0	3	3
	ITT426	INTERNET OF THINGS	2-1-0		
	ITT436	HIGH SPEED NETWORKS	2-1-0		
	ITT446	ADHOC AND WIRELESS SENSOR NETWORKS	2-1-0		
	ITT456	HUMAN COMPUTER INTERFACING	2-1-0		
	ITT466	PIPELINING AND PARALLEL PROCESSING	2-1-0		
	ITT476	NETWORK SCIENCE	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO	COURSES	L-T-P	HOURS	CREDIT
D	ITT418	INFORMATION STORAGE MANAGEMENT	2-1-0	3	3
	ITT428	SOFTWARE QUALITY ASSURANCE	2-1-0		
	ITT438	SOFTWARE ARCHITECTURE	2-1-0		
	ITT448	NETWORK ON CHIPS	2-1-0		
	ITT458	NATURAL LANGUAGE PROCESSING	2-1-0		
	ITT468	BIO-INFORMATICS	2-1-0		
	ITT478	DEEP LEARNING	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in INFORMATION TECHNOLOGY Branch** can opt to study the courses listed below.

Semester	BASKET I WEB AND ANDROID DEVELOPMENT				BASKET II COMPUTER COMMUNICATIONS				BASKET III SOFTWARE ENGINEERING			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	ITT281	JAVA PROGRAMMING	4	4	ITT283	DATA COMMUNICATION	4	4	ITT285	SOFTWARE ENGINEERING	4	4
S4	ITT282	DATABASE MANAGEMENT	4	4	ITT284	COMPUTER NETWORKS	4	4	ITT286	SOFTWARE PROJECT MANAGEMENT TECHNIQUES	4	4
S5	ITT381	WEB APPLICATION DEVELOPMENT	4	4	ITT383	INTERNET TECHNOLOGY	4	4	ITT 385	SOFTWARE ARCHITECTURE CONCEPTS	4	4
S6	ITT382	ANDROID PROGRAMMING	4	4	ITT384	INTERNETWORKING	4	4	ITT386	PRINCIPLES OF SOFTWARE QUALITY ASSURANCE	4	4
S7	ITD481	MINIPROJECT	4	4	ITD481	MINIPROJECT	4	4	ITD481	MINIPROJECT	4	4
S8	ITD482	MINIPROJECT	4	4	ITD482	MINIPROJECT	4	4	ITD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such

courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in INFORMATION TECHNOLOGY** can opt to study the courses listed below.

Semester	GROUP I				GROUP II				GROUP III			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	ITT292	MATHEMATICAL FOUNDATION FOR NETWORKING	4	4	ITT294	NUMBER THEORY	4	4	ITT296	MICROPROCESSOR AND MICROCONTROLLER PROGRAMMING	4	4
S5	ITT393	WIRELESS COMMUNICATION	4	4	ITT395	SECURITY IN COMPUTING	4	4	ITT397	ADVANCED COMPUTER ARCHITECTURE	4	4
S6	ITT394	DESIGN AND ANALYSIS OF NETWORKS	4	4	ITT396	APPLIED COMPUTER SECURITY	4	4	ITT398	EMBEDDED SYSTEM	4	4
S7	ITT495	ENTERPRISE NETWORKS	4	4	ITT497	WEB SECURITY	4	4	ITT499	ROBOTICS AND AUTOMATION	4	4
S8	ITD496	MINIPROJECT	4	4	ITD496	MINIPROJECT	4		ITD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.

- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. TECH MECHANICAL ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, , Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Communication, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc.

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MET201	MECHANICS OF SOLIDS	3-1-0	4	4
C	MET203	MECHANICS OF FLUIDS	3-1-0	4	4
D	MET205	METALLURGY & MATERIAL SCIENCE	3-1-0	4	4
E 1/2	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	MEL201	COMPUTER AIDED MACHINE DRAWING	0-0-3	3	2
T	MEL203	MATERIALS TESTING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4**	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	MET202	ENGINEERING THERMODYNAMICS	3-1-0	4	4
C	MET204	MANUFACTURING PROCESS	3-1-0	4	4
D	MET206	FLUID MACHINERY	3-1-0	4	4
E 1/2	EST200	DESIGN AND ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MEL202	FM & HM LAB	0-0-3	3	2
T	MEL204	MACHINE TOOLS LAB-I	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONORS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET301	MECHANICS OF MACHINERY	3-1-0	4	4
B	MET303	THERMAL ENGINEERING	3-1-0	4	4
C	MET305	INDUSTRIAL & SYSTEMS ENGINEERING	3-1-0	4	4
D	MET307	MACHINE TOOLS AND METROLOGY	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MEL331	MACHINE TOOLS LAB-II	0-0-3	3	2
T	MEL333	THERMAL ENGINEERING LAB-I	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONORS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET302	HEAT & MASS TRANSFER	3-1-0	4	4
B	MET304	DYNAMICS OF MACHINERY & MACHINE DESIGN	3-1-0	4	4
C	MET306	ADVANCED MANUFACTURING ENGINEERING	3-1-0	4	4
D	METXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E ½	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MET308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	MEL332	COMPUTER AIDED DESIGN & ANALYSIS LAB	0-0-3	3	2
T	MEL334	THERMAL ENGINEERING LAB-II	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MET312	NONDESTRUCTIVE TESTING	2-1-0	3	3
	MET322	DATA ANALYTICS FOR ENGINEERS	2-1-0		
	MET332	ADVANCED MECHANICS OF SOLIDS	2-1-0		
	MET342	IC ENGINE COMBUSTION AND POLLUTION	2-1-0		
	MET352	AUTOMOBILE ENGINEERING	2-1-0		
	MET362	PRODUCT DESIGN AND DEVELOPMENT	2-1-0		
	MET372	ADVANCED METAL JOINING TECHNIQUES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. **All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 2 to 4 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honors programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted online by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET401	DESIGN OF MACHINE ELEMENTS	2-1-0	3	3
B	METXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	METXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	MEL411	MECHANICAL ENGINEERING LAB	0-0-3	3	2
T	MEQ413	SEMINAR	0-0-3	3	2
U	MED415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONORS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MET413	ADVANCED METHODS IN NONDESTRUCTIVE TESTING	2-1-0	3	3
	MET423	OPTIMIZATION TECHNIQUES AND APPLICATIONS	2-1-0		
	MET433	FINITE ELEMENT METHOD	2-1-0		
	MET443	AEROSPACE ENGINEERING	2-1-0		
	MET453	HYBRID AND ELECTRIC VEHICLES	2-1-0		
	MET463	OPERATIONS MANAGEMENT	2-1-0		
	MET473	AIR CONDITIONING AND REFRIGERATION	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs The courses listed below are offered by the **Department of MECHANICAL ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MET415	INTRODUCTION TO BUSINESS ANALYTICS	2-1-0	3	3
	MET425	QUANTITATIVE TECHNIQUES FOR ENGINEERS	2-1-0		
	MET435	AUTOMOTIVE TECHNOLOGY	2-1-0		
	MET445	RENEWABLE ENERGY ENGINEERING	2-1-0		
	MET455	QUALITY ENGINEERING AND MANAGEMENT	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance : 10
Guide : 20
Technical Content of the Report : 30
Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Mechanical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
    - Survey and study of published literature on the assigned topic;
    - Preparing an Action Plan for conducting the investigation, including team work;
    - Working out a preliminary Approach to the Problem relating to the assigned topic;
    - Block level design documentation
    - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/

Feasibility;

- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET402	MECHATRONICS	2-1-0	3	3
B	METXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	METXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	METXXX	PROGRAM ELECTIVE V	2-1-0	3	3
E	MET404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	MED416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONORS COURSE	3-1-0	4*	4
TOTAL				**25/28**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MET414	QUALITY MANAGEMENT	2-1-0	3	3
	MET424	DECISIONS WITH METAHEURISTICS	2-1-0		
	MET434	PRESSURE VESSEL AND PIPING DESIGN	2-1-0		
	MET444	COMPUTATIONAL FLUID DYNAMICS	2-1-0		
	MET454	INDUSTRIAL TRIBOLOGY	2-1-0		
	MET464	MICRO AND NANO MANUFACTURING	2-1-0		
	MET474	HEATING AND VENTILATION SYSTEMS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MET 416	COMPOSITE MATERIALS	2-1-0	3	3
	MET 426	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	2-1-0		
	MET 436	ACOUSTICS AND NOISE CONTROL	2-1-0		
	MET 446	HEAT TRANSFER EQUIPMENT DESIGN	2-1-0		
	MET 456	ROBOTICS AND AUTOMATION	2-1-0		
	MET 466	TECHNOLOGY MANAGEMENT	2-1-0		
	MET 476	CRYOGENIC ENGINEERING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MET 418	RELIABILITY ENGINEERING	2-1-0	3	3
	MET 428	INDUSTRIAL INTERNET OF THINGS	2-1-0		
	MET438	FRACTURE MECHANICS	2-1-0		
	MET 448	GAS TURBINES AND JET PROPULSION	2-1-0		
	MET 458	ADVANCED ENERGY ENGINEERING	2-1-0		
	MET 468	ADDITIVE MANUFACTURING	2-1-0		
	MET 478	POWER PLANT ENGINEERING	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honors programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the syllabus mentioned for comprehensive course work in the sixth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/ Modelling/ Simulation/ Design/ Problem Solving/ Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;
    - Preparing a paper for Conference presentation/Publication in Journals, if possible;

- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide	: 30
Interim evaluation, 2 times in the semester by the evaluation committee	: 50
Quality of the report evaluated by the above committee	: 30
Final evaluation by a three member committee	: 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in MECHANICAL ENGINEERING Branch** can opt to study the courses listed below:

Semester	BASKET I				BASKET II				BASKET III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	MET281	MECHANICS OF MATERIALS	4	4	MET283	FLUID MECHANICS & MACHINERY	4	4	MET285	MATERIAL SCIENCE & TECHNOLOGY	4	4
S4	MET282	THEORY OF MACHINES	4	4	MET284	THERMODYNAMICS	4	4	MET286	MANUFACTURING TECHNOLOGY	4	4
S5	MET381	DYNAMICS OF MACHINES	4	4	MET383	THERMAL ENGINEERING	4	4	MET385	MACHINE TOOLS ENGINEERING	4	4
S6	MET382	MACHINE DESIGN	4	4	MET384	HEAT TRANSFER	4	4	MET386	INDUSTRIAL ENGINEERING	4	4
S7	MED481	MINIPROJECT	4	4	MED481	MINIPROJECT	4	4	MED481	MINIPROJECT	4	4
S8	MED482	MINIPROJECT	4	4	MED482	MINIPROJECT	4	4	MED482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all

semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in MECHANICAL ENGINEERING** can opt to study the courses listed below.

SEMESTER	GROUP I				GROUP II				GROUP III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S4	MET292	CONTINUUM MECHANICS	4	4	MET294	ADVANCED MECHANICS OF FLUIDS	4	4	MET296	MATERIALS IN MANUFACTURING	4	4
S5	MET393	EXPERIMENTAL STRESS	4	4	MET395	ADVANCED THERMODYNA	4	4	MET397	FLUID POWER	4	4

		ANALYSIS				MICS				AUTOMATION		
S6	MET394	ADVANCED DESIGN SYNTHESIS	4	4	MET396	COMPRESSIBLE FLUID FLOW	4	4	MET398	ADVANCED NUMERICAL CONTROLLED MACHINING	4	4
S7	MET495	ADVANCED THEORY OF VIBRATIONS	4	4	MET497	COMPUTATIONAL METHODS IN FLUID FLOW & HEAT TRANSFER	4	4	MET499	PRECISION MACHINING	4	4
S8	MED496	MINIPROJECT	4	4	MED496	MINIPROJECT	4	4	MED496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.

CURRICULUM I TO VIII: B. TECH MECHANICAL (AUTOMOBILE) ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Sem	1	2	3	4	5	6	7	8	Total
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									162

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.
2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MUT201	FLUID MECHANICS AND MACHINERY	3-1-0	4	4
C	MUT203	AUTO CHASSIS	4-0-0	4	4
D	MET205	METALLURGY AND MATERIAL SCIENCE	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	MEL201	COMPUTER AIDED MACHINE DRAWING	0-0-3	3	2
T	MUL203	FM & HM LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	MET202	ENGINEERING THERMODYNAMICS	3-1-0	4	4
C	MUT204	AUTO POWER PLANT	3-1-0	4	4
D	MUT206	MECHANICS OF SOLIDS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MUL202	MATERIALS TESTING LAB	0-0-3	3	2
T	MUL204	VEHICLE SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MUT301	AUTO ELECTRICAL AND ELECTRONICS	3-1-0	4	4
B	AUT303	MANUFACTURING PROCESS	3-1-0	4	4
C	MUT305	VEHICLE DYNAMICS	3-1-0	4	4
D	MUT307	AUTO TRANSMISSION	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MUL331	PRODUCTION ENGINEERING LAB	0-0-3	3	2
T	MEL333	THERMAL ENGINEERING LAB-I	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade-in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	AUT302	MECHANICS OF MACHINERY	3-1-0	4	4
B	MUT304	ADVANCED IC ENGINES	3-1-0	4	4
C	MUT306	AUTO COMPONENT DESIGN	3-1-0	4	4
D	MUTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MUT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	MEL332	COMPUTER AIDED DESIGN & ANALYSIS LAB	0-0-3	3	2
T	MUL332	ELECTRICAL SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MUT312	VEHICLE MAINTENANCE	2-1-0	3	3
	MET312	NON-DESTRUCTIVE TESTING	2-1-0		
	MUT322	VEHICLE BODY ENGINEERING	2-1-0		
	MUT332	HEATING VENTILATION AND AIR-CONDITIONING	2-1-0		
	MUT342	ELECTRIC VEHICLE TECHNOLOGY	2-1-0		
	MUT362	PRODUCT LIFE CYCLE MANAGEMENT	2-1-0		
	MUT372	NUCLEAR ENGINEERING	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MUT401	HEAT & MASS TRANSFER	2-1-0	3	3
B	MUTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	MUTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	MUL411	AUTOTRONICS AND VEHICLE TESTING LAB	0-0-3	3	2
T	MUQ413	SEMINAR	0-0-3	3	2
U	MUD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MUT413	FINITE ELEMENT METHODS	2-1-0	3	3
	MUT423	VEHICLE PERFORMANCE AND TESTING	2-1-0		
	MUT433	TRACTORS AND FARM EQUIPMENTS	2-1-0		
	MUT443	TOTAL QUALITY MANAGEMENT	2-1-0		
	MET423	OPTIMIZATION TECHNIQUES AND APPLICATIONS	2-1-0		
	MUT463	AUTOMOTIVE TESTING EQUIPMENTS	2-1-0		
	MUT473	AUTOMOTIVE AERODYNAMICS	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of MECHANICAL (AUTOMOBILE) for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MUT415	MODERN AUTOMOTIVE TECHNOLOGY	2-1-0	3	3
	MUT425	HYBRID AND ELECTRIC VEHICLES	2-1-0		
	MUT435	AUTOMOTIVE ERGONOMICS AND SAFETY	2-1-0		
	MUT445	AVG AND AUTONOMOUS VEHICLES	2-1-0		
	MUT455	COMPUTER SIMULATION AND ANALYSIS OF AUTOMOTIVE SYSTEMS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Mechanical (Automobile) Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MUT402	HYBRID AND ELECTRIC VEHICLES	2-1-0	3	3
B	MUTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	MUTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	MUTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	MUT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	MUD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MUT414	EMBEDDED SYSTEM IN AUTOMOBILES	2-1-0	3	3
	MET434	PRESSURE VESSEL PIPING DESIGN	2-1-0		
	MUT434	AVG AND AUTONOMOUS VEHICLES	2-1-0		
	MUT444	HUMAN RELATIONS MANAGEMENT	2-1-0		
	MET464	MICRO AND NANO MANUFACTURING	2-1-0		
	MUT464	OFF ROAD VEHICLES	2-1-0		
	MUT474	MODERN AUTOMOTIVE TECHNOLOGY	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MUT416	AUTOMOTIVE AIR CONDITIONING	2-1-0	3	3
	MUT426	OPERATIONS RESEARCH	2-1-0		
	MUT436	AUTOMOTIVE MECHATRONICS	2-1-0		
	MUT446	MARKETING MANAGEMENT	2-1-0		

	MUT456	THEORY OF VIBRATIONS	2-1-0		
	MUT466	AUTOMOTIVE ERGONOMICS AND SAFETY	2-1-0		
	MUT476	NVH IN AUTOMOBILES	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
	MET468	ADDITIVE MANUFACTURING	2-1-0	3	3
D	MUT428	METROLOGY AND INSTRUMENTATION	2-1-0		
	MUT438	HYDROGEN FUELLED VEHICLES	2-1-0		
	MUT448	ADVANCED METAL JOINING TECHNIQUES	2-1-0		
	MUT458	COMPUTER SIMULATION AND ANALYSIS OF AUTOMOTIVE SYSTEMS	2-1-0		
	MUT468	AUTOMOTIVE NAVIGATION AND CONTROLS	2-1-0		
	MUT478	ADVANCED ENERGY ENGINEERING	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;

- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the

consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in MECHANICAL AUTOMOBILE ENGINEERING Branch** can opt to study the courses listed below:

SEMESTER	BASKET I			
	COURSE NO.	COURSE NAME	HOURS	CREDIT
S3	AUT281	FUNDAMENTALS OF AUTOMOBILES ENGINEERING	4	4
S4	AUT282	AUTOMOTIVE CHASSIS AND ENGINE COMPONENTS	4	4
S5	AUT381	DYNAMICS OF AUTOMOBILES	4	4
S6	AUT382	MODERN AUTOMOTIVE TECHNOLOGY	4	4
S7	MUD481	MINIPROJECT	4	4
S8	MUD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in MECHANICAL (AUTO)** can opt to study the courses listed below:

SEMESTER	GROUP I			
	Course No.	**Course Name**	**HOURS**	**CREDIT**
S4	MUT292	INCOMPRESSIBLE AND COMPRESSIBLE FLOWS	4	4
S5	MUT393	ADVANCED THEORY OF VIBRATIONS	4	4
S6	MUT394	IC ENGINES AND ADVANCED COMBUSTION STRATEGIES	4	4
S7	MUT495	SIMULATION AND ANALYSIS OF IC ENGINE PROCESS	4	4
S8	MUD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.

- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: MECHANICAL PRODUCTION ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum.

Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLYcan choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MET201	MECHANICS OF SOLIDS	3-1-0	4	4
C	MPT203	FLUID MECHANICS AND MACHINERY	3-1-0	4	4
D	MET205	METALLURGY & MATERIAL SCIENCE	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	MPL201	PRODUCTION ENGINEERING DRAWING	0-0-3	3	2
T	MEL203	MATERIAL TESTING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	MPT202	MECHANICAL TECHNOLOGY	3-1-0	4	4
C	MET204	MANUFACTURING PROCESS	3-1-0	4	4
D	MPT206	MACHINE TOOL TECHNOLOGY	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MEL202	FM & HM LAB	0-0-3	3	2
T	MPL204	PRODUCTION TOOLING LAB -I	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MPT301	THEORY OF MACHINES	3-1-0	4	4
B	MPT303	METROLOGY AND INSTRUMENTATION	3-1-0	4	4
C	MET305	INDUSTRIAL & SYSTEMS ENGINEERING	3-1-0	4	4
D	MPT307	CAD/CAM/CIM	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MPL331	PRODUCTION TOOLING LAB -II	0-0-3	3	2
T	MPL333	PRODUCTION PROCESS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MPT302	ADVANCED MATERIALS AND MANUFACTURING SYSTEMS	4-0-0	4	4
B	MPT304	PRODUCTIONS AND OPERATIONS MANAGEMENT	3-1-0	4	4
C	MPT306	DYNAMICS OF MACHINERY	3-1-0	4	4
D	MPTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MPT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	MEL332	COMPUTER AIDED AND DESIGN ANALYSIS LAB	0-0-3	3	2
T	MPL334	PRODUCTION ENGINEERING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MPT312	SUPPLY CHAIN AND LOGISTICS MANAGEMENT	2-1-0	3	3
	MPT322	PRECISION ENGINEERING	2-1-0		
	MPT332	MAINTENANCE AND SAFETY ENGINEERING	2-1-0		
	MPT342	THERMODYNAMICS	2-1-0		
	MPT352	OPERATIONS RESEARCH	2-1-0		
	MET312	NON DESTRUCTIVE TESTING	2-1-0		
	MET352	AUTOMOBILE ENGINEERING	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MPT401	MACHINE DESIGN	2-1-0	3	3
B	MPTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	MPTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	MPL411	MECHANICAL ENGINEERING LAB	0-0-3	3	2
T	MPQ413	SEMINAR	0-0-3	3	2
U	MPD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MPT413	STATISTICS FOR ENGINEERS	2-1-0	3	3
	MPT423	ROBOTICS	2-1-0		
	MPT433	DESIGN OF EXPERIMENTS	2-1-0		
	MPT443	MARKETING MANAGEMENT	2-1-0		
	MPT453	COMPOSITE MATERIALS AND MECHANICS	2-1-0		
	MET433	FINITE ELEMENT METHOD	2-1-0		
	MET473	AIR CONDITIONING AND REFRIGERATION	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs.The courses listed below are offered by **the Department of MECHANICAL PRODUCTION ENGINEERING for students of other undergraduate branches offered in the college**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MPT415	PRODUCT DEVELOPMENT AND DESIGN	2-1-0	3	3
	MPT435	PLANT ENGINEERING AND MAINTENANCE	2-1-0		
	MPT445	INDUSTRIAL PSYCHOLOGY AND ORGANISATIONAL BEHAVIOUR	2-1-0		
	MET425	QUANTITATIVE TECHNIQUE FOR ENGINEERS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Mechanical(Production) Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;

- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HOD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET402	MECHATRONICS	2-1-0	3	3
B	MPTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	MPTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	MPTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	MPT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	MPD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MPT414	MACHINE TOOL DESIGN	2-1-0	3	3
	MPT424	ARTIFICIAL INTELIGENCE IN MANUFACTURING	2-1-0		
	MPT434	ADVANCED OPERATION RESEARCH	2-1-0		
	MPT444	RAPID PROTOTYPING, TOOLING AND MANUFACTURE	2-1-0		
	MPT454	NUCLEAR ENGINEERING	2-1-0		
	MPT464	PROJECT ENGINEERING AND MANAGEMENT	2-1-0		
	MPT474	FACILITIES PLANNING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MPT416	METAL FORMING TECHNOLOGY	2-1-0	3	3
	MPT426	INDUSTRIAL HYDRAULICS	2-1-0		
	MPT436	LEAN AND AGILE MANUFACTURING	2-1-0		
	MPT446	HUMAN RESOURCE MANAGEMENT	2-1-0		
	MPT456	TRIBOLOGY	2-1-0		
	MPT466	TOTAL QUALITY MANAGEMENT	2-1-0		
	MPT476	ADVANCED METAL CASTING	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MPT418	TOOL ENGINEERING	2-1-0	3	3
	MPT428	NANOTECHNOLOGY	2-1-0		
	MPT438	INDUSTRIAL AUTOMATION	2-1-0		
	MPT448	BIOMEDICAL ENGINEERING	2-1-0		
	MPT458	CREATIVITY AND PRODUCT ENGINEERING	2-1-0		
	MET458	ADVANCED ENERGY ENGINEERING	2-1-0		
	MET478	POWER PLANT ENGINEERING	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8.The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in INSPECTION AND QUALITY CONTROL** can opt to study the courses listed below:

SEMESTER	**BASKET I: INSPECTION AND QUALITY CONTROL Eligible- AU,CE,CH,CS,EE,EC,IE,ME,MR,MT,MU**			
	COURSE NO.	**COURSE NAME**	**HOURS**	**CREDIT**
S3	MPT281	INDUSTRIAL INSPECTION METHODS	4	4
S4	MPT 282	STATISTICAL PROCESS CONTROL	4	4
S5	MPT 381	RELIABILITY ENGINEERING AND MANAGEMENT	4	4
S6	MPT 382	CONTINUOUS IMPROVEMENT TECHNIQUES	4	4
S7	MPD 481	MINIPROJECT	4	4
S8	MPD 482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than

or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in MECHANICAL PRODUCTION ENGINEERING** can opt to study the courses listed below:

(vii)

SEMESTER	GROUP I:PRECISION ENGINEERING				GROUP II: SUSTAINABLE PRODUCT DEVELOPMENT			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S4	MPT292	PRECISION ENGINEERING	4	4	MPT294	ERGONOMICS	4	4
S5	MPT393	SURFACE ENGINEERING	4	4	MPT395	DESIGN FOR MANUFACTURE	4	4
S6	MPT394	PROCESSING OF NON-METALLIC MATERIALS	4	4	MPT396	PRODUCT DESIGN AND DEVELOPMENT	4	4
S7	MPT495	DESIGN AND MANUFACTURING OF MEMS	4	4	MPT497	SYSTEM DESIGN FOR SUSTAINABILITY	4	4
S8	MPD496	MINIPROJECT	4	4	MPD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. TECH MECHATRONICS

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three-digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.
   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS
   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION
   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MRT201	ELECTRICAL MACHINES & DRIVES	3-1-0	4	4
C	MRT203	ANALOG AND DIGITAL ELECTRONICS	3-1-0	4	4
D	MRT205	MECHANICS OF SOLIDS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	MRL201	ELECTRICAL TECHNOLOGY LAB	0-0-3	3	2
T	MRL203	ANALOG & DIGITAL ELECTRONICS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	MRT202	THERMODYNAMICS	3-1-0	4	4
C	MRT204	SENSORS AND ACTUATORS	3-1-0	4	4
D	MRT206	MICROPROCESSOR & EMBEDDED SYSTEMS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MRL202	MECHANICAL ENGINEERING LAB	0-0-3	3	2
T	MRL204	MICROPROCESSOR & EMBEDDED SYSTEM LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MET301	MECHANICS OF MACHINERY	3-1-0	4	4
B	MRT303	LINEAR CONTROL SYSTEMS	3-1-0	4	4
C	MRT305	PLC & DATA AQUISTION SYSTEMS	3-1-0	4	4
D	MRT307	SOFT COMPUTING TECHNIQUES	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MRL331	PLC & DATA ACQUISTION LAB	0-0-3	3	2
T	MRL333	INSRTUMENTATION LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2.
3. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MRT302	ROBOTICS & AUTOMATION	3-1-0	4	4
B	MRT304	DIGITAL IMAGE PROCESSING & MACHINE VISION	3-1-0	4	4
C	MRT306	INDUSTRIAL HYDRAULICS & PNEUMATICS	3-1-0	4	4
D	MRTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MRT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	MRL332	MECHATRONIC SYSTEMS LAB	0-0-3	3	2
T	MRD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MRT312	OBJECT ORIENTED PROGRAMMING	2-1-0	3	3
	MRT322	BIOMEDICAL INSTRUMENTATION	2-1-0		
	MRT332	POWER ELECTRONICS	2-1-0		
	MRT342	AUTOMOBILE ENGINEERING	2-1-0		
	MRT352	INDUSTRIAL ENGINEERING	2-1-0		
	MRT362	DESIGN FOR MANUFACTURE	2-1-0		
	MET372	OPERATIONS RESEARCH			

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.**The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MRT401	ADVANCED AUTOMATION SYSTEMS	2-1-0	3	3
B	MRTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	MRTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	MRL411	CAD LAB	0-0-3	3	2
T	MRQ413	SEMINAR	0-0-3	3	2
U	MRD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MRT413	NETWORK AND DATA SECURITY	2-1-0	3	3
	MRT423	MICRO ELECTRO MECHANICAL SYSTEMS	2-1-0		
	MRT433	RENEWABLE ENERGY	2-1-0		
	MRT443	MANUFACTURING TECHNOLOGY	2-1-0		
	MRT453	ENTREPRENEURSHIP	2-1-0		
	MRT463	FLUID MECHANICS & MACHINERY	2-1-0		
	MRT473	MAINTENANCE ENGINEERING	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. For example, the courses listed below are offered by **the Department of MECHATRONICS ENGINEERING for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MRT 415	BASICS OF ROBOTICS & AUTOMATION	2-1-0	3	3
	MRT 425	AUTOMATION SYSTEMS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes' duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Mechatronics either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before the evaluation committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HOD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MRT402	AUTOTRONICS	2-1-0	3	3
B	MRTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	MRTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	MRTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	MRT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	MRD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MRT414	IOT & APPLICATIONS	2-1-0	3	3
	MRT424	COMMUNICATION ENGINEERING	2-1-0		
	MRT434	SPECIAL ELECTRICAL MACHINES AND APPLICATIONS	2-1-0		
	MRT444	METALLURGY & MATERIALS ENGINEERING	2-1-0		
	MRT454	STATISTICAL QUALITY CONTROL	2-1-0		
	MRT464	HYBRID AND ELECTRIC VEHICLES	2-1-0		
	MRT474	OPERATIONS MANAGEMENT	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MRT416	ADVANCED MICROPROCESSORS AND MICROCONTROLLERS	2-1-0	3	3
	MRT426	NANO-ELECTRONICS	2-1-0		
	MRT436	NON LINEAR SYSTEMS AND CONTROL	2-1-0		
	MRT446	DYNAMICS OF MACHINERY	2-1-0		
	MRT456	ERGONOMICS	2-1-0		
	MRT466	ENERGY MANAGEMENT AND AUDITING	2-1-0		
	MRT476	SIX SIGMA	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MRT418	WIRELESS AND SENSOR NETWORKS	2-1-0	3	3
	MRT428	BIO-MECHATRONICS	2-1-0		
	MRT438	INDUSTRIAL INSTRUMENTATION	2-1-0		
	MRT448	HEAT & MASS TRANSFER	2-1-0		
	MRT458	SUPPLY CHAIN MANAGEMENT	2-1-0		
	MRT468	OPTIMIZATION TECHNIQUES	2-1-0		
	MRT478	ARTIFICIAL INTELLIGENCE	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three-member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully

theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

- In depth study of the topic assigned in the light of the Report prepared under PhaseI;
- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three-member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more

foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a miniproject based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8.Students who have registered **for B.Tech Minor in MECHATRONICS** can opt to study the courses listed below:

Semester	BASKET I				BASKET II			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	MRT 281	INTRODUCTION TO SENSORS AND ACTUATORS	4	4	MRT281	INTRODUCTION TO SENSORS AND ACTUATORS	4	4
S4	MRT 282	FUNDAMENTALS OF ANALOG AND DIGITAL ELECTRONICS	4	4	MRT 284	BASICS OF INDUSTRIAL HYDRAULICS & PNEUMATICS	4	4
S5	MRT 381	EMBEDDED SYSTEMS	4	4	MRT 383	DATA AQUISTION & PLC SYSTEMS	4	4
S6	MRT 382	INTRODUCTION TO ROBOTICS & AUTOMATION	4	4	MRT 384	ADVANCED AUTOMATION SYSTEMS	4	4
S7	MRD 481	MINIPROJECT	4	4	MRD 481	MINIPROJECT	4	4
S8	MRD 482	MINIPROJECT	4	4	MRD 482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all-academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8.Students who have registered for **B.Tech Honours in MECHATRONICS** can opt to study the courses listed below:

Semester	GROUP I				GROUP II			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	MRT292	MICRO MECHATRONIC SYSTEMS	4	4	MRT294	INDUSTRIAL AUTOMATION	4	4
S5	MRT 393	DRIVES & CONTROL SYSTEM FOR AUTOMATION	4	4	MRT395	ADVANCED CONTROL SYSTEMS	4	4
S6	MRT 394	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM IN AUTOMATION	4	4	MRT396	ADVANCED COMPUTER CONCEPT FOR AUTOMATION	4	4
S7	MRT 495	ADVANCED APPLICATIONS OF MECHATRONICS	4	4	MRT497	CNC MACHINE SYSTEMS DESIGN	4	4
S8	MRD 496	MINIPROJECT	4	4	MRD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks' induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batch mates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B.TECH METALLURGICAL AND MATERIALS ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Non-credit (P/F)Courses Mandatory with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semestershallhave more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester- wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgical & Materials Engineering	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST100	ENGINEERING MECHANICS	2-1-0	3	3
	EST110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METALLURGICAL & MATERIALS ENGINEERING, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	MTT201	METALLURGICAL THERMODYNAMICS AND KINETICS	3-1-0	4	4
C	MTT203	PHYSICAL METALLURGY	3-1-0	4	4
D	MTT205	MINERAL BENEFICIATION	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	MTL201	MINERAL DRESSING LAB	0-0-3	3	2
T	MTL203	METALLOGRAPHY LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	MTT202	HEAT TREATMENT OF MATERIALS	3-1-0	4	4
C	MTT204	TRANSPORT PHENOMENA	3-1-0	4	4
D	MTT206	MECHANICAL BEHAVIOR OF MATERIALS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	MTL202	HEAT TREATMENT LAB	0-0-3	3	2
T	MTL204	MATERIALS TESTING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MTT301	IRON AND STEEL MAKING	3-1-0	4	4
B	MTT303	NON FERROUS EXTRACTION OF METALS	3-1-0	4	4
C	MTT305	FOUNDRY TECHNOLOGY	3-1-0	4	4
D	MTT307	MATERIALS JOINING TECHNOLOGY	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	MTL331	FOUNDRY LAB	0-0-3	3	2
T	MTL333	MATERIALS JOINING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MTT302	CORROSION ENGINEERING	3-1-0	4	4
B	MTT304	DEFORMATION PROCESSING	3-1-0	4	4
C	MTT306	MATERIALS CHARACTERIZATION	3-1-0	4	4
D	MTTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MTT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	MTL332	CORROSION ENGINEERING LAB	0-0-3	3	2
T	MTL334	SOFTWARE LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
		TOTAL		**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MTT312	DESIGN AND SELECTION OF MATERIALS	2-1-0	3	3
	MTT322	AUTOMOTIVE MATERIALS	2-1-0		
	MTT332	MECHANICAL TECHNOLOGY	2-1-0		
	MTT342	ELECTRICAL, ELECTRONIC, OPTICAL AND MAGNETIC MATERIALS	2-1-0		
	MTT352	MEASUREMENTS AND CONTROL	2-1-0		
	MTT362	NANO-MATERIALS AND APPLICATIONS	2-1-0		
	MTT372	ENERGY MATERIALS AND TECHNOLOGY	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of

branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BOS choosing any 5 core courses studied from semester 3 to 5.**The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MTT401	NON-DESTRUCTING TESTING	2-1-0	3	3
B	MTTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	MTTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	MTL411	NON DESTRUCTIVE TESTING LAB	0-0-3	3	2
T	MTQ413	SEMINAR	0-0-3	3	2
U	MTD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MTT413	POWDER METALLURGY	2-1-0	3	3
	MTT423	NUCLEAR METALLURGY	2-1-0		
	MTT433	ELECTRICALENGINEERING MATERIALS	2-1-0		
	MTT443	SEMICONDUCTOR MATERIALS AND DEVICES	2-1-0		
	MTT453	EMERGING MATERIALS	2-1-0		
	MTT463	METALLURGY OF TOOL MATERIALS	2-1-0		
	MTT473	MATERIALS FOR EXTREME ENVIRONMENTS	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of METALLURGICAL AND MATERIALS ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MTT 415	INTRODUCTION TO QUALITY MANAGEMENT	2-1-0	3	3
	MTT 425	NON DESTRUCTIVE TESTING AND FAILURE ANALYSIS	2-1-0		
	MTT 435	PHYSICS OF MATERIALS	2-1-0		
	MTT 445	FUNDAMENTALS OF NANO MATERIALS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.

2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.
   Total marks: 100, only CIE, minimum required to pass 50
   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Metallurgical and Materials Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;

- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MTT402	CERAMICS, POLYMERS AND COMPOSITE MATERIALS	2-1-0	3	3
B	MTTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	MTTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	MTTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	MTT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	MTD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	MTT414	METALLURGICAL FAILURE ANALYSIS	2-1-0	3	3
	MTT424	FATIGUE, CREEP AND FRACTURE	2-1-0		
	MTT434	SPECIAL CASTING TECHNIQUES	2-1-0		
	MTT444	LADLE METALLURGY AND CONTINUOUS CASTING OF STEELS	2-1-0		
	MTT454	ALLOY DEVELOPMENT	2-1-0		
	MTT464	HIGH TEMPERATURE MATERIALS	2-1-0		
	MTT474	SURFACE ENGINEERING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	MTT416	NON FERROUS PHYSICAL METALLURGY	2-1-0	3	3
	MTT426	PARTICULATE PROCESSING	2-1-0		
	MTT436	SMART MATERIALS	2-1-0		
	MTT446	BIO-MATERIALS	2-1-0		
	MTT456	MANUFACTURING METHODS	2-1-0		
	MTT466	FRACTURE MECHANICS	2-1-0		
	MTT476	FUELS, FURNACES AND REFRACTORIES	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	MTT418	NON TRADITIONAL MACHINING	2-1-0	3	3
	MTT428	NON METALLIC MATERIALS	2-1-0		
	MTT438	COMPUTATIONAL MATERIALS SCIENCE	2-1-0		
	MTT448	ADVANCES IN METAL FORMING	2-1-0		
	MTT458	CERAMICS AND GLASSES	2-1-0		
	MTT468	RUBBER AND TYRE TECHNOLOGY	2-1-0		
	MTT478	PROCESS MODELLING AND APPLICATIONS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BOS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a miniproject based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi)The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8.Students who have registered **for B.Tech Minor in METALLURGICAL AND MATERIALS ENGINEERING** can opt to study the courses listed below:

Semester	MATERIALS SCIENCE				METALLURGICAL ENGINEERING				INDUSTRIAL METALLURGY			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S3	MTT281	PRINCIPLES OF PHYSICAL METALLURGY	4	4	MTT283	BASICS OF METALLURGICAL ENGINEERING	4	4	MTT285	MATERIAL SELECTION FOR INDUSTRIAL APPLICATIONS	4	4
S4	MTT282	METALLURGICAL HEAT TREATMENT	4	4	MTT284	ENGINEERING MATERIALS	4	4	MTT286	MECHANICAL METALLURGY	4	4
S5	MTT381	COMPOSITE MATERIALS	4	4	MTT383	INTRODUCTION TO FOUNDRY TECHNOLOGY	4	4	MTT385	WELDING METALLURGY	4	4
S6	MTT382	TESTING AND EVALUATION OF MATERIALS	4	4	MTT384	NON DESTRUCTIVE EVALUATION	4	4	MTT386	INTRODUCTION TO MATERIALS CHARACTERIZATION	4	4

S7	MTD481	MINIPROJECT	4	4	MTD481	MINIPROJECT	4	4	MTD481	MINIPROJECT	4	4
S8	MTD482	MINIPROJECT	4	4	MTD482	MINIPROJECT	4	4	MTD482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in Metallurgical and Materials Engineering with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8.Students who have registered for **B.Tech Honours in METALLURGICAL AND MATERIALS ENGINEERING** can opt to study the courses listed below:

SEMESTER	Group-I				Group-II				Group-III			
	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT	Course No.	Course Name	HOURS	CREDIT
S4	MTT292	ADVANCED THERMODYNAMICS OF MATERIALS	4	4	MTT294	ALLOY DESIGN AND DEVELOPMENT	4	4	MTT296	RECENT DEVELOPMENTS IN WELDING PROCESSES	4	4
S5	MTT393	PHASE TRANSFORMATIONS	4	4	MTT395	ECONOMICS OF METAL PRODUCTION PROCESSES	4	4	MTT397	RECENT TRENDS IN NANO MATERIALS	4	4
S6	MTT394	CRYSTALLOGRAPHY	4	4	MTT396	RECENT TRENDS IN METAL FORMING PROCESSES	4	4	MTT398	ADVANCED CHARACTERIZATION TECHNIQUES	4	4
S7	MTT495	EXPERIMENTAL TECHNIQUES IN MATERIALS SCIENCE	4	4	MTT497	AEROSPACE MATERIALS	4	4	MTT499	ADVANCED SOLIDIFICATION PROCESSING	4	4
S8	MTD496	MINIPROJECT	4	4	MTD496	MINIPROJECT	4		MTD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: NAVAL ARCHITECTURE AND SHIP BUILDING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINERA ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUN 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERNTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	SBT 201	INTRODUCTION TO NAVAL ARCHITECTURE	3-1-0	4	4
C	SBT 203	MECHANICS OF SOLIDS	3-1-0	4	4
D	SBT 205	MECHANICS OF FLUIDS	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	SBL 201	MECHANICS OF FLUIDS LAB	0-0-3	3	2
T	SBL 203	WELDING AND MACHINE TOOLS LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	SBT202	RESISTANCE AND PROPULSION OF SHIPS	3-1-0	4	4
C	SBT204	STABILITY OF SHIPS AND SUBMARINES	3-1-0	4	4
D	SBT206	ANALYSIS OF STRUCTURES	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	SBL202	SHIP DESIGN LAB	0-0-3	3	2
T	SBL204	MEASUREMENTS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	SBT301	SHIP DYNAMICS	3-1-0	4	4
B	SBT303	STRUCTURAL DESIGN OF SHIPS	3-1-0	4	4
C	SBT305	STRENGTH OF SHIPS – I	3-1-0	4	4
D	SBT307	ELECTRICAL TECHNOLOGY AND INSTRUMENTATION	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	SBL331	STRENGTH OF MATERIALS LAB	0-0-3	3	2
T	SBL333	MARINE HYDRODYNAMICS AND HYDRAULIC MACHINERIES LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	SBT302	SHIP DESIGN – I	3-1-0	4	4
B	SBT304	STRENGTH OF SHIPS - II	3-1-0	4	4
C	SBT306	MARINE ENGINEERING	3-1-0	4	4
D	SBTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	SBT308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	SBL332	CAD/ CAM LAB	0-0-3	3	2
T	SBL334	ELECTRICAL ENGINEERING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
		TOTAL		**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	SBT312	MATERIAL SCIENCE	2-1-0	3	3
	SBT322	MARINE POLLUTION, CONTROL AND RECOVERY SYSTEMS	2-1-0		
	SBT332	APPLIED THERMODYNAMICS	2-1-0		
	SBT342	INLAND WATER TRANSPORTATION	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

Total marks: 150, CIE 75 marks and ESE 75 marks

Split up for CIE

Attendance	: 10
Guide	: 15
Project Report	: 10
Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement)	: 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	SBT401	SHIP DESIGN - II	2-1-0	3	3
B	SBTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	SBTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	SBL411	MARINE ENGINEERING LAB	0-0-3	3	2
T	SBQ413	SEMINAR	0-0-3	3	2
U	SBD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				24/28	15/19

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	SBT413	SHIPBUILDING MATERIALS, CORROSION PREVENTION AND PROTECTION	2-1-0	3	3
	SB 423	SHIP RECYCLING	2-1-0		
	SBT433	DESIGN OF FISHING VESSELS	2-1-0		
	SBT443	SHIP PRODUCTION	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. For example The courses listed below are offered by **the Department of NAVAL ARCHITECTURE & SHIP BUILDING for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	SBT 415	DREDGERS AND HARBOUR CRAFTS	2-1-0	3	3
	SBT 425	SHIPBUILDING TECHNOLOGY	2-1-0		
	SBT 435	MARINE MATERIALS AND CORROSION	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.

2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.
   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10

   Guide : 20

   Technical Content of the Report : 30

   Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Naval Architecture and ship building , either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;

- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	SBT402	OFFSHORE STRUCTURES	2-1-0	3	3
B	SBTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	SBTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	SBTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	SBT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	SBD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	SBT414	JOINING TECHNIQUES IN SHIPBUILDING TECHNOLOGY	2-1-0	3	3
	SBT424	SHIP PRODUCTION MANAGEMENT	2-1-0		
	SBT434	SUBMARINE AND SUBMERSIBLES	2-1-0		
	SBT444	ELECTRICAL SYSTEMS IN SHIPS AND SHIPYARDS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	SBT416	SHIP SURVEY ESTIMATION AND REPAIR	2-1-0	3	3
	SBT426	REFRIGERATION AND AIR CONDITIONING OF SHIPS	2-1-0		
	SBT436	MARITIME LAW	2-1-0		
	SBT446	DESIGN OF MACHINE ELEMENTS	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	SBT418	EXPERIMENTAL TECHNIQUES ON SHIPS AND MODELS	2-1-0	3	3
	SBT428	OCEAN WAVE HYDRODYNAMICS	2-1-0		
	SBT438	COMPUTER AIDED DESIGN AND COMPUTER AIDED MANUFACTURING	2-1-0		
	SBT448	FINITE ELEMENT METHOD	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
   - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot

be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum, of which one course shall be a mini project based on the chosen area. They can do miniproject on the chosen area in S7 or S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in NAVAL ARCHITECTURE & SHIP BUILDING Branch** can opt to study the courses listed below:

Basket I				
Semester	**COURSE NO.**	**Course Name**	**Hours**	**Credit**
S3	SBT 281	FUNDAMENTAL CONCEPTS IN NAVAL ARCHITECTURE	4	4
S4	SBT 282	STABILITY OF SHIPS	4	4
S5	SBT 381	RESISTANCE OF SHIPS	4	4
S6	SBT 382	PROPULSION OF SHIPS	4	4
S7	SBD 481	MINI PROJECT -1	4	4
S8	SBD 482	MINI PROJECT -2	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than

or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in NAVAL ARCHITECTURE & SHIP BUILDING** can opt to study the courses listed below:

Group I				
Semester	**COURSE NO.**	**Course Name**	**Hours**	**Credit**
S4	SBT292	ADVANCED PROPELLER DESIGN OF SHIPS	4	4
S5	SBT393	ADVANCED SHIP STABILITY AND DYNAMICS CALCULATIONS	4	4
S6	SBT394	DYNAMIC ANALYSIS OF SHIP STRUCTURES	4	4
S7	SBT495	ECONOMICS IN SHIP DESIGN	4	4
S8	SBD496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.

- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. TECH POLYMER ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLYcan choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS	3-1-0	4	4
B	CHT201	CHEMISTRY FOR PROCESS ENGINEERING	3-1-0	4	4
C	POT201	POLYMERS & POLYMERISATION PRINCIPLES	3-1-0	4	4
D	POT203	POLYMER SCIENCE	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	POL201	CHEMISTRY LAB	0-0-3	3	2
T	POL203	COMPUTER AIDED DRAFTING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	CHT202	CHEMICAL ENGINEERING THERMODYNAMICS	3-1-0	4	4
C	POT202	POLYMER PHYSICS	3-1-0	4	4
D	POT204	LATEX TECHNOLOGY	3-1-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	POL202	SPECIFICATION TEST LAB	0-0-3	3	2
T	POL204	POLYMER PREPARATION AND ANALYSIS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	POT301	PLASTIC MATERIALS	3-1-0	4	4
B	POT303	FLUID MECHANICS	3-1-0	4	4
C	POT305	RUBBERS – SCIENCE AND TECHNOLOGY	3-1-0	4	4
D	POT307	POLYMER PROCESSING	3-1-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	POL331	FLUID MECHANICS LAB	0-0-3	3	2
T	POL333	LATEX PRODUCTS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	POT302	POLYMER MACHINERY AND PRODUCT MANUFACTURING	3-1-0	4	4
B	POT304	TYRE TECHNOLOGY	3-1-0	4	4
C	POT306	PAINTS AND SURFACE COATINGS	3-1-0	4	4
D	POTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	POT308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	POL332	PRODUCT MANUFACTURING LAB	0-0-3	3	2
T	POD334	MINI PROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	POT312	HEAT AND MASS TRANSFER	2-1-0	3	3
	POT322	ENERGY ENGINEERING	2-1-0		
	POT332	INDUSTRIAL BIOTECHNOLOGY	2-1-0		
	POT342	MATERIAL SCIENCE AND ENGINEERING	2-1-0		
	POT352	OPERATIONS RESEARCH	2-1-0		
	POT362	AIR POLLUTION CONTROL	2-1-0		
	POT372	CATALYST SCIENCE AND CATALYTIC PROCESSES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	POT401	POLYMER TESTING	2-1-0	3	3
B	POTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	POTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	POL411	POLYMER TESTING LAB	0-0-3	3	2
T	POQ413	SEMINAR	0-0-3	3	2
U	POD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	POT413	ENGINEERING STATISTICS AND QUALITY CONTROL	2-1-0	3	3
	POT423	OIL AND NATURAL GAS ENGINEERING	2-1-0		
	POT433	PROCESS MODELLING AND SIMULATION	2-1-0		
	POT443	CORROSION ENGINEERING	2-1-0		
	POT453	PROJECT ENGINEERING	2-1-0		
	POT463	COMPUTER AIDED DESIGN AND MANUFACTURE	2-1-0		
	POT473	BIO REACTOR DESIGN	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes

duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Polymer Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before a departmental committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

   The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	POT402	POLYMER PRODUCTS - DESIGN AND TESTING	2-1-0	3	3
B	POTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	POTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	POTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	POT404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	POD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	POT414	FIBRE TECHNOLOGY	2-1-0	3	3
	POT424	PETROLEUM REFINERY ENGINEERING	2-1-0		
	POT434	ADDITIVE MANUFACTURING	2-1-0		
	POT444	POLYMER NAN COMPOSITES	2-1-0		
	POT454	FAILURE ANALYSIS OF POLYMERS	2-1-0		
	POT464	ENVIRONMENTAL IMPACT ANALYSIS	2-1-0		
	POT474	ELECTROCHEMICAL ENGINEERING	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	POT416	SPECIALITY POLYMERS	2-1-0	3	3
	POT426	POLYMERS FOR ELECTRONIC APPLICATIONS	2-1-0		
	POT436	POLYMERS FOR SPACE APPLICATIONS	2-1-0		
	POT446	COMPOSITE MATERIALS	2-1-0		
	POT456	LIQUID CRYSTAL POLYMERS	2-1-0		
	POT466	PLASTICS PACKAGING TECHNOLOGY	2-1-0		
	POT476	MODERN METHODS OF INSTRUMENTATION	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	POT418	POLYMERS AND ENVIRONMENT	2-1-0	3	3
	POT428	BIOMEDICAL AND BIOPOLYMERS	2-1-0		
	POT438	ADHESIVE SCIENCE AND TECHNOLOGY	2-1-0		
	POT448	POLYMER BLENDS AND COMPOSITES	2-1-0		
	POT458	SAFETY ENGINEERING OF PROCESS PLANTS	2-1-0		
	POT468	POLYMERS AND SEPARATION PROCESS	2-1-0		
	POT478	POLYMERS AND FUEL CELL TECHNOLOGY	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;

- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be

exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through course listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in Polymer Engineering Branch** can opt to study the courses listed below:

Semester	GROUP I				GROUP II				GROUP III			
	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT	Course No	Course Name	HOURS	CREDIT
S4	POT 292	Fundamentals of Manufacturing	4	4	POT 294	Energy Technology	4	4	POT 296	Polymers in Construction	4	4
S5	POT 393	Mould and Die Design	4	4	POT 395	Conducting Polymers	4	4	POT 397	Processing of Paints	4	4

S6	POT 394	Advanced Mould Manufacturing	4	4	POT 396	Polymers & Photovoltaic Technology	4	4	POT 398	Plastics & Decoration	4	4
S7	POT 495	Advanced Product Design	4	4	POT 497	Advanced Polymer Electronics	4	4	POT 499	Technology of Printing Inks	4	4
S8	POD 496	MINIPROJECT	4	4	POD 496	MINIPROJECT	4		POD496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: PRODUCTION ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering PhysicsB in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLYcan choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	PET201	MECHANICS OF SOLIDS	3-1-0	4	4
C	PET203	FLUID MECHANICS AND MACHINERY	3-1-0	4	4
D	PET205	METALLURGY AND MATERIAL SCIENCE	3-1-0	4	4
E1/2	EST200	DESIGN& ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	-
S	PEL201	MATERIAL TESTING LAB	0-0-3	3	2
T	PEL203	COMPUTER AIDED MACHINE DRAWING	0-0-3	3	2
R/M	VAC	REMEDIAL/ MINOR COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	EET212	ELECTRICAL DRIVES AND AUTOMATION	3-1-0	4	4
C	PET204	THERMODYNAMICS AND HEAT TRANSFER	3-1-0	4	4
D	PET206	MECHANISM AND MACHINES THEORY	3-1-0	4	4
E1/2	EST200	DESIGN& ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	-
S	EEL212	ELECTRICAL AND ELECTRONICS LAB	0-0-3	3	2
T	PEL204	MECHANICAL ENGINEERING LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/ MINOR COURSE/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PET301	DESIGN OF MACHINE ELEMENTS	3-1-0	4	4
B	PET303	CAD/CAM/CIM	3-1-0	4	4
C	PET305	PRODUCTION PROCESSES	3-1-0	4	4
D	PET307	MACHINE TOOL TECHNOLOGY AND TOOL ENGINEERING	3-1-0	4	4
E1/2	HUT300	INDUSTRIAL ECONOMICS& FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	-
S	PEL331	COMPUTER AIDED DESIGN AND ANALYSIS LAB	0-0-3	3	2
T	PEL333	MACHINE TOOL LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/ MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PET302	PLASTICITY AND METAL FORMING	3-1-0	4	4
B	PET304	METROLOGY AND INSTRUMENTATION	3-1-0	4	4
C	PET306	INDUSTRIAL ROBOTICS	3-1-0	4	4
D	PETXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS& FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	PET308	COMPREHENSIVE COURSE WORK	1-0-0	1	1
S	PEL332	MANUFACTURING PROCESS AND SIMULATION LAB	0-0-3	3	2
T	PEL334	METROLOGY LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/ MINOR/HONOURS COURSE	3-1-0	4**	4
		TOTAL		**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PET312	ADVANCED PRODUCTION PROCESS	2-1-0	3	3
	PET322	MECHATRONICS	2-1-0		
	PET332	PROJECT MANAGEMENT	2-1-0		
	PET342	FEM	2-1-0		
	PET352	COMPOSITES	2-1-0		
	PET362	DECISION MODELLING	2-1-0		
	PET372	ENERGY TECHNOLOGIES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. **All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 2 to 4 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted online by the University. **Syllabus for comprehensive examination shall be prepared by the respective BOS choosing any 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PET401	INDUSTRIAL ENGINEERING	2-1-0	3	3
B	PETXXX	PROGRAMME ELECTIVE II	2-1-0	3	3
C	PETXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	-
S	PEL411	INDUSTRIAL ENGINEERING LAB	0-0-3	3	2
T	PEQ413	SEMINAR	0-0-3	3	2
U	PED415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/ MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	PET413	NONCONVENTIONAL MACHINING	2-1-0	3	3
	PET423	ADVANCES IN INDUSTRIAL AUTOMATION AND ROBOTICS	2-1-0		
	PET433	TQM	2-1-0		
	PET443	MACHINE DYNAMICS AND DESIGN	2-1-0		
	PET453	FAILURE OF MATERIALS	2-1-0		
	PET463	APPLIED PROBABILITY AND STATISTICS	2-1-0		
	PET473	CFD	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. The courses listed below are offered by **the Department of PRODUCTION ENGINEERING for students of other undergraduate branches offered in the college under KTU.**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	PET415	INTEGRATED PRODUCT DEVELOPMENT	2-1-0	3	3
	PET425	CONTEMPORARY MATERIALS	2-1-0		
	PET435	FLIGHT AGAINST GRAVITY	2-1-0		
	PET445	TQM	2-1-0		
	PET455	ADDITIVE MANUFACTURING	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honors course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.

2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Production Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned

topic;

- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation by the evaluation committee	: 20
Final Seminar	: 30
The report evaluated by the evaluation committee	: 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PET402	OPERATIONS MANAGEMENT	2-1-0	3	3
B	PETXXX	PROGRAMME ELECTIVE III	2-1-0	3	3
C	PETXXX	PROGRAMME ELECTIVE IV	2-1-0	3	3
D	PETXXX	PROGRAMME ELECTIVE V	2-1-0	3	3
T	PET404	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	PED416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/ MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	PET414	ADDITIVE MANUFACTURING	2-1-0	3	3
	PET424	MODELLING AND ANALYSIS OF MANUFACTURING SYSTEMS	2-1-0		
	PET434	LEAN AND AGILE MANUFACTURING	2-1-0		
	PET444	PRODUCTION ENGINEERING TOOLING	2-1-0		
	PET454	ENERGY MATERIALS	2-1-0		
	PET464	TIME SERIES ANALYSIS.	2-1-0		
	PET474	HVAC SYSTEMS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	PET416	INTELLIGENT MANUFACTURING SYSTEMS	2-1-0	3	3
	PET426	ADVANCED MACHINE CONTROLS	2-1-0		
	PET436	ERP	2-1-0		
	PET446	MACHINE TOOL DESIGN	2-1-0		
	PET456	ADVANCED MATERIALS	2-1-0		
	PET466	MULTIVARIATE DATA ANALYSIS.	2-1-0		
	PET476	ENERGY MANAGEMENT	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PET418	MAINTENANCE AND RELIABILITY ENGINEERING	2-1-0	3	3
	PET428	INTEGRATED MANUFACTURING SYSTEMS	2-1-0		
	PET438	MARKETING MANAGEMENT	2-1-0		
	PET448	DESIGN FOR MANUFACTURE	2-1-0		
	PET458	PROCESSING OF ADVANCED MATERIALS	2-1-0		
	PET468	ADVANCED OPTIMIZATION TECHNIQUES	2-1-0		
	PET478	RENEWABLE ENERGY TECHNOLOGIES	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honorsprogramme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the syllabus mentioned for comprehensive course work in the sixth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.
3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/ Modelling/ Simulation/ Design/ Problem Solving/ Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide	: 30
Interim evaluation, 2 times in the semester by the evaluation committee	: 50
Quality of the report evaluated by the above committee	: 30
Final evaluation by a three member committee	: 40

(The final evaluation committee comprises Project coordinator, expert from industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses**.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject on the chosen area in S7 or S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8.Students who have registered **for B.Tech Minor in QUALITY ENGINEERING Branch** can opt to study the courses listed below:

Semester	**BASKET I: QUALITY ENGINEERING Eligible- AU,CE,CH,CS,EE,EC,IE,ME,MP,MR,MT,MU**			
	Course No.	**Course Name**	**HOURS**	**CREDIT**
S3	PET281	INDUSTRIAL INSPECTION	4	4
S4	PET282	RELIABILITY ENGINEERING	4	4
S5	PET381	STATISTICAL QUALITY CONTROL	4	4
S6	PET382	TOTAL QUALITY MANAGEMENT	4	4
S7	PED481	MINIPROJECT	4	4
S8	PED482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than

or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in PRODUCTION ENGINEERING** can opt to study the courses listed below.

SEMESTER	GROUP I			
	Course No.	**Course Name**	**HOURS**	**CREDIT**
S4	PET292	PREDICTIVE ANALYTICS	4	4
S5	PET393	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	4	4
S6	PET394	IOT AND CLOUD MANUFACTURING	4	4
S7	PET495	BIG DATA ANALYTICS	4	4
S8	PED496	MINIPROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.

- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII:B.TECH ROBOTICS AND AUTOMATION

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

Note: To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics A and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics A in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics A in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	RAT 201	PROCESSING AND PROPERTIES OF MATERIALS	4-0-0	4	4
C	RAT 203	ELECTRONIC DEVICES AND CIRCUITS	3-1-0	4	4
D	RAT 205	DIGITAL ELECTRONICS	3-1-0	4	4
E	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
1/2	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN 201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	RAL 201	MACHINE DRAWING AND SOLID MODELLING LAB	0-0-3	3	2
T	RAL 203	ELECTRONIC CIRCUITS AND DIGITAL ELECTRONICS LABORATORY	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	RAT 202	KINEMATICS AND DYNAMICS OF MECHANISMS	3-1-0	4	4
C	RAT 204	MANUFACTURING PROCESSES	3-1-0	4	4
D	RAT 206	MICROCONTROLLERS AND EMBEDDED SYSTEMS	3-1-0	4	4
E ½	EST 200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT 200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN 202	CONSTITUTION OF INDIA	2-0-0	2	--
S	RAL 202	MANUFACTURING AND PROTOTYPING LAB	0-0-3	3	2
T	RAL 204	MICROCONTROLLERS AND EMBEDDED SYSTEMS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	RAT 301	INTRODUCTION TO ROBOTICS	3-1-0	4	4
B	RAT 303	SOLID MECHANICS	3-1-0	4	4
C	RAT 305	INDUSTRIAL AUTOMATION	3-1-0	4	4
D	RAT 307	CONTROL SYSTEMS	3-1-0	4	4
E 1/2	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT 310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN 301	DISASTER MANAGEMENT	2-0-0	2	--
S	RAL 331	AUTOMATION LAB	0-0-3	3	2
T	RAL 333	ROBOT OPERATING SYSTEM LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	RAT 302	DESIGN OF MACHINE ELEMENTS	3-1-0	4	4
B	RAT 304	ELECTRIC DRIVES AND CONTROL	3-1-0	4	4
C	RAT 306	SIGNALS AND SYSTEMS	3-1-0	4	4
D	RAT XXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT 310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	RAT 308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	RAL 332	ROBOTICS LAB	0-0-3	3	2
T	RAD 334	MINIPROJECT/CORE LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	RAT 312	SENSORS AND TRANSDUCERS	2-1-0	3	3
	RAT 322	ROBOTIC CONTROL SYSTEMS	2-1-0		
	RAT 332	FLUID POWER AUTOMATION	2-1-0		
	RAT 342	MECHANICAL MEASUREMENTS AND METROLOGY	2-1-0		
	RAT 352	ENGINEERING OPTIMIZATION	2-1-0		
	RAT 362	COMMUNICATIONS NETWORKS	2-1-0		
	RAT 372	SOFT COMPUTING TECHNIQUES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50%

of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing the above listed 5 core courses studied from semester 3 to 5.** The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practicing questions based on the core courses listed in the curriculum.

4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

Total marks: 150, CIE 75 marks and ESE 75 marks

Split up for CIE

Attendance	: 10
Guide	: 15
Project Report	: 10

Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	RAT 401	ALGORITHMS AND DATA STRUCTURES	2-0-2	4	3
B	RAT XXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	RAT XXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN 401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	RAL 411	ELECTRICAL DRIVES AND CONTROL LAB	0-0-3	3	2
T	RAQ 413	SEMINAR	0-0-3	3	2
U	RAD 415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	RAT 413	MOBILE ROBOTICS	2-1-0	3	3
	RAT 423	PLC AND DISTRIBUTED CONTROL SYSTEMS	2-1-0		
	RAT 433	THEORY OF ELASTICITY	2-1-0		
	RAT 443	DESIGNING THE MECHANISMS FOR AUTOMATED MACHINES	2-1-0		
	RAT 453	TRIBOLOGY	2-1-0		
	RAT 463	FINITE ELEMENT METHODS	2-1-0		
	RAT 473	FUNDAMENTALS OF MOMENTUM, HEAT AND MASS TRANSFER	2-1-0		

OPEN ELECTIVE

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. **The courses listed below are offered by the Department of Robotics and Automation for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	RAT415	FUNDAMENTALS OF ROBOTICS	2-1-0	3	3
	RAT425	BASICS OF MOBILE ROBOTICS	2-1-0		
	RAT435	INDUSTRIAL AUTOMATION	2-1-0		
	RAT445	AI FOR ROBOTICS	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Robotics and Automation, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected

to provide a good initiation for the student(s) in R&D work. The assignment to normally include:

- Survey and study of published literature on the assigned topic;
- Preparing an Action Plan for conducting the investigation, including team work;
- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide	:30
Interim evaluation by the evaluation committee	:20
Final Seminar	:30
The report evaluated by the evaluation committee	:20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	RAT 402	AI AND MACHINE LEARNING	2-1-0	3	3
B	RAT XXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	RAT XXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	RAT XXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	RAT 404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	RAD 416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	RAT 414	MACHINE VISION	2-1-0	3	3
	RAT 424	BEHAVIORAL ROBOTICS	2-1-0		
	RAT 434	INDUSTRIAL MANIPULATORS	2-1-0		
	RAT 444	ROBOT MOTION PLANNING	2-1-0		
	RAT 454	CNC MACHINES	2-1-0		
	RAT 464	NONLINEAR CONTROL	2-1-0		
	RAT 474	CONTINUUM MECHANICS	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	RAT 416	DESIGN FOR MANUFACTURING AND ASSEMBLY	2-1-0	3	3
	RAT 426	NATURAL LANGUAGE PROCESSING	2-1-0		
	RAT 436	DIGITAL CONTROL SYSTEMS	2-1-0		
	RAT 446	PROBABILISTIC ROBOTICS	2-1-0		

	RAT 456	INDUSTRY 4.0	2-1-0		
	RAT 476	SUPERVISORY CONTROL	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	RAT 418	MECHATRONIC SYSTEM DESIGN	2-1-0	3	3
	RAT 428	VIBRATION	2-1-0		
	RAT 438	CO-OPERATIVE ROBOTICS	2-1-0		
	RAT 448	ROBOT NAVIGATION	2-1-0		
	RAT 458	HUMAN-MACHINE INTERFACE	2-1-0		
	RAT 468	ADAPTIVE CONTROL	2-1-0		
	RAT 478	AI FOR ROBOTICS	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
   - Review and finalization of the Approach to the Problem relating to the assigned topic;
   - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;

- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do miniproject either in S7 or in S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in ROBOTICS AND AUTOMATION** can opt to study the courses listed below:

Semester	**BASKET I**			
	Course No.	**Course Name**	**HOURS**	**CREDIT**
S3	RAT281	BASICS OF ROBOTICS	4	4
S4	RAT 282	INTRODUCTION TO INDUSTRIAL AUTOMATION	4	4
S5	RAT 381	AI AND MACHINE LEARNING FOR ROBOTICS	4	4
S6	RAT 382	INTRODUCTION TO MOBILE ROBOTICS	4	4
S7	RAD 481	MINIPROJECT	4	4
S8	RAD 482	MINIPROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing

this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select

only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. For example: Students who have registered for **B.Tech Honours in ROBOTICS & AUTOMATION** can opt to study the courses listed below:

Semester	GROUP I			
	Course No	**Course Name**	**HOURS**	**CREDIT**
S4	RAT292	SENSORS AND ACTUATORS FOR ROBOTS	4	4
S5	RAT393	PLC AND SCADA	4	4
S6	RAT394	ADVANCED CONTROL FOR ROBOTICS	4	4
S7	RAT495	FIELD ROBOTICS	4	4
S8	RAD496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

CURRICULUM I TO VIII: B. TECH SAFETY & FIRE ENGINEERING

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	76
5	Program Elective Courses	PEC	15
6	Open Elective Courses	OEC	3
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
Credits for Activity	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management, Finance & Accounting, Life Skills, Professional Communication, Economics etc

Mandatory non-credit courses: Sustainable Engineering, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the Table 1.

Table 1: Code for the courses

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses
D	Project based courses (Major, Mini Projects)
Q	Seminar Courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

Departments

Each course is offered by a Department and their two-letter course prefix is given in Table 2.

Table 2: Departments and their codes

Sl.No	Department	Course Prefix	Sl.No	Department	Course Prefix
01	Aeronautical Engg	AO	16	Information Technology	IT
02	Applied Electronics & Instrumentation	AE	17	Instrumentation & Control	IC
03	Automobile	AU	18	Mandatory Courses	MC
04	Biomedical Engg	BM	19	Mathematics	MA
05	Biotechnology	BT	20	Mechanical Engg	ME
06	Chemical Engg	CH	21	Mechatronics	MR
07	Chemistry	CY	22	Metallurgy	MT
08	Civil Engg	CE	23	Mechanical (Auto)	MU
09	Computer Science	CS	24	Mechanical(Prod)	MP
10	Electrical & Electronics	EE	25	Naval & Ship Building	SB
11	Electronics & Biomedical	EB	26	Physics	PH
12	Electronics & Communication	EC	27	Polymer Engg	PO
13	Food Technology	FT	28	Production Engg	PE
14	Humanities	HU	29	Robotics and Automation	RA
15	Industrial Engg	IE	30	Safety & Fire Engg	FS

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 101	LINEAR ALGEBRA AND CALCULUS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICSB	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 101	LIFE SKILLS	2-0-2	4	--
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

NOTE:

To make up for the hours lost due to induction program, one extra hour may be allotted to each course

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT 102	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	3-1-0	4	4
B 1/2	PHT 110	ENGINEERING PHYSICS B	3-1-0	4	4
	CYT 100	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	EST 100	ENGINEERING MECHANICS	2-1-0	3	3
	EST 110	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	EST 120	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	EST 130	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	HUT 102	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	EST 102	PROGRAMMING IN C	2-1-2	5	4
S 1/2	PHL 120	ENGINEERING PHYSICS LAB	0-0-2	2	1
	CYL 120	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESL 120	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics B and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics B in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics B in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches

in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.

3. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.

   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

4. LIFE SKILLS

   Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

5. PROFESSIONAL COMMUNICATION

   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT201	PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	3-1-0	4	4
B	FST201	FIRE ENGINEERING FUNDAMENTALS	3-1-0	4	4
C	FST203	CHEMICAL PROCESS PRINCIPLES	3-1-0	4	4
D	FST205	PRINCIPLES OF SAFETY MANAGEMENT	4-0-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN201	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	FSL201	CHEMICAL ENGINEERING LAB	0-0-3	3	2
T	FSL203	SAFETY ENGINEERING LAB	0-0-3	3	2
R/M	VAC	REMEDIAL/MINOR COURSE	3-1-0	4 *	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	MAT202	PROBABILITY, STATISTICS AND NUMERICAL METHODS	3-1-0	4	4
B	FST202	FLUID MECHANICS AND FIRE HYDRAULICS CALCULATION	3-1-0	4	4
C	FST204	TRANSFER OPERATIONS IN CHEMICAL ENGINEERING	3-1-0	4	4
D	FST206	ELECTRICAL TECHNOLOGY AND SAFETY	4-0-0	4	4
E 1/2	EST200	DESIGN & ENGINEERING	2-0-0	2	2
	HUT200	PROFESSIONAL ETHICS	2-0-0	2	2
F	MCN202	CONSTITUTION OF INDIA	2-0-0	2	--
S	FSL202	HEAT AND MASS TRANSFER LAB	0-0-3	3	2
T	FSL204	FLUID MECHANICS LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**26/30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student doesnot opt for minor programme, he/she can be given remedial class.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FST301	PLANNING AND DESIGN OF FIRE PROTECTION SYSTEMS	3-1-0	4	4
B	FST303	SAFETY IN MANUFACTURING INDUSTRY	3-1-0	4	4
C	FST305	OCCUPATIONAL HEALTH AND FIRST AID	4-0-0	4	4
D	FST307	SAFETY IN CONSTRUCTION INDUSTRY	4-0-0	4	4
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MCN301	DISASTER MANAGEMENT	2-0-0	2	--
S	FSL331	MACHINE TOOL LAB	0-0-3	3	2
T	FSL333	FIRE ENGINEERING AND FIRST AID LAB	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**27/31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade-in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FST302	HAZARD IDENTIFICATION AND RISK ASSESSMENT	3-1-0	4	4
B	FST304	STRUCTURAL FIRE SAFETY	3-1-0	4	4
C	FST306	PROCESS SAFETY AND CONTROL ENGINEERING	3-1-0	4	4
D	FSTXXX	PROGRAM ELECTIVE I	2-1-0	3	3
E 1/2	HUT300	INDUSTRIAL ECONOMICS & FORIEGN TRADE	3-0-0	3	3
	HUT310	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	FST308	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	FSL332	ENVIRONMENTAL ENGINEERING AND INDUSTRIAL HYGIENE LAB	0-0-3	3	2
T	FSD334	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**23/27**

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	FST312	ENVIRONMENTAL ENGINEERING AND MANAGEMENT	2-1-0	3	3
	FST322	COMPUTATIONAL FLUID DYNAMICS	2-1-0		
	FST332	BIOMECHANICS AND ERGONOMICS	2-1-0		
	FST342	FAULT DETECTION AND DAIGNOSIS	2-1-0		
	FST352	HEAT TRANSFER COMBUSTION AND EXPLOSION	2-1-0		
	FST362	INDUSTRIAL ECOLOGY	2-1-0		
	FST372	SAFETY IN MINES	2-1-0		

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade-in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted by the University. **Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5.**The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.
4. Mini project: It is introduced in sixth semester with a specific objective to strengthen the understanding of student's fundamentals through effective application of theoretical concepts. Mini project can help to boost their skills and widen the horizon of their thinking. The ultimate aim of an engineering student is to resolve a problem by applying theoretical knowledge. Doing more projects increases problem-solving skills. Students should identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The internal evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department comprising HoD or a senior faculty member, Academic coordinator for that program, project guide/coordinator.

   Total marks: 150, CIE 75 marks and ESE 75 marks

   Split up for CIE

   Attendance : 10

   Guide : 15

   Project Report : 10

   Evaluation by the Committee (will be evaluating the level of completion and demonstration of functionality/specifications, presentation, oral examination, work knowledge and involvement) : 40

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FST401	SAFETY IN PETROLEUM AND PETROCHEMICAL INDUSTRIES	2-1-0	3	3
B	FSTXXX	PROGRAM ELECTIVE II	2-1-0	3	3
C	FSTXXX	OPEN ELECTIVE	2-1-0	3	3
D	MCN401	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	FSL411	CAD AND COMPUTATIONAL LAB	0-0-3	3	2
T	FSQ413	SEMINAR	0-0-3	3	2
U	FSD415	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**24/28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	FST413	FIRE DYNAMICS	2-1-0	3	3
	FST423	AUTOMOBILE ENGINEERING & SAFETY	3-0-0		
	FST433	OHSAS 18000 and ISO 14000	3-0-0		
	FST443	NUCLEAR ENGINEERING AND SAFETY	2-1-0		
	FST453	SAFETY IN POWER PLANT ENGINEERING	3-0-0		
	FST463	SAFETY IN MATERIAL HANDLING	2-1-0		
	FST473	EXPLOSIVE TECHNOLOGY AND SAFETY	2-1-0		

OPEN ELECTIVE (OE)

The open elective is offered in semester 7. Each program should specify the courses (maximum 5) they would like to offer as electives for other programs. For example: The courses listed below are offered by **the Department of Safety and Fire Engineering for students of other undergraduate branches offered in the college under KTU**

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	FST 415	RESPONSIBLE ENGINEERING	3-0-0	3	3
	FST 425	SAFETY IN CONSTRUCTION INDUSTRY	3-0-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

   Attendance : 10
   Guide : 20
   Technical Content of the Report : 30
   Presentation : 40
3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Safety and fire Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;

- Working out a preliminary Approach to the Problem relating to the assigned topic;
- Block level design documentation
- Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
- Preparing a Written Report on the Study conducted for presentation to the Department;
- Final Seminar, as oral Presentation before the evaluation committee.

Total marks: 100, only CIE, minimum required to pass 50

Guide : 30

Interim evaluation by the evaluation committee : 20

Final Seminar : 30

The report evaluated by the evaluation committee : 20

The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor.

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	FST402	HUMAN FACTORS ENGINEERING AND BEHAVIOUR BASED SAFETY	2-1-0	3	3
B	FSTXXX	PROGRAM ELECTIVE III	2-1-0	3	3
C	FSTXXX	PROGRAM ELECTIVE IV	2-1-0	3	3
D	FSTXXX	PROGRAM ELECTIVE V	2-1-0	3	3
T	FST404	COMPREHENSIVE COURSE VIVA	1-0-0	1	1
U	FSD416	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	REMEDIAL/MINOR/HONOURS COURSE	3-1-0	4*	4
TOTAL				**25/29**	**17/21**

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	FST414	LEGAL ASPECTS OF HSE	3-0-0	3	3
	FST424	FOOD AND BIOSAFETY	2-1-0		
	FST434	NUMERICAL METHODS FOR PROCESS ENGINEERS	2-1-0		
	FST444	QUALITY ENGINEERING IN PRODUCTION SYSTEM	2-1-0		
	FST454	ENVIRONMENTAL POLLUTION AND CONTROL	2-1-0		
	FST464	MARINE CORROSION AND PREVENTION	2-1-0		
	FST474	FUNDAMENTALS OF NANOSCIENCE	2-1-0		

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
C	FST416	TRANSPORTATION SYSTEM AND SAFETY	2-1-0	3	3
	FST426	CHEMICAL TECHONOLOGY AND MECHANICAL OPERATIONS	2-1-0		
	FST436	DOCK SAFETY	2-1-0		
	FST446	RELIABILITY ENGINEERING	2-1-0		

	FST456	FIRE MODELLING	2-1-0		
	FST466	COMPOSITE MATERIALS	2-1-0		
	FST476	SAFETY IN TEXTILE INDUSTRY	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	FST418	ADVANCED SAFETY ENGINEERING AND MANAGEMENT	2-1-0	3	3
	FST428	FIRE RISK CALCULATIONS	2-1-0		
	FST438	DRILLING AND STORAGE	2-1-0		
	FST448	TOTAL QUALITY MANAGEMENT	2-1-0		
	FST458	SHIP'S FIRE PREVENTION AND CONTROL	2-1-0		
	FST468	OFFSHORE TECHNOLOGY	2-1-0		
	FST478	SAFETY IN POWDER HANDLING	2-1-0		

NOTE:

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Course Viva: The comprehensive course viva in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the core subjects studied from third to eighth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
   - In depth study of the topic assigned in the light of the Report prepared under Phase;

- Review and finalization of the Approach to the Problem relating to the assigned topic;
- Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
- Final development of product/process, testing, results, conclusions and future directions;
- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide : 30

Interim evaluation, 2 times in the semester by the evaluation committee : 50

Quality of the report evaluated by the above committee : 30

(The evaluation committee comprises HoD or a senior faculty member, Project coordinator and project supervisor).

Final evaluation by a three member committee : 40

(The final evaluation committee comprises Project coordinator, expert from Industry/research Institute and a senior faculty from a sister department. The same committee will conduct comprehensive course viva for 50 marks).

MINOR

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx with Minor in yyy”. The fact will also be reflected in the

consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by **M slot courses.**

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for minor, of which one course shall be a mini project based on the chosen area. They can do mini project on the chosen area in S7 or S8. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

(vi) The registration for minor program will commence from semester 3 and the all academic units offering minors in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 baskets. The basket of courses may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. Reshuffling of courses between various baskets will not be allowed. In any case, they should carry out a mini project based on the chosen area in S7 or S8. Students who have registered **for B.Tech Minor in SAFETY & FIRE ENGINEERING Branch** can opt to study the courses listed below:

Basket I				
Semester	**COURSE NO.**	**Course Name**	**Hours**	**Credit**
S3	FST 281	FUNDAMENTALS OF FIRE ENGINEERING	4	4
S4	FST 282	HAZARD CONTROL IN MANUFACTURING	4	4
S5	FST 381	OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE	4	4
S6	FST 382	ENVIRONMENTAL ENGINEERING AND MANAGEMENT	4	4
S7	FSD 481	MINI PROJECT	4	4
S8	FSD 482	MINI PROJECT	4	4

HONOURS

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx, with Honours." The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses listed in the curriculum for honours, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired by undergoing 2 MOOCs recommended by the Board of studies and approved by the Academic Council or through courses listed in the curriculum. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

(vi) The registration for honours program will commence from semester 4 and the all-academic units offering honours in their discipline should prescribe set of such courses. The courses shall be grouped into maximum of 3 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. In any case, they should carry out a mini project based on the chosen area in S8. Students who have registered for **B.Tech Honours in SAFETY & FIRE ENGINEERING** can opt to study the courses listed below:

Group I				
Semester	**COURSE NO.**	**Course Name**	**Hours**	**Credit**
S4	FST292	ADVANCES IN FIRE ENGINEERING	4	4
S5	FST393	INDUSTRIAL NOISE AND VIBRATION CONTROL	4	4
S6	FST394	MAINTAINABILITY ENGINEERING	4	4
S7	FST495	EMERGENCY PLANNING AND MANAGEMENT	4	4
S8	FSD496	MINI PROJECT	4	4

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.

- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

IQAC LMCST <iqac@lmcst.ac.in>

Fwd: Academics- Syllabus and Minutes of of Curriculum Committee for MCA Bridge Course - approved - orders issued.

LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY Admin <lourdesmatha@ktu.edu.in> Mon, Jan 24, 2022 at 9:24 AM
To: iqac@lmcst.ac.in

---------- Forwarded message ----------
From: **asst academics1** <asstacademics1@ktu.edu.in>
Date: Tue, Nov 3, 2020 at 11:43 AM
Subject: Academics- Syllabus and Minutes of of Curriculum Committee for MCA Bridge Course - approved - orders issued.
To: ACE COLLEGE OF ENGINEERING Admin <ace@ktu.edu.in>, ADI SHANKARA INSTITUTE OF ENGG AND TECHNOLOGY Admin <[illegible]@ktu.edu.in>, AHALIA SCHOOL OF ENGINEERING AND TECHNOLOGY Admin <ahalia@ktu.edu.in>, AL-AMEEN ENGINEERING COLLEGE, KULAPPULLY SHORANUR <[illegible]@ktu.edu.in>, AL AZHAR COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <alazhar@ktu.edu.in>, ALBERTIAN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <albertian@ktu.edu.in>, AMAL JYOTHI COLLEGE OF ENGINEERING Admin <amaljyothi@ktu.edu.in>, Dr B Maruthu Kannan <[illegible]@ktu.edu.in>, ARCHANA COLLEGE OF ENGINEERING Admin <archana@ktu.edu.in>, ARYANET INSTITUTE OF TECHNOLOGY Admin <aryanet@ktu.edu.in>, AWH ENGINEERING COLLEGE Admin <awh@ktu.edu.in>, AXIS COLLEGE OF ENGINEERING & TECHNOLOGY Admin <axis@ktu.edu.in>, BASELIOS MATHEWS II COLLEGE OF ENGINEERING Admin <baseliousm2@ktu.edu.in>, BASELIOS THOMAS I CATHOLICOSE COLLEGE OF ENGG AND TECH Admin <baseliost1@ktu.edu.in>, BISHOP JEROME INSTITUTE Admin <bishopjerome@ktu.edu.in>, BELIEVERS CHURCH CAARMEL ENGINEERING COLLEGE Admin <believerschurch@ktu.edu.in>, CARMEL COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <carmel@ktu.edu.in>, CHRIST COLLEGE OF ENGINEERING Admin <christ@ktu.edu.in>, CHRIST KNOWLEDGE CITY Admin <christcity@ktu.edu.in>, COCHIN COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <cochincet@ktu.edu.in>, COCHIN INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <cochinist@ktu.edu.in>, COLLEGE OF ENGINEERING ARANMULA Admin <cearanmula@ktu.edu.in>, COLLEGE OF ENGINEERING POONJAR Admin <cepoonjar@ktu.edu.in>, COLLEGE OF ENGINEERING ATTINGAL Admin <ceattingal@ktu.edu.in>, COLLEGE OF ENGINEERING AND MANAGEMENT, PUNNAPRA Admin <cepunnapra@ktu.edu.in>, COLLEGE OF ENGINEERING & TECHNOLOGY-PAYYANUR Admin <cepayyannur@ktu.edu.in>, COLLEGE OF ENGINEERING ADOOR Admin <ceadoor@ktu.edu.in>, COLLEGE OF ENGINEERING CHENGANNUR Admin <cechengannur@ktu.edu.in>, COLLEGE OF ENGINEERING CHERTHALA Admin <cecherthala@ktu.edu.in>, COLLEGE OF ENGINEERING KALLOOPPARA Admin <cekallooppara@ktu.edu.in>, COLLEGE OF ENGINEERING KARUNAGAPPALLY Admin <cekarunagappally@ktu.edu.in>, COLLEGE OF ENGINEERING KIDANGOOR Admin <cekidangoor@ktu.edu.in>, COLLEGE OF ENGINEERING KOTTARAKARA Admin <cekottarakara@ktu.edu.in>, COLLEGE OF ENGINEERING MUNNAR Admin <cemunnar@ktu.edu.in>, COLLEGE OF ENGINEERING PATHANAPURAM Admin <cepathanapuram@ktu.edu.in>, COLLEGE OF ENGINEERING PERUMON Admin <ceperumon@ktu.edu.in>, COLLEGE OF ENGINEERING THALASSERY Admin <cethalassery@ktu.edu.in>, COLLEGE OF ENGINEERING TRIKARIPUR Admin <cetrikaripur@ktu.edu.in>, COLLEGE OF ENGINEERING TRIVANDRUM Admin <cet@ktu.edu.in>, COLLEGE OF ENGINEERING VADAKARA Admin <cevadakara@ktu.edu.in>, ER&DCI INSTITUTE OF TECHNOLOGY Admin <erdci@ktu.edu.in>, ERANAD KNOWLEDGE CITY TECHNICAL CAMPUS Admin <eranad@ktu.edu.in>, Federal Institute of Science And Technology (FISAT) Admin <fisat@ktu.edu.in>, FOCUS INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <focus@ktu.edu.in>, GOVERNMENT ENGINEERING COLLEGE SREEKRISHNAPURAM Admin <gecpalakkad@ktu.edu.in>, Govt. Engineering College, Barton Hill Admin <gecbartonhill@ktu.edu.in>, Government Engineering College Idukki Admin <gecidukki@ktu.edu.in>, GOVERNMENT COLLEGE OF ENGINEERING KANNUR KTU-Admin <geckannur@ktu.edu.in>, Government Engineering College Kozhikode Admin <geccalicut@ktu.edu.in>, Government Engineering College, Thrissur Admin <gecthrissur@ktu.edu.in>, Government Engineering College Wayanad Admin <gecwayanad@ktu.edu.in>, GURUDEVA INSTITUTE OF SCIENCE AND TECHNOLOGY Admin <gurudeva@ktu.edu.in>, HEERA COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <heera@ktu.edu.in>, Hindustan College of Engineering Admin <hindustan@ktu.edu.in>, Holy Grace Academy of Engineering Admin <holygrace@ktu.edu.in>, HOLY KINGS COLLEGE OF ENGINEERING AND TECHNOLOGY Admin <holykings@ktu.edu.in>, IES COLLEGE OF ENGINEERING Admin <ies@ktu.edu.in>, ILAHIA COLLEGE OF ENGINEERING & TECHNOLOGY Admin <ilahiacet@ktu.edu.in>, ILAHIA SCHOOL OF SCIENCE AND TECHNOLOGY Admin <ilahiaschool@ktu.edu.in>, Principal ILMCET <ilm@ktu.edu.in>, Indira Gandhi Institute of Engineering and Technology Women Admin <indiragandhi@ktu.edu.in>,

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Please see the attachment.

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1496-2020-KTUPrincipal of all affiliated colleges.pdf
73K

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Fwd: Regulation etc

LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY Admin <lourdesmatha@ktu.edu.in> Mon, Jan 24, 2022 at 9:36 AM
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---------- Forwarded message ---------
From: **Director Academics** <directoracademics@ktu.edu.in>
Date: Tue, May 28, 2019 at 10:58 AM
Subject: Regulation etc
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Sir/Mam
Pls see the ac council approved
(i) B.Tech regulation for 2019 admission
(ii) Curriculum template from S1 to S8

Director (Academic),
APJ Abdul Kalam Technological University.

2 attachments

Regulation.pdf
433K

CURRICULUM TEMPLATE _Final.pdf
661K

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

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ANNEXURE 1

Regulation for B.Tech, 2019

The A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019

This may be called the A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019. These are subject to the provisions of the APJ Abdul Kalam Technological University Act, 2015, the statutes and ordinances if any issued in the subject from time to time. It is the express understanding that these regulations are subject to the approval of the concerned statutory bodies of the University. These regulations shall be applicable for students admitted from 2019 onward.

1. Preamble	
R1.1	The University has the right to modify the regulations from time to time.
R1.2	In all matters related to the regulations, the decision of the University and its interpretation given by the BOG shall be final and binding.
2. Admission	
R2.1	Admission policy, eligibility for admission and admission procedure shall be decided by the University or the competent statutory authority for admissions from time to time.
R2.2	If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the University or the statutory body concerned, the Vice Chancellor may revoke the admission of the candidate and report the matter to the BOG.
R2.3	No student shall be permitted, under any circumstances, to change the branch/stream to which he/she is admitted by the competent authority for admission.
R2.4	A student admitted to a particular institute shall continue studying in that institute till the completion of the course, unless he/she is permitted an inter college transfer as per R9.1 to 9.12.
3. Structure of B.Tech. Program.	
R3.1	The duration of the B.Tech. Program shall be 4 years (8 semesters)
R3.2	The maximum duration shall be six academic years spanning 12 semesters.
R3.3	Every academic year shall have two semesters "1st July to 31st December (Odd semester)" and "1st January to 30th June (Even semester)". Each semester shall have minimum of 72 working days. The vacation of the faculty and staff shall be as per the Government orders from time to time.
R3.4	Every branch of the B.Tech Program shall have a curriculum and syllabi for the courses approved by the Academic Council. Syllabus for any course shall be normally modified / updated once in four years. However, innovative elective courses can be included as

and when required, on the recommendations of the respective Board of Studies and subject to the approval of the Academic Council. All revisions shall be based only on the recommendations of the Board of Studies concerned.

R3.5 The academic programs of the University follow the credit system. The general pattern is as below:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 to 2 Hours Practical(P) per week	1 credit
3 to 4 Hours Practical(P) per week	2 credit
The workload of a faculty member shall be the actual number of hours engaged by the faculty member.	

R3.6 The curriculum of any branch of the B.Tech. Program shall have a total of 160 academic credits and 2 additional pass/fail credits.

R3.7 Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

S. No.	Category	Code	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HSMC	8
2	Basic Science courses	BSC	26
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	22
4	Professional core courses	PCC	76
5	Professional Elective courses relevant to chosen specialization/branch	PEC	15
6	Open subjects – Electives from other technical and /or emerging subjects ` as specified in the curriculum concerned.	OEC	03
7	Project work, seminar and internship in industry or elsewhere	PROJ	10
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	MC	Non credit
9	Mandatory Student Activities (Pass/Fail)	SA	2
		Total Credits	162

R3.8	No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Credit per semester shall not be less than 15 or greater than 25 and cumulative credits shall not be less than 162.
R3.9	The medium of instruction shall be English. All examinations, project/seminar reports and presentations shall be in English.
4. Academic Monitoring and Student Support.	
R4.1	Advisory System: There shall be one Senior Faculty Advisor (SFA) for a class and a faculty advisor (FA) each for 25 to 35 students in the class. The Principal shall assign a regular faculty member with minimum five years of experience as the Senior Faculty Advisor (SFA) in discussion with the Head of Department concerned.
R4.2	The documents regarding all academic and non academic matters of students under an advisory group shall be kept under the custody of Faculty Advisor/Senior Faculty Advisor.
R4.3	All requests/applications from a student or parent to higher offices are to be forwarded/recommended by his/her Faculty Advisor/Senior Faculty Advisor. Students and parents shall first approach their Faculty Advisor/ Senior Faculty Advisor for all kinds of advices, clarifications and permissions on academic matters. It is the official responsibility of the institution to provide the required guidance, clarifications and advices to the students and parents strictly based on the prevailing academic regulations.
R4.4	The SFA shall arrange separate or combined meetings with advisors; course faculty, Parents and students as and when required and discuss the academic progress of students under their advisory group. The Senior Faculty Advisor/ Faculty Advisor shall also offer guidance and help to solve the issues on academic and non-academic matters including personal issues of the students in their advisory group. Advisory meetings shall preferably be convened: 1. Immediately after the commencement of the semester. 2. Immediately after announcing the marks of first internal evaluation test. The internal marks, activity points earned during the semester and eligibility of attendance shall be uploaded in the University portal only after displaying the same in the department notice board at least for two working days. This is for the information and feed back of the students. Any concerns raised by the students regarding attendance and internal marks and activity points shall be looked into in the combined meetings of advisors, course faculty and the students concerned. The principal/ HoD shall ensure the proper redressal of the concerns raised by the students regarding internal assessment and attendance. The FA/SFA shall be the custodian of the minutes and action taken reports of the advisory meetings.

R4.5	The SFA shall get the minutes and action taken reports of advisory meetings approved by the Head of Department and the Principal. It shall be the duty of the HoD and the Principal to produce it before the University as and when required.
R4.6	The FA/SFA shall keep a hard copy of the consolidated statement of attendance, activity points and internal marks of the students in their advisory group. It shall be kept with the HoD without fail for all sorts of inspections.
R4.7	Regular communication with the parents of students in respect of progress in academic matters and other general issues shall be the responsibility of the Senior Faculty Advisor/ Faculty Advisor.
R4.8	The Principal shall inform/forward all regulations, guide lines, communications, announcements etc issued by the University regarding student academic and other matters to the HoDs/ Senior Faculty Advisors for information and timely action.
R4.9	It shall be the official responsibility of the Principal to arrange necessary orientation programmes to the HoDs, SFAs and SAs regarding student counseling, the prevailing University norms, regulations, guidelines and procedures on all academic and other University related matters.
5. Academic Auditing of affiliated institutions.	
R5.1	There shall be academic auditing in each affiliated college at stipulated intervals. The academic auditing shall be conducted jointly by an Internal Quality Assurance Cell (IQAC) within the college and external academic auditor(s) appointed by the University. The Internal Quality Assurance Cell (IQAC) in each college shall oversee and monitor all the academic activities including all internal evaluations and examinations. This cell shall prepare academic audit statements in the formats prescribed by the University for each semester at regular intervals. These reports shall be presented to the external academic auditor(s), who shall use it as reference for independent auditing. The external auditor(s) shall submit the final audit report to the University in the prescribed format. Academic auditing shall cover:- 1. Course delivery and adherence to the course plan, syllabus coverage, quality of question papers used for internal examinations, internal evaluation, maintenance of laboratory experimental set ups and equipments, practical assignments, mini projects and conduct of practical classes and their evaluation. 2. Co-curricular and Extra-curricular activities available for students, the monitoring mechanism of activity points to be earned by the students. 3. Academic functioning of the college encompassing students, faculty and college administration covering punctuality, attendance, discipline, academic, environment, learning ecosystem, academic accountability, academic achievements and benchmarking. 4. The audit shall also cover the quality criteria prescribed by NBA/NAAC.

6. Assessment

R6.1 There shall be End Semester Examinations (ESE) in every semester for all courses as prescribed under the respective curriculum, except the Lab/ workshops courses for 1 & 2 semesters. The End Semester Examinations shall be conducted by the University. Semester classes shall be completed at least ten days before the commencement of the End Semester Examination.

R6.2 The End Semester Examinations (ESE) shall be held twice in a year – May/June session (for even semesters) and November/December session (for odd semesters). However, the End Semester Examinations of the VII and VIII Semesters shall be conducted in both the sessions.

R6.3 Candidates in each semester shall be evaluated both by Continuous Internal Evaluation (CIE) and End Semester Examinations (ESE). The ratio of Continuous Internal Evaluation (CIE) to End Semester Examinations (ESE) shall be as below :

1. Theory Courses : 1 : 2
2. Laboratory Courses : 1 : 1
3. Project : CIE only
4. Seminar : CIE only

R6.4 Continuous Internal Evaluation (CIE)): The Continuous Internal Evaluation shall be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum two). The faculty member (s) concerned shall carry out the Continuous Internal Evaluation (CIE) for the course allotted to him/her. The CIE marks for individual subjects shall be computed by giving weightage to the following parameters unless otherwise specified in the curriculum.

Course	Attendance	Tests	Assignment/ Class work/ Course project.
Theory	20%	50%	30%
Drawing/ Practical	20%	40%	40%

There shall be minimum two internal evaluation tests, each of 2hrs duration. Each test shall cover 50% of the syllabus and shall be for 50marks. Retest shall be permitted to the students who could not appear for the internal tests due to genuine grounds. Three days shall be utilised for conducting the internal evaluation test.

Project work	a. Work assessed by the project guide – 30% b. Three member Continuous Internal Evaluation Committee – 40% (Guide shall be one member in the CIE committee) c. Final Evaluation by a three member Committee comprising of the department project coordinator, guide and an external expert. The external expert shall be an academician or from industry. The industry expert is preferred : 30% d. One third of the project credit shall be completed in VII semester and two third in VIII semester.

	Seminar	The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on the style of presentation, technical content, adequacy of reference, depth of knowledge and overall quality of the report. a) Attendance : 10% b) Guide : 20% c) Technical content : 30% d) Presentation : 40%
	The CIE marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full, only if the candidate has secured 90% attendance or above in the subject. If a student has attendance for a subject below 90%, reduction in the marks for the attendance shall be made proportionally. The CIE marks obtained by the student for all subjects in a semester are to be published at least 5 days before the commencement of the University examinations. Duty leave shall be accounted for awarding the internal marks for attendance.	
R6.5	Students, who have completed a course but could not write the end semester examination, shall be awarded "I' Grade, provided they meet other eligibility criteria (R6.6). They shall register (exam registration) and appear for the end semester examination at the next opportunity and earn the credits without having to register (course registration) for the course again.	
R6.6	The main eligibility criteria for registering to the End Semester Examination are attendance in the course and no pending disciplinary action. The minimum attendance for appearing for the End Semester Examination is 75% in each course. Students who do not meet these eligibility criteria are awarded an FE grade.	
R6.7	The students with FE grade shall register for the courses during the normal semesters in which the courses are offered. However, for the seventh and eighth semester FE grade students can register for the courses in the next immediate chance, if offered by their institute.	
R6.8	A student who does not register for all the courses listed in the curriculum for a semester shall not be eligible to enroll for the next higher semester.	
R6.9	The maximum number of credits a student can register (course registration) for, in a semester is limited to 08 credits in excess of the total mandatory credits allotted in the curriculum for that semester.	
R6.10	A student will be eligible for the award of B. Tech. Degree of the University on satisfying the following requirements: 1. Fulfilled all the curriculum requirements within the stipulated duration of the course. 2. Earned the required minimum credits as specified in the curriculum for the branch of study (R3.6 and R3.7). 3. No pending disciplinary action.	

R6.11	Students registered for a course have to attend the course regularly and undergo the Continuous Internal Evaluation (CIE) and appear for the End Semester Examinations (ESE). Credits for the course are deemed to be earned only on getting at least a pass grade 'P' or better in the composite evaluation.
R6.12	Pass minimum for a course shall be 40% for the End Semester Examination and 50% of CIE and ESA put together. Letter grade 'F' will be awarded to the student for a course if either his/her mark for the End Semester Examination (ESE) is below 40 % or the overall mark [Continuous Internal Evaluation (CIE) + End Semester Examination (ESE)] is below 50 %.
R6.13	Students who received F grade in an End Semester Examination shall have to appear for the End Semester Examination at the next opportunity and earn the credits. They shall not be permitted to register for the course again.
R6.14	Continuous Internal Evaluation mark percentage shall not exceed 30% over the End Semester Examination mark %. CIE marks awarded to a student shall be normalised accordingly. For example if the end semester mark % is 40, then the maximum eligible CIE mark % is 40+30 = 70 %.)
R6.15	Grading is based on the overall % marks obtained by the student in a course, as given in 6.16. The grade card shall only give the grades against the courses the student has registered. Semester grade card shall give the grade for each registered course, Semester Grade Point Average (SGPA) for the semester as well as Cumulative Grade Point Average (CGPA).
R6.16	**Grade and Grade Points**

Grades	**Grade Point (GP)**	**% of Total Marks obtained in the course**	
S	10	90% and above	
A+	9.0	85% and above but less than 90%	
A	8.5	80% and above but less than 85%	
B+	8.0	75% and above but less than 80%	
B	7.5	70% and above but less than 75%	
C +	7.0	65% and above but less than 70%	
C	6.5	60% and above but less than 65%	
D	6.0	55% and above but less than 60%	
P (Pass)	5.5	50% and above but less than 55%	
F (Fail)	0	Below 50% (CIE + ESE) or Below 40 % for ESE	
FE	0	Failed due to lack of eligibility criteria (R6.6)	
I	0	Could not appear for the end semester examination but fulfills the eligibility criteria.	
Classification of B. Tech Degree.	First Class with Distinction		CGPA 8.0 and above
	First Class		CGPA 6.5 and above
Equivalent percentage mark shall be = 10 * CGPA – 2.5			

R6.17

Minimum Cumulative Credit Requirements for Registering to Higher Semesters

Semester	Allotted Credits	Cumulative Credits	Minimum Cumulative Credits required for B. Tech	Minimum Cumulative Credits required for B. Tech Lateral Enrty.
First	17	17	Not Applicable	Not Applicable
Second	21	38	Not Insisted	Not Insisted
Third	22	60	Not Insisted	Not Insisted
Fourth	22	82	Not Insisted	Not Insisted
Fifth	23	105	21 Credits from S1& S2	Not Insisted
Sixth	24	129	Not Insisted	Not Insisted
Seventh	15	144	47 Credits from S1 to S4	09 Credits from S3 to S4
Eight	16	160	Not Insisted	Not Insisted

R6.18 There is no provision for improving the grade. However, the student is permitted to check the answer books of the End Semester Examination after the results are declared, on payment of the prescribed fee. Any discrepancy in evaluation could be brought to the notice of the Controller of Examination, who shall initiate appropriate action as per the University Examination Manual.

R.6.19 The students can apply for revaluation of the answer books of the end semester examination after the results are declared. The final mark awarded will be the better of the two marks. If the difference in marks obtained in revaluation and the original valuation is more than 15% of the maximum marks, it shall be sent for third valuation. The final mark shall then be the average of the closer of the two marks obtained in the three valuations to the advantage of the student or the mark obtained in the original valuation whichever is higher. The Controller of Examination shall examine such cases and conduct proper enquiry to see whether any of the examiners is responsible for negligent valuation of answer script and initiate suitable action as per the University Examination Manual.

R6.20 Grade cards shall be made available in the student login for the registered courses, in every semester. On earning the required credits for the degree, the University will issue the final consolidated grade sheet for the B. Tech program including CGPA.

R6.21 **Calculation of SGPA/CGPA**

Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) are calculated as follows.

SGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the curriculum of that semester. The failed and incomplete courses shall also be considered in the calculation.

CGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the

	curriculum up to that semester for which the 'CGPA' is needed. Here the failed courses shall also be accounted. CGPA for the B. Tech programme is arrived at by considering all course credits that are needed for the degree and their respective grade points. For students admitted under lateral entry scheme, credits for the first and second semester courses shall not be accounted for the calculation of CGPA. Equivalent percentage mark shall be = 10 * CGPA – 2.5
R6.22	Any act of violation of University directions, indiscipline, misbehavior, or unfair practice in examinations from the part of students, faculty members, staff, institution, management or any other source shall be viewed very seriously. It is the legal responsibility of the principal and the college management to see that the examinations are conducted strictly as per the directions of the University and as specified in the examination Manual. Malpractices in examinations observed or reported by an official employed by the University, faculty member, invigilator or anybody shall be immediately reported to the Principal. The principal shall in turn conduct a preliminary enquiry giving the student concerned a chance to explain his/her case. The Principal shall then forward the case with his/her preliminary enquiry report and remarks to the Controller of Examinations along with all related documents and evidences within two working days. The Controller of examination shall decide the course of action on the issue as per the prescribed norms in the University Examination Manual.
R6.23	A student shall earn 2 credits by actively involving in co – curricular and extra – curricular activities as per the guidelines issued by the University from time to time. On getting minimum 100 activity points the student passes the course and earns the two credits which shall not be counted for the calculation of CGPA but mandatory for the award of the Degree. For the students admitted under lateral entry scheme the 2 credits shall be considered to be earned on getting 75 activity points. The students are required to keep a file containing documentary proofs of activities done by him/her attested by the Senior Faculty Advisor/ Faculty Advisor.
	7. Break of Study
R7.1	A student is permitted to avail break of study: i) In case of accident or serious illness needing prolonged hospitalization and rest. ii) In case the student has a bright idea and would like to initiate a start-up venture or develop a product. iii) In case of any personal reasons that need a break in study. iv) For internship leading to employment. For break of study due to illness, student shall submit all necessary medical reports together with the recommendation of the doctor treating him giving definite reasons for break of study and its duration. Before joining back, the student should submit the fitness certificate from the doctor who treated him. Students who want to initiate a start-up venture or a product development, have to

	submit a project report, clearly indicating the purpose, action plan, technical details, funding details and future plans to the college Principal. The Principal shall evaluate the proposal by constituting an expert team consisting of a technocrat and a bank executive and take an appropriate decision based on the team's recommendation. The break of study for the start up shall be permitted only after the 4th semester for a maximum duration of two semesters. This is however permitted only on successfully completing the courses listed out in the first two semesters. Students who require a break in study due to personal reasons shall convince the Principal on the genuine need for it by giving authentic evidence for the same. Students who require break in study for 'internship leading to employment' shall produce the offer letter obtained from the employer concerned. The principal shall verify the authenticity of the offer and submit his recommendation to the University sufficiently in advance for approval. Only campus placed students with an annual compensation more than 6 lakhs are eligible to avail this facility. In the semester system followed by the University, break of study for an academic year is the preferred option than break of study for a semester. The student can avail the break of study only with the prior approval of the University. The Principal shall upload the request of the student with all relevant documents to the University portal for the approval with his/her recommendations. Students shall have to rejoin on the first working day of the same semester on which he/she had started availing the break of study.
	8.Attendance
R8.1	Students are expected to attain 100% attendance for all courses. However, under unavoidable circumstances they are permitted to avail leave. Total leave of absence shall not exceed 25% of the academic contact hours for a course and 75% attendance is mandatory for registering to the end semester examination. On medical ground the college Principal can relax the minimum attendance requirement to 60%, to write the end semester examination. This is permitted for one or more courses registered in the semester. Principal shall keep all records which led to his decision on attendance, for verification by the Academic Auditors/ University officials. This provision is applicable only to any two semesters during the entire program period. In case of prolonged illness, break of study is permitted as per R7.1.
R8.2	The Principals are authorized to grant attendance relaxation (duty leave) to the students in officially sponsored national level competitions/championships/ tournaments when called upon to do so, up to a maximum of 10%. Such students should produce the participation certificate countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extracurricular activities: within ten days of the event. The participation certificate thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the certificate if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account. The student shall get official prior permission from the University for representing the University.

8.3	The Principals are authorized to grant attendance relaxation (duty leave) to the students for organizing extra/ co-curricular activities, up to a maximum of 05%. Such students should produce the required documents countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extra/ co-curricular activities: within ten days of the events. The documents thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the documents, if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account.
9.Inter College Transfer	
R9.1	Inter college transfer shall be applicable only for regular B. Tech students.
R9.2	The transfer shall be permitted just before the commencement of third semester.
R9.3	The transfer shall be with effect from the first working day of the third semester.
R9.4	The transfer shall be only within the sanctioned strength of the receiving college.
R9.5	The following Category of students shall not be eligible for inter college transfer 1. Govt. of India Nominee. 2. Management Quota in Aided colleges. 3. Management Quota in private Self Financing Colleges 4. Students admitted under NRI/PIO quota. 5. Lateral Entry students. 6. Students admitted under TFW Scheme. 7. Students admitted in any supernumerary seats. 8. Any other category which are ineligible as per the conditions for admission prescribed by Govt. of Kerala/Govt. of India.
R9.6	The transfer shall be permitted: 1. Between Govt/ Govt. Aided Colleges. 2. Between Self – Financing Colleges. (Including Govt. Controlled SFC).
R9.7	Notification inviting application for inter college transfer shall be issued by the University just before the commencement of the third semester.
R9.8	The candidate should fulfill the academic eligibility requirement for promotion to the third semester.
R9.9	If the number of applicants is more than the vacant seats available, the transfer may be based on the Kerala Engineering Entrance Rank.
R9.10	The students shall opt only one college for inter college transfer.
R9.11	The selected candidates shall remit a fee of Rs 3000/- (No fee for SC/ST students) within the stipulated date to the University. However, this rule is not applicable to the students transferred to other institutes under “Shift College” University order.
R9.12	The College transfer once approved by the receiving college will be final and binding on the applicant. No student will be permitted, under any circumstances, to refuse the change of college once offered.

10.Migration from other Universities	
R10.1	Migration to the University from other Universities shall be permitted only if the parent University and the APJ Abdul Kalam Technological University enters into a bipartite agreement/ MoU for this purpose. However, this condition is not applicable to the students in any of the Engineering colleges/ institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala.
R10.2	The student shall be permitted to migrate only if he/she fulfills the University eligibility criteria for admission to the course applied for migration.
R10.3	The migration shall be permitted only up to the fifth semester of the B. Tech program and half the duration of the program in the case of other programs.
R10.4	The admission shall be offered on migration basis through lateral transfer of credits. Lateral credit transfer shall be as recommended by the concerned Board of Studies.
R10.5	The students shall be allowed to migrate to the University subject to satisfying the rules and regulations of the University as regards to, maximum number of backlogs, grade points, minimum credit requirement for promotion to higher semesters, etc.
R10.6	The student shall be offered admission in any of the affiliated colleges/institutions of the University subject to availability of seats. The student shall produce no objection certificate from the concerned college/institute in this regard.
R10.7	The students offered admission shall have to take transitory courses/ additional courses of the previous semesters to satisfy the program requirement as recommended by the concerned board of studies.
R10.8	The students offered admission shall pay the migration fees and the University fees as prescribed by the University. The application processing fee (University fee) shall be Rs 5000/- (Rupees five thousand only) and the migration fees shall be Rs 20000/- (Rupees twenty thousand only). The migration fee is charged for the meeting expenses of the concerned Board of studies to decide on the student suitability for migration and to recommend the transitory courses/ additional courses to be done by the student to fulfill the academic requirement of the University. The processing fee shall be paid along with the application, and the migration fee shall be paid to the University at the time of offering admission. The fee once paid shall not be refunded under any circumstances. The students in any of the Engineering colleges / institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala, are exempted from paying the processing fee and the migration fee.
R10.9	The migrated students shall follow the rules and regulations of the University.
R10.10	The students offered admission shall produce a migration certificate from the parent University at the time of admission.
R10.11	The student offered admission shall produce a character certificate from the parent institute/University at the time of admission.
R10.12	Regulations, Scheme and Syllabus of the respective specialization attested by the Registrar of the parent University or equivalent authority shall be submitted to the University along with the application seeking migration to the University.
R10.13	Attested copies of all certificates and mark lists from 10^{th} onwards shall be submitted along with the application for migration (Original certificates and mark lists shall be

	produced as and when required by the University).
R10.14	Assessment of the student suitability for migration in terms of programs, backlogs, grade points, credit requirements, etc shall be done by the concerned Board of Studies.
R10.15	Assessment of the transitory courses/ additional courses to be done by the student as per the academic requirement of the University shall be as recommended by the concerned Board of Studies.
11. Minor in Engineering.	
R11.1	All B. Tech students shall be eligible to register for Minor in Engineering.
R11.2	The Minor in Engineering registration shall be along with the registration of the 3rd semester.
R11.3	If a student fails in any course of the minor, he/she shall not be eligible to continue the B.Tech Minor. However, the additional credits and grades thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R11.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech Degree with Minor.
R11.5	Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, during the specified period. The total number of contact hours for these three courses shall be 126 Hrs (42Hrs/course). The duration of a course shall be minimum 14 weeks. The remaining 8 credits could be acquired through two MOOCs recommended by the Board of studies and approved by the Academic Council.
R11.6	Curriculum and the syllabus of the three courses shall be approved by the Board of studies and the Academic Council.
R11.7	The assessment of the courses other than MOOCs and earning of credits shall be as per R6.1 to R6.23. The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R11.8	Under graduate Degree with minor shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech program and Minor in Engineering.
12. B. Tech (Honours)	
R12.1	All B. Tech students are eligible to register B.Tech (Honours). However, their mandatory CGPA at the end of eighth semester shall be 8.5 or higher to be eligible for the award of B. Tech (Honours).
R12.2	The B. Tech (Honours) registration shall be along with the registration of the 4th semester.
R12.3	If a student fails in any course including the course chosen for B. Tech (Honours), he/she shall not be eligible to continue the B.Tech(Honours). However, the additional credits thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R12.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech (Honours) Degree.

R12.5	Out of the 20 Credits, 12 credits shall be earned by undergoing minimum three specified B. Tech (Honours) Elective courses of the respective stream. Credits for the B. Tech (Honours) Elective courses are deemed to be earned only on getting at least a grade 'C' or better in the composite evaluation. A student shall not be permitted to select the normal elective courses of the respective B. Tech programs for attaining the credit requirements of B. Tech (Honours). The remaining 8 credits could be acquired through two MOOCs of the respective streams recommended by the Board of studies and approved by the Academic Council.
R12.6	The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R12.7	The institutions offering B. Tech Honours programs shall not charge any additional fee from the students.
R12.8	B. Tech (Honours) Degree shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech and B. Tech (Honours) programs.
	13. Grace Marks for Sports /Arts Competitions.
R13.1	Only bona-fide, regular candidates are eligible for the award of Grace Marks.
R13.2	The criterion for the award of Grace Marks is representing the University in officially sponsored national level competitions/championships/ tournaments when called upon to do so. The student shall get official prior permission from the University for representing the University.
R13.3	The maximum grace marks that can be awarded to a candidate in a particular semester for all activities put together shall be 5% of the aggregate maximum End Semester Examination marks of all theory courses for which the University conducts End Semester Examinations.
R13.4	The maximum grace marks that can be awarded to a student for a theory course in a particular semester for all activities put together shall not exceed 10% of the maximum aggregate marks of End Semester Examination of the course.
R13.5	The Grace Marks shall not be awarded to a student for Practical/ Lab/ Viva Voce/ internal assessment/ Seminar etc even though she/he fails for the same.
R13.6	Eligible Grace Marks shall be distributed equally on all theory papers/courses of an examination. However, re – distribution of Grace Marks shall be allowed only in the case of those courses of an examination for which the candidate has passed. Re-distribution is possible from passed courses to failed courses only. Re-distribution of Grace Marks is not permissible from failed courses to other courses for a pass.
R13.7	The Grace Marks shall be awarded for all theory papers/courses/subjects in a semester.
R13.8	Re- distribution shall be done only for enabling a candidate to obtain the minimum marks required for a pass.
R13.09	Grace Marks shall not be re – distributed from one semester to another semester.
R13.10	If the candidate does not secure the minimum marks required for a pass even after effecting re- distribution, eligible moderation fixed by the respective board if any, shall be awarded to that candidate in addition to the Grace Marks for a pass.
R13.11	Eligible Grace Marks shall be awarded for the regular examination of the performing semester only. Grace Marks shall not be awarded for supplementary examinations.

R13.12	The performing semester shall be considered from 1st July to 31st December (Odd semester) and 1st January to 30th June (Even Semester).
R13.13	Grace Marks shall be awarded on the basis of performance in the respective semester.
R13.14	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
R13.15	Only a single highest achievement during the period of a semester shall be considered for awarding the grace marks.
14.Grace Marks for Persons With Disability (PWD)	
R14.1	A person with disability means a person suffering from not less than 40% of any disability as certified by the District Medical Board. To be eligible for the grace marks, the certificate of disability specifying the percentage of disability shall be produced before the Principal at the time of admission.
R14.2	The Grace Marks that can be awarded for PWD candidates shall be 25% of the marks scored by the candidate in each course at the time of finalization of the results.
R14.3	Transfer of marks from one paper to another shall not be permitted. Fractions of marks if any, while computing the Grace Marks shall be rounded off to the next higher integer.
R14.4	PWD candidates who are eligible for Grace Marks shall be awarded Grace Marks for regular and supplementary chances until they pass the whole examination.
R14.5	Grace Marks shall be awarded only for the marks of the End Semester Examinations conducted by the University.
R14.6	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
15. Transitory provision.	
15.1	Notwithstanding anything contained in these regulations, the Vice-Chancellor shall, for a period of two years from the date of coming into force of these regulations, has the power to provide by order that these Regulations shall be applied to any B. Tech program with such modifications as may be necessary.

The A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019

This may be called the A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019. These are subject to the provisions of the APJ Abdul Kalam Technological University Act, 2015, the statutes and ordinances if any issued in the subject from time to time. It is the express understanding that these regulations are subject to the approval of the concerned statutory bodies of the University. These regulations shall be applicable for students admitted from 2019 onward.

1. Preamble	
R1.1	The University has the right to modify the regulations from time to time.
R1.2	In all matters related to the regulations, the decision of the University and its interpretation given by the BOG shall be final and binding.
2. Admission	
R2.1	Admission policy, eligibility for admission and admission procedure shall be decided by the University or the competent statutory authority for admissions from time to time.
R2.2	If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the University or the statutory body concerned, the Vice Chancellor may revoke the admission of the candidate and report the matter to the BOG.
R2.3	No student shall be permitted, under any circumstances, to change the branch/stream to which he/she is admitted by the competent authority for admission.
R2.4	A student admitted to a particular institute shall continue studying in that institute till the completion of the course, unless he/she is permitted an inter college transfer as per R9.1 to 9.12.
3. Structure of B.Tech. Program.	
R3.1	The duration of the B.Tech. Program shall be 4 years (8 semesters)
R3.2	The maximum duration shall be six academic years spanning 12 semesters.
R3.3	Every academic year shall have two semesters "1st July to 31st December (Odd semester)" and "1st January to 30th June (Even semester)". Each semester shall have minimum of 72 working days. The vacation of the faculty and staff shall be as per the Government orders from time to time.
R3.4	Every branch of the B.Tech Program shall have a curriculum and syllabi for the courses approved by the Academic Council. Syllabus for any course shall be normally modified / updated once in four years. However, innovative elective courses can be included as

and when required, on the recommendations of the respective Board of Studies and subject to the approval of the Academic Council. All revisions shall be based only on the recommendations of the Board of Studies concerned.

R3.5 The academic programs of the University follow the credit system. The general pattern is as below:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 to 2 Hours Practical(P) per week	1 credit
3 to 4 Hours Practical(P) per week	2 credit
The workload of a faculty member shall be the actual number of hours engaged by the faculty member.	

R3.6 The curriculum of any branch of the B.Tech. Program shall have a total of 160 academic credits and 2 additional pass/fail credits.

R3.7 Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

S. No.	Category	Code	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HSMC	08
2	Basic Science courses	BSC	26
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	22
4	Professional core courses	PCC	66
5	Professional Elective courses relevant to chosen specialization/branch	PEC	19
6	Open subjects – Electives from other technical and /or emerging subjects ` as specified in the curriculum concerned.	OEC	09
7	Project work, seminar and internship in industry or elsewhere	PROJ	10
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	MC	Non credit
9	Mandatory Student Activities (Pass/Fail)	SA	2
		Total Credits	162

R3.8	No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Credit per semester shall not be less than 15 or greater than 25 and cumulative credits shall not be less than 162.
R3.9	The medium of instruction shall be English. All examinations, project/seminar reports and presentations shall be in English.
4. Academic Monitoring and Student Support.	
R4.1	Advisory System: There shall be one Senior Faculty Advisor (SFA) for a class and a faculty advisor (FA) each for 25 to 35 students in the class. The Principal shall assign a regular faculty member with minimum five years of experience as the Senior Faculty Advisor (SFA) in discussion with the Head of Department concerned.
R4.2	The documents regarding all academic and non academic matters of students under an advisory group shall be kept under the custody of Faculty Advisor/Senior Faculty Advisor.
R4.3	All requests/applications from a student or parent to higher offices are to be forwarded/recommended by his/her Faculty Advisor/Senior Faculty Advisor. Students and parents shall first approach their Faculty Advisor/ Senior Faculty Advisor for all kinds of advices, clarifications and permissions on academic matters. It is the official responsibility of the institution to provide the required guidance, clarifications and advices to the students and parents strictly based on the prevailing academic regulations.
R4.4	The SFA shall arrange separate or combined meetings with advisors; course faculty, Parents and students as and when required and discuss the academic progress of students under their advisory group. The Senior Faculty Advisor/ Faculty Advisor shall also offer guidance and help to solve the issues on academic and non-academic matters including personal issues of the students in their advisory group. Advisory meetings shall preferably be convened: 1. Immediately after the commencement of the semester. 2. Immediately after announcing the marks of first internal evaluation test. The internal marks, activity points earned during the semester and eligibility of attendance shall be uploaded in the University portal only after displaying the same in the department notice board at least for two working days. This is for the information and feed back of the students. Any concerns raised by the students regarding attendance and internal marks and activity points shall be looked into in the combined meetings of advisors, course faculty and the students concerned. The principal/ HoD shall ensure the proper redressal of the concerns raised by the students regarding internal assessment and attendance. The FA/SFA shall be the custodian of the minutes and action taken reports of the advisory meetings.

R4.5	The SFA shall get the minutes and action taken reports of advisory meetings approved by the Head of Department and the Principal. It shall be the duty of the HoD and the Principal to produce it before the University as and when required.
R4.6	The FA/SFA shall keep a hard copy of the consolidated statement of attendance, activity points and internal marks of the students in their advisory group. It shall be kept with the HoD without fail for all sorts of inspections.
R4.7	Regular communication with the parents of students in respect of progress in academic matters and other general issues shall be the responsibility of the Senior Faculty Advisor/ Faculty Advisor.
R4.8	The Principal shall inform/forward all regulations, guide lines, communications, announcements etc issued by the University regarding student academic and other matters to the HoDs/ Senior Faculty Advisors for information and timely action.
R4.9	It shall be the official responsibility of the Principal to arrange necessary orientation programmes to the HoDs, SFAs and SAs regarding student counselling, the prevailing University norms, regulations, guidelines and procedures on all academic and other University related matters.
5. Academic Auditing of affiliated institutions.	
R5.1	There shall be academic auditing in each affiliated college at stipulated intervals. The academic auditing shall be conducted jointly by an Internal Quality Assurance Cell (IQAC) within the college and external academic auditor(s) appointed by the University. The Internal Quality Assurance Cell (IQAC) in each college shall oversee and monitor all the academic activities including all internal evaluations and examinations. This cell shall prepare academic audit statements in the formats prescribed by the University for each semester at regular intervals. These reports shall be presented to the external academic auditor(s), who shall use it as reference for independent auditing. The external auditor(s) shall submit the final audit report to the University in the prescribed format. Academic auditing shall cover:- 1. Course delivery and adherence to the course plan, syllabus coverage, quality of question papers used for internal examinations, internal evaluation, maintenance of laboratory experimental set ups and equipments, practical assignments, mini projects and conduct of practical classes and their evaluation. 2. Co-curricular and Extra-curricular activities available for students, the monitoring mechanism of activity points to be earned by the students. 3. Academic functioning of the college encompassing students, faculty and college administration covering punctuality, attendance, discipline, academic, environment, learning ecosystem, academic accountability, academic achievements and benchmarking. 4. The audit shall also cover the quality criteria prescribed by NBA/NAAC.

6. Assessment

R6.1 There shall be End Semester Examinations (ESE) in every semester for all courses as prescribed under the respective curriculum, except the Lab/ workshops courses for 1 & 2 semesters. The End Semester Examinations shall be conducted by the University. Semester classes shall be completed at least ten days before the commencement of the End Semester Examination.

R6.2 The End Semester Examinations (ESE) shall be held twice in a year – May/June session (for even semesters) and November/December session (for odd semesters). However, the End Semester Examinations of the VII and VIII Semesters shall be conducted in both the sessions.

R6.3 Candidates in each semester shall be evaluated both by Continuous Internal Evaluation (CIE) and End Semester Examinations (ESE). The ratio of Continuous Internal Evaluation (CIE) to End Semester Examinations (ESE) shall be as below :

1. Theory Courses : 1 : 2
2. Laboratory Courses : 1 : 1
3. Project : CIE only
4. Seminar : CIE only

R6.4 Continuous Internal Evaluation (CIE)): The Continuous Internal Evaluation shall be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum two). The faculty member (s) concerned shall carry out the Continuous Internal Evaluation (CIE) for the course allotted to him/her. The CIE marks for individual subjects shall be computed by giving weightage to the following parameters unless otherwise specified in the curriculum.

Course	Attendance	Tests	Assignment/ Class work/ Course project.
Theory	20%	50%	30%
Drawing/ Practical	20%	40%	40%

There shall be minimum two internal evaluation tests, each of 2hrs duration. Each test shall cover 50% of the syllabus and shall be for 50marks. Retest shall be permitted to the students who could not appear for the internal tests due to genuine grounds. Three days shall be utilised for conducting the internal evaluation test.

Project work	a. Work assessed by the project guide – 30% b. Three member Continuous Internal Evaluation Committee – 40% (Guide shall be one member in the CIE committee) c. Final Evaluation by a three member Committee comprising of the department project coordinator, guide and an external expert. The external expert shall be an academician or from industry. The industry expert is preferred : 30% d. One third of the project credit shall be completed in VII semester and two third in VIII semester.

	Seminar	The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on the style of presentation, technical content, adequacy of reference, depth of knowledge and overall quality of the report. a) Attendance : 10% b) Guide : 20% c) Technical content : 30% d) Presentation : 40%

The CIE marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full, only if the candidate has secured 90% attendance or above in the subject. If a student has attendance for a subject below 90%, reduction in the marks for the attendance shall be made proportionally. The CIE marks obtained by the student for all subjects in a semester are to be published at least 5 days before the commencement of the University examinations. Duty leave shall be accounted for awarding the internal marks for attendance.

R6.5	Students, who have completed a course but could not write the end semester examination, shall be awarded "I' Grade, provided they meet other eligibility criteria (R6.6). They shall register (exam registration) and appear for the end semester examination at the next opportunity and earn the credits without having to register (course registration) for the course again.
R6.6	The main eligibility criteria for registering to the End Semester Examination are attendance in the course and no pending disciplinary action. The minimum attendance for appearing for the End Semester Examination is 75% in each course. Students who do not meet these eligibility criteria are awarded an FE grade.
R6.7	The students with FE grade shall register for the courses during the normal semesters in which the courses are offered. However, for the seventh and eighth semester FE grade students can register for the courses in the next immediate chance, if offered by their institute.
R6.8	A student who does not register for all the courses listed in the curriculum for a semester shall not be eligible to enroll for the next higher semester.
R6.9	The maximum number of credits a student can register (course registration) for, in a semester is limited to 08 credits in excess of the total mandatory credits allotted in the curriculum for that semester.
R6.10	A student will be eligible for the award of B. Tech. Degree of the University on satisfying the following requirements: 1. Fulfilled all the curriculum requirements within the stipulated duration of the course. 2. Earned the required minimum credits as specified in the curriculum for the branch of study (R3.6 and R3.7). 3. No pending disciplinary action.

R6.11	Students registered for a course have to attend the course regularly and undergo the Continuous Internal Evaluation (CIE) and appear for the End Semester Examinations (ESE). Credits for the course are deemed to be earned only on getting at least a pass grade 'P' or better in the composite evaluation.
R6.12	Pass minimum for a course shall be 40% for the End Semester Examination and 50% of CIE and ESA put together. Letter grade 'F' will be awarded to the student for a course if either his/her mark for the End Semester Examination (ESE) is below 40 % or the overall mark [Continuous Internal Evaluation (CIE) + End Semester Examination (ESE)] is below 50 %.
R6.13	Students who received F grade in an End Semester Examination shall have to appear for the End Semester Examination at the next opportunity and earn the credits. They shall not be permitted to register for the course again.
R6.14	Continuous Internal Evaluation mark percentage shall not exceed 30% over the End Semester Examination mark %. CIE marks awarded to a student shall be normalised accordingly. For example if the end semester mark % is 40, then the maximum eligible CIE mark % is 40+30 = 70 %.)
R6.15	Grading is based on the overall % marks obtained by the student in a course, as given in 6.16. The grade card shall only give the grades against the courses the student has registered. Semester grade card shall give the grade for each registered course, Semester Grade Point Average (SGPA) for the semester as well as Cumulative Grade Point Average (CGPA).
R6.16	**Grade and Grade Points**

Grades	**Grade Point (GP)**	**% of Total Marks obtained in the course**	
S	10	90% and above	
A+	9.0	85% and above but less than 90%	
A	8.5	80% and above but less than 85%	
B+	8.0	75% and above but less than 80%	
B	7.5	70% and above but less than 75%	
C +	7.0	65% and above but less than 70%	
C	6.5	60% and above but less than 65%	
D	6.0	55% and above but less than 60%	
P (Pass)	5.5	50% and above but less than 55%	
F (Fail)	0	Below 50% (CIE + ESE) or Below 40 % for ESE	
FE	0	Failed due to lack of eligibility criteria (R6.6)	
I	0	Could not appear for the end semester examination but fulfills the eligibility criteria.	
Classification of B. Tech Degree.	First Class with Distinction		CGPA 8.0 and above
	First Class		CGPA 6.5 and above
Equivalent percentage mark shall be = 10 * CGPA – 2.5			

R6.17

Minimum Cumulative Credit Requirements for Registering to Higher Semesters

Semester	Allotted Credits	Cumulative Credits	Minimum Cumulative Credits required for B. Tech	Minimum Cumulative Credits required for B. Tech Lateral Enrty.
First	17	17	Not Applicable	Not Applicable
Second	21	38	Not Insisted	Not Insisted
Third	22	60	Not Insisted	Not Insisted
Fourth	22	82	Not Insisted	Not Insisted
Fifth	23	105	21 Credits from S1& S2	Not Insisted
Sixth	24	129	Not Insisted	Not Insisted
Seventh	15	144	47 Credits from S1 to S4	09 Credits from S3 to S4
Eight	16	160	Not Insisted	Not Insisted

R6.18 There is no provision for improving the grade. However, the student is permitted to check the answer books of the End Semester Examination after the results are declared, on payment of the prescribed fee. Any discrepancy in evaluation could be brought to the notice of the Controller of Examination, who shall initiate appropriate action as per the University Examination Manual.

R.6.19 The students can apply for revaluation of the answer books of the end semester examination after the results are declared. The final mark awarded will be the better of the two marks. If the difference in marks obtained in revaluation and the original valuation is more than 15% of the maximum marks, it shall be sent for third valuation. The final mark shall then be the average of the closer of the two marks obtained in the three valuations to the advantage of the student or the mark obtained in the original valuation whichever is higher. The Controller of Examination shall examine such cases and conduct proper enquiry to see whether any of the examiners is responsible for negligent valuation of answer script and initiate suitable action as per the University Examination Manual.

R6.20 Grade cards shall be made available in the student login for the registered courses, in every semester. On earning the required credits for the degree, the University will issue the final consolidated grade sheet for the B. Tech program including CGPA.

R6.21 **Calculation of SGPA/CGPA**

Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) are calculated as follows.

SGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the curriculum of that semester. The failed and incomplete courses shall also be considered in the calculation.

CGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the

	curriculum up to that semester for which the 'CGPA' is needed. Here the failed courses shall also be accounted. CGPA for the B. Tech programme is arrived at by considering all course credits that are needed for the degree and their respective grade points. For students admitted under lateral entry scheme, credits for the first and second semester courses shall not be accounted for the calculation of CGPA. Equivalent percentage mark shall be = 10 * CGPA – 2.5
R6.22	Any act of violation of University directions, indiscipline, misbehavior, or unfair practice in examinations from the part of students, faculty members, staff, institution, management or any other source shall be viewed very seriously. It is the legal responsibility of the principal and the college management to see that the examinations are conducted strictly as per the directions of the University and as specified in the examination Manual. Malpractices in examinations observed or reported by an official employed by the University, faculty member, invigilator or anybody shall be immediately reported to the Principal. The principal shall in turn conduct a preliminary enquiry giving the student concerned a chance to explain his/her case. The Principal shall then forward the case with his/her preliminary enquiry report and remarks to the Controller of Examinations along with all related documents and evidences within two working days. The Controller of examination shall decide the course of action on the issue as per the prescribed norms in the University Examination Manual.
R6.23	A student shall earn 2 credits by actively involving in co – curricular and extra – curricular activities as per the guidelines issued by the University from time to time. On getting minimum 100 activity points the student passes the course and earns the two credits which shall not be counted for the calculation of CGPA but mandatory for the award of the Degree. For the students admitted under lateral entry scheme the 2 credits shall be considered to be earned on getting 75 activity points. The students are required to keep a file containing documentary proofs of activities done by him/her attested by the Senior Faculty Advisor/ Faculty Advisor.
7. Break of Study	
R7.1	A student is permitted to avail break of study: i) In case of accident or serious illness needing prolonged hospitalization and rest. ii) In case the student has a bright idea and would like to initiate a start-up venture or develop a product. iii) In case of any personal reasons that need a break in study. iv) For internship leading to employment. For break of study due to illness, student shall submit all necessary medical reports together with the recommendation of the doctor treating him giving definite reasons for break of study and its duration. Before joining back, the student should submit the fitness certificate from the doctor who treated him. Students who want to initiate a start-up venture or a product development, have to

	submit a project report, clearly indicating the purpose, action plan, technical details, funding details and future plans to the college Principal. The Principal shall evaluate the proposal by constituting an expert team consisting of a technocrat and a bank executive and take an appropriate decision based on the team's recommendation. The break of study for the start up shall be permitted only after the 4th semester for a maximum duration of two semesters. This is however permitted only on successfully completing the courses listed out in the first two semesters. Students who require a break in study due to personal reasons shall convince the Principal on the genuine need for it by giving authentic evidence for the same. Students who require break in study for 'internship leading to employment' shall produce the offer letter obtained from the employer concerned. The principal shall verify the authenticity of the offer and submit his recommendation to the University sufficiently in advance for approval. Only campus placed students with an annual compensation more than 6 lakhs are eligible to avail this facility. In the semester system followed by the University, break of study for an academic year is the preferred option than break of study for a semester. The student can avail the break of study only with the prior approval of the University. The Principal shall upload the request of the student with all relevant documents to the University portal for the approval with his/her recommendations. Students shall have to rejoin on the first working day of the same semester on which he/she had started availing the break of study.
	8.Attendance
R8.1	Students are expected to attain 100% attendance for all courses. However, under unavoidable circumstances they are permitted to avail leave. Total leave of absence shall not exceed 25% of the academic contact hours for a course and 75% attendance is mandatory for registering to the end semester examination. On medical ground the college Principal can relax the minimum attendance requirement to 60%, to write the end semester examination. This is permitted for one or more courses registered in the semester. Principal shall keep all records which led to his decision on attendance, for verification by the Academic Auditors/ University officials. This provision is applicable only to any two semesters during the entire program period. In case of prolonged illness, break of study is permitted as per R7.1.
R8.2	The Principals are authoriesd to grant attendance relaxation (duty leave) to the students in officially sponsored national level competitions/championships/ tournaments when called upon to do so, up to a maximum of 10%. Such students should produce the participation certificate countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extracurricular activities: within ten days of the event. The participation certificate thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the certificate if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account. The student shall get official prior permission from the University for representing the University.

8.3	The Principals are authoriesd to grant attendance relaxation (duty leave) to the students for organising extra/ co-curricular activities, up to a maximum of 05%. Such students should produce the required documents countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extra/ co-curricular activities: within ten days of the events. The documents thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the documents, if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account.
9.Inter College Transfer	
R9.1	Inter college transfer shall be applicable only for regular B. Tech students.
R9.2	The transfer shall be permitted just before the commencement of third semester.
R9.3	The transfer shall be with effect from the first working day of the third semester.
R9.4	The transfer shall be only within the sanctioned strength of the receiving college.
R9.5	The following Category of students shall not be eligible for inter college transfer 1. Govt. of India Nominee. 2. Management Quota in Aided colleges. 3. Management Quota in private Self Financing Colleges 4. Students admitted under NRI/PIO quota. 5. Lateral Entry students. 6. Students admitted under TFW Scheme. 7. Students admitted in any supernumerary seats. 8. Any other category which are ineligible as per the conditions for admission prescribed by Govt. of Kerala/Govt. of India.
R9.6	The transfer shall be permitted: 1. Between Govt/ Govt. Aided Colleges. 2. Between Self – Financing Colleges. (Including Govt. Controlled SFC).
R9.7	Notification inviting application for inter college transfer shall be issued by the University just before the commencement of the third semester.
R9.8	The candidate should fulfill the academic eligibility requirement for promotion to the third semester.
R9.9	If the number of applicants is more than the vacant seats available, the transfer may be based on the Kerala Engineering Entrance Rank.
R9.10	The students shall opt only one college for inter college transfer.
R9.11	The selected candidates shall remit a fee of Rs 3000/- (No fee for SC/ST students) within the stipulated date to the University. However, this rule is not applicable to the students transferred to other institutes under “Shift College” University order.
R9.12	The College transfer once approved by the receiving college will be final and binding on the applicant. No student will be permitted, under any circumstances, to refuse the change of college once offered.

10.Migration from other Universities	
R10.1	Migration to the University from other Universities shall be permitted only if the parent University and the APJ Abdul Kalam Technological University enters into a bipartite agreement/ MoU for this purpose. However, this condition is not applicable to the students in any of the Engineering colleges/ institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala.
R10.2	The student shall be permitted to migrate only if he/she fulfills the University eligibility criteria for admission to the course applied for migration.
R10.3	The migration shall be permitted only up to the fifth semester of the B. Tech program and half the duration of the program in the case of other programs.
R10.4	The admission shall be offered on migration basis through lateral transfer of credits. Lateral credit transfer shall be as recommended by the concerned Board of Studies.
R10.5	The students shall be allowed to migrate to the University subject to satisfying the rules and regulations of the University as regards to, maximum number of backlogs, grade points, minimum credit requirement for promotion to higher semesters, etc.
R10.6	The student shall be offered admission in any of the affiliated colleges/institutions of the University subject to availability of seats. The student shall produce no objection certificate from the concerned college/institute in this regard.
R10.7	The students offered admission shall have to take transitory courses/ additional courses of the previous semesters to satisfy the program requirement as recommended by the concerned board of studies.
R10.8	The students offered admission shall pay the migration fees and the University fees as prescribed by the University. The application processing fee (University fee) shall be Rs 5000/- (Rupees five thousand only) and the migration fees shall be Rs 20000/- (Rupees twenty thousand only). The migration fee is charged for the meeting expenses of the concerned Board of studies to decide on the student suitability for migration and to recommend the transitory courses/ additional courses to be done by the student to fulfill the academic requirement of the University. The processing fee shall be paid along with the application, and the migration fee shall be paid to the University at the time of offering admission. The fee once paid shall not be refunded under any circumstances. The students in any of the Engineering colleges / institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala, are exempted from paying the processing fee and the migration fee.
R10.9	The migrated students shall follow the rules and regulations of the University.
R10.10	The students offered admission shall produce a migration certificate from the parent University at the time of admission.
R10.11	The student offered admission shall produce a character certificate from the parent institute/University at the time of admission.
R10.12	Regulations, Scheme and Syllabus of the respective specialization attested by the Registrar of the parent University or equivalent authority shall be submitted to the University along with the application seeking migration to the University.
R10.13	Attested copies of all certificates and mark lists from 10^{th} onwards shall be submitted along with the application for migration (Original certificates and mark lists shall be

	produced as and when required by the University).
R10.14	Assessment of the student suitability for migration in terms of programs, backlogs, grade points, credit requirements, etc shall be done by the concerned Board of Studies.
R10.15	Assessment of the transitory courses/ additional courses to be done by the student as per the academic requirement of the University shall be as recommended by the concerned Board of Studies.
11. Minor in Engineering.	
R11.1	All B. Tech students shall be eligible to register for Minor in Engineering.
R11.2	The Minor in Engineering registration shall be along with the registration of the 3rd semester.
R11.3	If a student fails in any course of the minor, he/she shall not be eligible to continue the B.Tech Minor. However, the additional credits and grades thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R11.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech Degree with Minor.
R11.5	Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, during the specified period. The total number of contact hours for these courses shall be 126 Hrs (42Hrs/course). The duration of a course shall be minimum 14 weeks. The remaining 8 credits could be acquired through two MOOCs recommended by the Board of studies and approved by the Academic Council.
R11.6	Curriculum and the syllabus of the four courses shall be approved by the Board of studies and the Academic Council.
R11.7	The assessment of the courses other than MOOCs and earning of credits shall be as per R6.1 to R6.23. The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R11.8	Under graduate Degree with minor shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech program and Minor in Engineering.
12. B. Tech (Honours)	
R12.1	All B. Tech students are eligible to register B.Tech (Honours). However, their mandatory CGPA at the end of eighth semester shall be 8.5 or higher to be eligible for the award of B. Tech (Honours).
R12.2	The B. Tech (Honours) registration shall be along with the registration of the 4th semester.
R12.3	If a student fails in any course including the course chosen for B. Tech (Honours), he/she shall not be eligible to continue the B.Tech(Honours). However, the additional credits thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R12.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech (Honours) Degree.

R12.5	Out of the 20 Credits, 12 credits shall be earned by undergoing minimum three specified B. Tech (Honours) Elective courses of the respective stream. Credits for the B. Tech (Honours) Elective courses are deemed to be earned only on getting at least a grade 'C' or better in the composite evaluation. A student shall not be permitted to select the normal elective courses of the respective B. Tech programs for attaining the credit requirements of B. Tech (Honours). The remaining 8 credits could be acquired through two MOOCs of the respective streams recommended by the Board of studies and approved by the Academic Council.
R12.6	The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R12.7	The institutions offering B. Tech Honours programs shall not charge any additional fee from the students.
R12.8	B. Tech (Honours) Degree shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech and B. Tech (Honours) programs.
	13. Grace Marks for Sports /Arts Competitions.
R13.1	Only bona-fide, regular candidates are eligible for the award of Grace Marks.
R13.2	The criterion for the award of Grace Marks is representing the University in officially sponsored national level competitions/championships/ tournaments when called upon to do so. The student shall get official prior permission from the University for representing the University.
R13.3	The maximum grace marks that can be awarded to a candidate in a particular semester for all activities put together shall be 5% of the aggregate maximum End Semester Examination marks of all theory courses for which the University conducts End Semester Examinations.
R13.4	The maximum grace marks that can be awarded to a student for a theory course in a particular semester for all activities put together shall not exceed 10% of the maximum aggregate marks of End Semester Examination of the course.
R13.5	The Grace Marks shall not be awarded to a student for Practical/ Lab/ Viva Voce/ internal assessment/ Seminar etc even though she/he fails for the same.
R13.6	Eligible Grace Marks shall be distributed equally on all theory papers/courses of an examination. However, re – distribution of Grace Marks shall be allowed only in the case of those courses of an examination for which the candidate has passed. Re-distribution is possible from passed courses to failed courses only. Re-distribution of Grace Marks is not permissible from failed courses to other courses for a pass.
R13.7	The Grace Marks shall be awarded for all theory papers/courses/subjects in a semester.
R13.8	Re- distribution shall be done only for enabling a candidate to obtain the minimum marks required for a pass.
R13.09	Grace Marks shall not be re – distributed from one semester to another semester.
R13.10	If the candidate does not secure the minimum marks required for a pass even after effecting re- distribution, eligible moderation fixed by the respective board if any, shall be awarded to that candidate in addition to the Grace Marks for a pass.
R13.11	Eligible Grace Marks shall be awarded for the regular examination of the performing semester only. Grace Marks shall not be awarded for supplementary examinations.

R13.12	The performing semester shall be considered from 1st July to 31st December (Odd semester) and 1st January to 30th June (Even Semester).
R13.13	Grace Marks shall be awarded on the basis of performance in the respective semester.
R13.14	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
R13.15	Only a single highest achievement during the period of a semester shall be considered for awarding the grace marks.
14.Grace Marks for Persons With Disability (PWD)	
R14.1	A person with disability means a person suffering from not less than 40% of any disability as certified by the District Medical Board. To be eligible for the grace marks, the certificate of disability specifying the percentage of disability shall be produced before the Principal at the time of admission.
R14.2	The Grace Marks that can be awarded for PWD candidates shall be 25% of the marks scored by the candidate in each course at the time of finalization of the results.
R14.3	Transfer of marks from one paper to another shall not be permitted. Fractions of marks if any, while computing the Grace Marks shall be rounded off to the next higher integer.
R14.4	PWD candidates who are eligible for Grace Marks shall be awarded Grace Marks for regular and supplementary chances until they pass the whole examination.
R14.5	Grace Marks shall be awarded only for the marks of the End Semester Examinations conducted by the University.
R14.6	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
15. Transitory provision.	
15.1	Notwithstanding anything contained in these regulations, the Vice-Chancellor shall, for a period of two years from the date of coming into force of these regulations, has the power to provide by order that these Regulations shall be applied to any B. Tech program with such modifications as may be necessary.

MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 3

April 2016

Subjects and Credits in Trimester 3

Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam duration (Hrs.)	Credits
31	Marketing Management II	4-0-0	40	60	3	3
32	Financial Management II	4-0-0	40	60	3	3
33	Human Resource Management	4-0-0	40	60	3	3
34	Business Research Methods	2-0-0	20	30	1.5	1.5
35	Management Information Systems	2-0-0	20	30	1.5	1.5
36	Operations Research	4-0-0	40	60	3	3
37	Strategic Management	4-0-0	40	60	3	3
38	Soft-Skills III	0-2-0	-	60	-	3
39	Project	0-0-3	-	-	-	-
	Total	24-2-3	240	420	-	21

Course No	Course Name	L-T-P	Credits	Year of Introduction
31	Marketing Management - II	4-0-0	3	2016

Course Objectives

The objective of this course is to equip the students with the concepts of Planning, designing and implementing marketing strategy to achieve the long-term objectives have been critical for any firm in a competitive market situation. This course seeks to develop the different analytical perspectives and management decision tools.

Syllabus

Promotion and Distribution Decisions, Marketing communications, Marketing Research,, Creating Competitive Advantage, Services Marketing, Rural Marketing,
Emerging Trends in Marketing

Expected Outcome

On completion of the course, the students are expected to understand the importance and role of marketing in a global environment, to understand the scope and process of marketing, to know the process of designing effective marketing strategies and to understand how marketing mix decisions are made and managed over time.

References

1. Arunkumar and N Meenakshi. *Marketing Management.*Vikas Publishing, 2011.
2. Etzel,MJ, BJWalker and William J Stanton. *Marketing (Fourteenth Edition).*McGraw Hill, 2007.
3. Evans, Joel R and Barry Berman. Marketing in the 21st Century.Cengage Learning, 2010.
4. Karunakaran, K.Marketing Management (Text and Cases). Himalaya Publishing House, 2010.
5. Kotler, Philip, et al. Marketing Management: A South Asian Perspective. Pearson, 2012.
6. Lamb, CharlesW, et al. Marketing. Cengage Learning India, 2012.
7. Masterson, Rosalind and David Pickton. Marketing: An Introduction. Sage Publications, 2014.
8. Neelamegham, S.Marketing in India: Text and Cases (4/e). Vikas Publishing House, 2012.
9. Panda, TapanK.Marketing Management: Text and Cases Indian Context. Excel Books India, 2009.
10. Pride, William M and OC Ferrel. Marketing: Planning, Implementation and Control. Cengage Learning, 2011.
11. Ramaswamy, VS and S Namakumari. Marketing Management: Global Perspective, Indian Context.Maxmillan Publishers, 2009.
12. Saxena, Rajan. Marketing Management (Fourth Edition).TataMcGraw Hill, 209.
13. Shahajan, S. Applied *Case Studies in Marketing.* Primus Books, 2011.

Course Plan – MARKETING MANAGEMENT - II

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Distribution Decisions- distribution channels - physical distribution systems- channel intermediaries - channel management -wholesaling and retailing - retail marketing - multi level marketing (network marketing)-Direct marketing: Meaning, features, functions, basic concepts of e-commerce, e-business, e-marketing, m-commerce, m-marketing, E-networking	8	25
II	Promotion Decisions: Promotion mix -integrated marketing communication - advertising – sales promotion - personal selling - publicity - public relations- Marketing communication: Concept of communication mix, communication objectives, steps in developing effective communication. Stages in designing message Advertising: Advertising objectives, Advertising budget, advertising copy, AIDA model, advertising agency decision	7	10
	FIRST INTERNAL EXAMINATION		
III	Sales promotion: Sales promotion mix, kinds of promotion, tools and techniques of sales promotion, push-pull strategies of promotion Public Relations: Meaning, objectives, types, functions of PR Marketing Research: Marketing Information System and Research - demand estimation and sales forecasting. Creating Competitive Advantage: Competitor Analysis - competitive strategies - competitive positions – balancing customer and competition orientations	8	10
IV	Marketing organization: Concept of marketing organization, factors influencing size of the marketing organization, various types of marketing structures / organization Marketing control systems: Organizing marketing department - marketing control techniques - annual plan control - profitability control - strategic control-Marketing audit: Meaning, features of marketing audit, various components of marketing audit	7	25
	SECOND INTERNAL EXAMINATION		
V	Services Marketing - Meaning- characteristics of services and their marketing implications - strategies for service firms - managing service quality - managing productivity - managing product support services - marketing mix for service marketing. Rural Marketing - Meaning - current Indian rural market scenario - scope - difficulties - strategies to cope up- case studies	8	10
	Emerging trends in marketing: social marketing – digital marketing - green marketing - global marketing – marketing analytics - Current developments in Marketing, Ethics in Marketing	**7**	20
	TRIMESTER EXAMINATION	**45**	

Course No	Course Name	L-T-P	Credits	Year of Introduction
32	Financial Management 2	4-0-0	3	2016

Course Objectives

This course enables the students to familiarize with management and analysis of financial performance, capital structure planning, dividend policy, working capital management and some of the emerging areas in financial management.

Syllabus

The syllabus of the course includes financial performance, capital structure decisions, dividend policy, working capital management and some emerging areas in financial management.

Expected Outcome

This course will enable the students to have sound knowledge on performance analysis of firms, Capital Structure planning, dividend policy and Working capital management

References

1. Brealey, Richard A and Stewart CMyers. *Principles of Corporate Finance.* McGraw Hill India, 2012.
2. Brigham, Eugene F and Joel F Houston. Fundamentals of Financial Management (13/e). Cengage Learning, 2012.
3. Chandra, Prasanna Financial Management, Theory & Practice. Tata McGraw Hill, 2014.
4. Damodaran, Aswath. Corporate Finance: Theory and Practice (4/e). Wiley India, 2012.
5. Gitman, Lawrence J and Chad J Zutter. Principles of Managerial Finance (14/e). Pearson Education, 2007.
6. Kapil, Sheeba. Financial Management. Pearson Education India, 2010.
7. Khan, M Y and P K Jain. Financial Management: text, problems and cases. New Delhi: Tata Mc-Graw Hill, 2013
8. Kishore, Ravi M. Financial Management: Comprehensive Text Book with Case Studies (7/e). Taxmann Allied Services, 2009.
9. Kothari, Rajesh and Bobby Dutta. Contemporary Financial Management. McMillan Publishers, India, 2005.
10. Pandey, IM. Financial Management. Vikas Publishing House, 2009.
11. Reddy, G Sudarsana. Financial Management. Himalaya Publishing House, 2011.
12. Ross, Stephen, Randolf Westerfield and Bradford Jordan. Fundamentals of Corporate Finance, McGraw Hill, 2010.
13. Sharan, Vyuptakesh. Fundamentals of Financial Management. Pearson Education, 2012.
14. Srivastava, Rajiv and Anil Misra. Financial Management. Oxford University Press India, 2011.
15. Vanhome, James C. Financial Management and Policy (12/e). Pearson Education, 2002.
16. Vanhorne, James C and John M Wachowicz (Jr). *Fundamentals of Financial Management, (13/e).*Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester exams
I	Financial Performance Analysis: Trend analysis; Ratio analysis- liquidity ratios, leverage ratios, activity ratios, profitability ratios, , market capitalization ratios - Inter firm comparison - Common Size Statement – Comparative Statements and Trend Analysis.	9	20%
II	Capital structure planning - optimum capital structure - financial leverage, operating leverage and combined leverage -.	6	10%
First Internal Examination			
II	capital structure theories - net income approach - net operating income approach -Modigliani and Miller (MM) approach -traditional approach - Factors affecting Capital structure	7	15%
III	Dividend Policy - factors influencing dividend policy stable dividend policy-forms of dividend - cash dividend - bonus shares - stock split - buyback of shares – dividend policy and value of firms - models - Walter's model - Gordon's Model - MM Irrelevance Approach - the bird-in-the hand argument.	8	20 %
Second Internal Examination			
IV	Working capital management - concepts of working capital - issues in working capital management – operating cycle and determinants of working capital - estimation of working capital, Management of cash - management of the receivables, Inventory management - financing of working capital - trade credit - accrued expenses and deferred income - bank finance for working capital	9	20%
V	Emerging areas in Financial Management: Corporate restructuring, mergers and acquisition - Behavioural finance, and Financial engineering	6	15%
	Trimester Examination	45	

Course Objectives

This subject provides the key aspects of managing human resources in domestic and

Course No.	Course Name	L-T-P	Credits	Year of Introduction
33	Human Resource Management	4-0-0	3	2016

multi-national organizations, including a consideration of labour relations and diversity manage-ment issues. Topics include job analysis, planning, recruiting, selection, orientation, train-ing and development, performance appraisal, compensation and benefits, dispute resolution, and legal frameworks for both the non-union and union environments.

Syllabus

Evolution of HR, Definition- Meaning- objectives-differences between personnel management and HRM, Human Resource Acquisition, Analysis and Designing of Jobs, HR planning, Hu-man Resource Development, Compensation, Employee Relations

Expected Outcome

The students are expected to have critical skills required to manage human resources in a multitude of workplace environments. Students are expected to get basic knowledge about management of Human Resources and Industrial Relations.

References

1. Decenzo, David A and Stephen P Robbins. *Human Resource Management (11/e).* Wiley, 2013.
2. Dwivedi, R S. *A Text Book of Human Resource Management.* Vikas Publishing House, 2009.
3. Fisher, Cynthia D and Lyle F Schoenfeldt. *Human Resource Management (6/e).* Cengage Learning, 2006.
4. Gomex-Mejia, Luis R, David B Balkin and Robert L Cardy. *Managing Human Resources.* Person/Prentice Hall, 2009.
5. Kandula, Srinivas R. *Human Resource Management in Practice with 300 Models, Tech-niques and Tools.* PHI Learning, 2009.
6. Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* Cengage Learning, 2009.
7. lvancevich, John M. *Human Resource Management.* McGraw Hill, 2007.
8. Mamoria, C B and S V Gankar. *Personnel Management.* Himalaya Publishing House, 2009.
9. Pattanayak, Biswajeet. *Human Resource Management.* PHI Learning, 2005.
10. Rao, P Subha. *Essentials of Human Resource Management and Industrial Relations: (Text, Cases and Games).* Himalayan Books, 2011.
11. Rao, V S P. *Human Resource Management.* Excel Books, 2010.
12. Sanghi, Seema. *Human Resource Management.* Vikas Publishing, 2014.
13. Snell, Scott, George Bohlander and Veena Vohra. *Human Resource Management: A South Asian Perspective.* Cengage Learning India, 2010.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Evolution of HRM - Meaning and significance - differences between personnel management and HRM - Major functions of HRM - Line functions and staff functions - human capital management – Characteristics and qualities of HR Manager - Recent trends in HRM	6	10
II	Job Design, Work and Motivation - Job design and quality of work life, A conceptual model of job design, Job performance outcomes, Job analysis, Job designs: the result of job analysis. The way people perceive their jobs, Designing Job range: Job rotation and job Enlargement, Designing Job depth: Job enrichment and job design.	8	10
	First Internal Examination		
II	Pre-recruitment functions: Organizational structure - Analysis and Designing of Jobs - HR planning - Factors affecting HR Planning - HRP process - Requisites of a good HRP - Barriers to HRP Recruitment, selection and appointment: Meaning and significance of recruitment - Process of recruitment -Sources of recruitment - Cost-benefit analysis of recruitment - Process of selection - Difference between recruitment and selection - Selection techniques: tests, interviews and salary negotiation - Meaning and significance of appointment - Process of appointment - Induction and Placement.	12	20
III	Training and development: Meaning and significance of training and development - Process of training development - Training Need Analysis - Training Design – Training Implementation - Training evaluation - Methods of training: on-the-job and off-the-job methods	6	10
	Second Internal Examination		
IV	Performance Management: Meaning and significance of Performance Management - Types of performance appraisal system - Performance goal setting – Performance coaching and monitoring - Performance evaluation and performance feedback - Aligning performance outcome to career and succession planning Compensation and benefits: Meaning and significance - Components of Compensation - Factors affecting wages and salaries	7	10
V	Employee relations: Meaning and significance of employee relations - Employee relations in unionised and non-unionised organizations, participative management - Handling grievances, managing discipline, conducting domestic enquiry -	6	15
	Trimester Examination	45	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
34	Business Research Methods	2-0-0	1.5	2016

Course Objectives

The course objective is to familiarize the research methods used in decision making by managers. The subject aims to meet the challenge of the fast pace decision making environment, to provide the knowledge and skills a manager needs to solve business problems.

Syllabus

Introduction to Business Research, Definition - need for business research, types of research, formulating research hypothesis and research design, Sampling design, Research Variable-Identification and defining research problems, secondary and primary methods of data collection, Questionnaire construction, data analysis and drawing inferences

Expected Outcome

After the completion of the course, the students will be able to study business problems and find ways to solve them by collecting relevant data and analyzing it in the appropriate manner to reach valid and insightful results and conclusions. The students will become familiar with sampling methods, defining research hypotheses and testing them statistically.

References

1. Chawla, Deepak and Neena Sondhi. *Research Methodology: Concepts and Cases.* Vikas Publishing House, 2011.
2. Cooper, Donald R, Pamela S Schindler and J K Sharma. *Business Research Methods (11/e).* New Delhi: McGraw Hill Educaiton India, 2013.
3. Krishnaswamy, O R and M Ranganathan. *Methodology of Research in Social Sciences.* Himalaya Publishing House, 2011.
4. Levin, Richard I, et al. *Statistics for Management (7/e).* Pearson Education, 2012.
5. Malhotra, Naresh K. *Marketing Research: An Applied Orientation (6/e).* Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Business Research: Definition - need for business research - types of research - exploratory and conclusive - basic and applied research - qualitative research - general research process - identifying and defining research problem - literature survey - identification of key research variables - theoretical framework - formulating research hypothesis	5	20
II	Formulation of research design - sampling design – data collection and data editing - data analysis and interpretation - preparation of research report - research proposal framework - business research applications in marketing - human resource management - financial and accounting decisions - production and operations management - cross-functional areas - case studies	4	20
	First Internal Examination		
III	Measurement and scaling - concepts and operational definitions - nominal, ordinal, interval and ratio scales - comparative scales - paired comparison scales - rank order scaling - constant sum scaling - Q sort technique - non-comparative scales - Likert, Semantic Differential - Staple - criteria for good measurement - reliability - validity - sensitivity	3	20
IV	Data Collection: Sampling design - secondary and primary methods of data collection - probability and non-probability sampling methods - merits and demerits -Review of various sampling methods - determination of sample size - data collection and data editing - coding - categorization - handling unsatisfactory responses and missing values - questionnaire construction - type of questions - guidelines for questionnaire designing - questionnaire testing - other methods of data collection - observation - projective methods - goodness of fit of data -reliability and consistency - Cronbach's Alpha	5	20
	Second Internal Examination		
V	Data Analysis and Reporting: Data analysis – descriptive analysis of uni-variate and bi-variate data – parametric tests for hypotheses testing - z test - t test - ANOVA - introduction to MANOVA and ANCOVA; SEM - non-parametric tests for hypotheses testing - Chi-square - run test for randomness - one and two-sample sign tests - Mann-Whitney U test - Wilcoxon signed-rank test - Kruskal-Wallis test - Correlation and regression analysis - Multivariate analysis - dependency techniques: multiple regression - discriminant analysis - conjoint analysis inter-dependency techniques: Factor Analysis - Cluster Analysis	5	20
	Trimester Examination	22	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
35	Management Information Systems	2-0-0	1.5	2016

Course Objectives

The objective of this course is to acquaint the students with the role, functions and development of information systems at different levels of the organisation and to develop a broader understanding of the management and information technology systems.

Syllabus

Information systems, enterprise systems, types of information systems, E-business, decision making concepts, GDSS, Database concepts, DBMS, data warehousing, data mining, Cyber security, system development cycles.

Expected Outcome

On completion of this course, the students will have an understanding of systems thinking, and ability to analyse business situations from a systems perspective. They also get exposure to the various system concepts and terminologies.

References

1. Behl, Ramesh. *Information Technology for Management.* Tata McGraw Hill Education, 2009.
2. Laudon, Kenneth C and Jane P Laudon. *Management Information Systems: Managing the Digital Firm.* Pearson Education, 2013.
3. O'Brien, James and George Marakas. *Management Information Systems (10/e).* McGraw Hill, 2010.
4. Rainer, R Kelly, Brad Prince and Hugh J Watson. *Introduction to Information Systems (3/e).* Wiley, 2014.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	e-business- e-commerce- e-government e-Commerce models and strategies-Cases of successful e-Commerce companies Ethical and social issues with e-Commerce Impact of IT on business	5	20
II	Database concept, Advantages of DBMS, database types, Database models, data warehousing, data mining, data trends, Data Flow Diagram	4	20
	First Internal Examination		
III	Information Security and Control System Vulnerability-Wireless security challenges-Malwares-Cyber terrorism and Cyber crimes-Spoofing, phishing, sniffing, DOS attacks	4	20
IV	Ensuring wireless security, Encryption and public key infrastructure, Firewalls, Intrusion Detection systems and anti-virus software-Ensuring cloud security and mobile digital platform	4	20
	Second Internal Examination		
V	Enterprise Information systems-SCM, CRM, ERP. ERP-Benefits, Challenges, Trends, Big 5, ERP Implementation life cycle	4	20
	Trimester Examination	21	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
36	Operations Research	4-0-0	3	2016

Course Objectives

The objective of this course is to acquaint the students with the scope and applications of operations research in business and industry problems. This course exposes the students to the use of various scientific tools and models in OR for business analysis and better managerial decision making. Use of software in solving problems is expected.

Syllabus

Introduction, development of OR, Linear programming problems, Allocation models such as transportation, assignment, and travelling salesman problems, Decision theory, Game theory, queuing theory, project management and introduction to simulation.

Expected Outcome

The successful completion of this course will enable the students to generate mathematical models of business scenarios and to analyze the business situations. The students will become able to use different mathematical models and the solution procedures.

References

1. Hillier, F S, et al. *Introduction to Operations Research (9/e).* Tata McGraw Hill, 2011.
2. Ravindran, A and Don T Phillips. *Operations Research: Principles and Practice.* John Wiley & Sons, 1987.
3. Sharma, J K. *Operations Research: Theory and Applications (5/e).* New Delhi: Laxmi Publications, 2013.
4. Taha, Hamdy A. *Operations Research: An Introduction (9/e).* Prentice Hall, 2010.
5. Vohra, N D. *Quantitative Techniques for Management.* Tata McGraw Hill Education, 2015.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Operations Research: Origin and growth of OR, importance of OR in managerial decision making, scope & applications of OR, models and modelling in OR. Linear programming problems: Formulation of the problem, solution by graphical method & simplex algorithm, degeneracy in LPP. Case discussion	7	15
II	Allocation Problem models: Transportation problems: formulation, methods of finding initial solution (North West Corner Rule, Least Cost Method and Vogel's Approximation Method), test for optimality (MODI Method), unbalanced transportation problems, maximization transportation problem. Assignment problems: formulation, methods of solution, Hungarian method, multiple optimal solutions, unbalanced problems, maximization problems. Case analysis	8	20
	First Internal Examination		
III	Duality in LPP, revised simplex method, Sensitivity of optimal LP solutions, Integer programming problems, Gomory's cutting plane algorithm, introduction to branch and bound technique. Sequencing Problem: Johnson's Algorithm for *n* Jobs and Two machines, Two jobs and *m* - Machines Problems and *n* Jobs and *m* Machine problems.	6	10
IV	Decision theory: Concepts of decision making, decision making environments, Decision making under uncertainty - Decision making under risk, decision tree analysis. Case discussion. Dynamic Programming - Concepts, forward and backward recursion, solution to LPP by dynamic programming method.	9	20
	Second Internal Examination		
IV	Concepts of network analysis, project network models, Critical Path Method, PERT, project time-cost trade off, resource scheduling. Case discussion	5	10
V	Game Theory: Two person zero-sum game, saddle point games, principle of dominance, graphical solution. Replacement analysis: items that deteriorate over time, items that fail suddenly, optimum replacement policies for both cases. Stochastic models: Markov process, queuing model structure, Kendall Lee notation - M/M/1 queues - standard problems.	10	25
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
37	Strategic Management	4-0-0	3	2016

Course Objectives

- *Ability to recognize role and functions of Corporate board in strategic management*
- *Deeper understanding of the integrative nature of strategic management*
- *Learn to apply strategic planning models like Porter Model*
- *Understand the importance of environmental scanning in formulating strategy*
- *Identification and evaluation of the role of leadership, organizational structure and change-management in strategy-implementation*
- *Develop an integrated outlook on the role of accounting and finance, operations management and human resource management in developing strategy*

Syllabus

Basic concepts of strategic management, Concept of Strategy and the Strategy formation Pro-cess, Objectives and Goals - Corporate Governance and Social responsibility, Types of strate-gies, strategy formulation, Strategy Choic, Strategy review.

Expected Outcome

On completion of the course acquire the ability to generate and evaluate strategies in relation to a particular problem using real-world scenarios.

References

1. Hill, Charles W L and Gareth R Jones. *Strategic Management: An Integrated Approach.* Cengage Learning, 2012.
2. Kazmi, Azhar. *Strategic Management and Business Policy (3/e).* Tata McGraw Hill, 2008.
3. Parnell, John A. *Strategic Management: Theory and Practice.* SAGE Publications, 2013.
4. Wheelen, Thomas L and J David Hunger. *Strategic Management and Business Policy: Towards Global Sustainability.* Prentice Hall, 2012.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Basic concepts of strategic management - framework for strategic management, the Concept of Strategy and the Strategy formation Process - Stakeholders in business - vision, Mission and Purpose strategic management process - strategic management at the business level, functional level and corporate level - Constitution of Board – Role and functions of corporate board and top management in strategic management.	7	20
II	Objectives and Goals - Corporate Governance and Social responsibility Environmental Scanning- Analysing industry and competition - internal appraisal - External Environment - Porter's Five Forces Model-Strategic Groups Competitive Changes during Industry Evolution- Globalisation and Industry Structure - National Context and Competitive advantage Resources-Capabilities and competencies - core competencies-Low cost and differentiation Generic Building Blocks of Competitive Advantage- Distinctive Competencies Resources and Capabilities durability of competitive Advantage- Avoiding failures and sustaining competitive advantage concepts, techniques and cases.	8	20
	First Internal Examination		
III	Strategy formulation- Types of strategies - Integration, intensive, diversification, and defensive strategies - strategic analysis -The generic strategic alternatives - Stability, Expansion, Retrenchment and Combination strategies - Business level strategy- Strategy in the Global Environment– comparative cost analysis, portfolio analysis, operating and financial analysis. - Building and Re-structuring the corporation- Strategic analysis and choice - Environmental Threat and Opportunity Profile (ETOP) - Organizational Capability Profile - Strategic Advantage Profile - Corporate Portfolio Analysis - SWOT Analysis - GAP Analysis - Mc Kinsey's 7s Framework - GE 9 Cell Model - Distinctive competitiveness - Selection of matrix - Balance Score Card	10	20
IV	Strategy Choice-criteria and process-Routes for executing strategy. The implementation process, Designing organisational structure - Designing Strategic Control Systems, Resource allocation	5	10
	Second Internal Examination		
IV	Matching structure and control to strategy - Implementing Strategic change-Politics-Power and Conflict-Strategy implementation - Role of organizational structure, Culture and Leadership, Strategy and Social Responsibility.	5	10
V	Strategy review, evaluation and control- Auditing - Techniques of strategic evaluation & control-case study Matching structure and control to strategy-Using computers to evaluate strategies; Managing Technology and Innovation-Strategic issues for Non Profit organisations. New Business Models and strategies for Internet Economy	10	20
	Trimester Examination	45	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
38	Soft Skills III	0-2-0	3	2016

Course Objectives

The objective of this course is to enable students understand the importance communication in the corporate life via group discussions and live interviews. Be enabled to write technically adept resumes and cover letters. The course also aims to enable students to combat stress and manage and resolve possible conflicts.

Syllabus

Stress, Conflict management, Resume writing, Group Discussions, Interview skills

Expected Outcome

- *Enhancement of the holistic development of students and improvement of their employability skills.*
- *To develop strategies to manage stress*
- *To develop methods or perspectives to resolve conflicts*
- *To have hands-on group discussion and interview exposure in a simulated corporate environment*
- *To develop adept resume writing skills*

References

1. Bovee, Courtland, John Thill and Mukesh Chaturvedi. *Business Communication Today.* Pearson Education, 2009.
2. Monippally, Matthukutty M. *Business Communication Strategies.* Tata McGraw-Hill Pub-lishing Company Ltd. 2001

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Stress Management - Eustress and Distress - Causes of Stress - Impact of Stress -Managing Stress	4	2
II	Conflict - Goal Conflict - Cognitive Conflict - Intrapersonal and Interpersonal Conflict - Conflict resolution	4	6
III	Resume vs CV vs Biodata writing - Cover letter writing	2	6
IV	Group Discussion - Do's and Don'ts - Interview Skills - Giving and taking Interviews	4	6
V	Hands-on experience of Giving and Taking Interviews	8	10

MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 2

April 2016

Subjects and Credits in Trimester 2

Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam duration (Hrs.)	Credits
21	Organizational Behaviour II	4-0-0	40	60	3	3
22	Macro Economics	4-0-0	40	60	3	3
23	Marketing Management I	4-0-0	40	60	3	3
24	Operations Management	4-0-0	40	60	3	3
25	Financial Management I	4-0-0	40	60	3	3
26	Business Law	4-0-0	40	60	3	3
27	Soft-Skills II	0-2-0	20	-	-	-
28	Project	0-0-3	-	-	-	-
	Total	24-2-3	260	360	-	18

SECOND TRIMESTER SYLLABUS

Course No.	Course Name	L-T-P	Credits	Year of Introduction
21	Organizational Behaviour II	4-0-0	3	2015

Course Objectives

The course focuses on managing teams at work and the organization system as a whole. The objective is to understand how individuals, groups and whole organizations work together more effectively within the increasing pace of corporate change, dramatic restructuring and downsizing and advanced global competition.

Syllabus

Group Behaviour and Interpersonal Influence, Organizational Processes, Organizational Design, Change and Innovation, Emerging Aspects of Organizational Behaviour.

Expected Outcome

- Apply problem solving and critical thinking abilities to analyse the kinds of choices available for developing alternative organisational behaviour approaches in the workplace
- Form an appreciation of the complexities and uncertainties of organisational behaviour by examining your own role in the light of experience of real-time problem settings
- Demonstrate a developmental approach to personal and key skills of planning, review and feedback and verbal communication

References

1. Aswathappa, K. Organizational Behavior. Himalaya Publishing House, 2007.
2. Berg, Green. Behavior in Organizations. New Delhi: Pearson, 2013.
3. Chandran, Jit S. *Organizational Behavior.* New Delhi: Vikas Publishing House, Third Edition.
4. David, Johnson J. *Organizational Communication Structure.* Ablex Publishing, 1993.
5. Dwivedi, R. S. *Human Relations & Organizational Behavior: A Global Perspective.* Delhi: Macmillan India, 2001.
6. Luthans, Fred. *Organisation Behaviour.* New Delhi: McGraw Hill Education, 2011.
7. McShane, Steven Lattimore, Mara Olekalns and Tony Travaglioni. *Organizational Behavior: Emerging Knowledge, Global Insights.* McGraw Hill, 2012.
8. Newstorm, John W and Keith Davis. *Organizational Behavior: Human Behavior at Work.* New York: McGraw-Hill, 2014.
9. Poertner, Shirley and Karen Massetti Miller. *The art of giving and receiving feedback.* Coastal Training Technologies, 1996.
10. Robins, Stephen P. *Organization Behaviour.* New Delhi: Pearson Education, 2012.
11. Sanghi, Seema. *Essentials of Organisational Behaviour.* New Delhi: Pearson, 2010.
12. Sekaran, Uma. *Organizational Behavior.* New Delhi: McGraw-hill, 2004.
13. Werner, David. *Managing Company-wide Communication.* Chapman & Hall, 1995.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Social systems and organizational culture - Understanding a Social System, Social Culture, Role, Status, Organizational culture, Influencing culture change, Sustaining the culture, Characteristics of effective socialization	7	20
II	Managing the Organization System: Effects of organization culture on employee performance - creating and sustaining organization culture - Management of Change: forces responsible for change - resistance to change overcoming resistance to change - planned change – approaches to manage organization change -OD inventions- creating a culture for change - Learning Organizations	10	20
	First Internal Examination		
III	Empowerment and Participation- The nature of empowerment and Participation- How participation works- Programs for participation-Important considerations in participation- Assertive Behaviour: Interpersonal Orientations- Facilitating smooth relations- Stroking	6	10
IV	Managing misbehaviour - The emergence in Management of the study of misbehaviour, Selected misbehaviours; work stress and its management - Stress and Counselling - What is stress?, Stress model, Work stressors, Stress outcomes, Stress moderators, Stress prevention and management,	9	20
	Second Internal Examination		
IV	Employee counselling, Types of counselling-Ethical decision making in organisations: Factors that inhibit or facilitate ethical decision making in organizations, Steps to ensure ethical decisions	6	10
V	Global implications of organizational behavior: International setting for the management criteria - planning, organizing, staffing, controlling and leading; Cultural influences on international negotiations; managing multi-cultural teams; Organisational structure that connects organizational departments, functions and geography to achieve organizational goals; Impacts of globalization on organizational culture	7	20
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
22	Macro Economics	4-0-0	3	2015

Course Objectives

This subject provides the macro economic environment at national as well as global level for managing business. The subject also provides an introduction to the determination of aggregate income and employment with an analysis of fiscal and monetary policy. Policy issues relating to overall aggregate demand management will be discussed.

Syllabus

Indian Economy and Business environment - Political and legal, economic, technological, International Business environments, Globalization and Indian business environment, Meauring the economy, business cycles, inflation, national income, economic and monetary policies. Industrial policies and structure, industry and inter-industry analysis.

Expected Outcome

On completion of the course the students will acquire knowledge about the linkages and functioning of macro-economic variables like aggregate income, aggregate demand and sup-ply, savings, investment and employment. They also will learn about aggregate output and price levels and general equilibrium, money, credit and dynamics of inflation, national in-come and sectoral contributions, business environment and the global scenarios.

References

1. Abel, Andrew B, Ben Bernanke and Dean Croushore. Macro Economics. Pearson, 2013.
2. Agarwal, Vanita. Macro Economics: Theory and Policy. Pearson Education India, 2010.
3. Bedi, Suresh. Business Environment. Excel Books, 2005.
4. Datt, Ruddar and KPM Sundharam. Indian Economy. S Chand, 2013 (70th Edition).
5. Femando, A C. Business Environment. Pearson, 2011.
6. Hall, Robert E and David H Papell. Macro Economics: Economic Growth, Fluctuations and Policy, Viva Books Private Limited, 2010.
7. Hill, Charles WL and Arun Kumar Jain. International Business: Competing in the Global Market-place. Tata McGraw Hill, 2009.
8. Kennedy, M and Maria John. Macro Economic Theory. PHI, 2011.
9. Leontief, Wassily. Structure of American Economy. Oxford University Press, 1951.
10. Mankiw, N Gregory. Principles of Macroeconomics. Cengage Learning, 2015.
11. Misra, SK and VK Puri. Economic Environment of Business (With Case Studies). Himalaya Publish-ing House, 2012.
12. Paul, Justin. Business Environment: Text and Cases. Tata McGraw Hill, 2010.
13. Vaish, M. C. Macro Economic Theory. Vikas Publishing House, 2009.
14. Wetherly, Paul and Dorron Otter. The Business Environment: Themes and Issues in a Globalizing World. OUP Oxford, 2014.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Indian Economy and Business environment: Nature and scope, Structure of the Business Environment- Internal and external environment Political and legal environment: Overview, philosophies, political system, judiciary Constitution of India Economic environment: Overview, Nature of Indian economy, Features of Indian economy, Changes in recent times Socio-cultural environment: Socio-cultural factors affecting business	7	15
II	Globalization and Indian business environment: Meaning and implications, phases, Globalization impact on Indian economy across sectors, Modes of entry strategies India's foreign trade policies: Recent developments, Global outsourcing, MNCs and FDIs in retail, infrastructure, pharma, insurance, banking & finance, and automobile; Impact of WTO on India's foreign trade Technological environment: Technology and development, Integrating technology with business, India and global knowledge market	8	15
	First Internal Examination		
III	International Business Environment: Review of global economy, The global recession, Business environment in developed and developing countries International trade theories GATT and WTO: Agreements and implications International cultural aspects: Values and norms, religion and ethics, language, education, impact of cultural differences in business	6	15
IV	Measuring the economy: Basic economic concepts, Open and closed economies, Primary, secondary and tertiary sectors and their contribution to the economy, SWOT analysis of the Indian economy, Measuring GDP and GDP growth rate, Components of GDP Business Cycle: Features, Phases, Economic time series, Economic indicators, Correlation, persistence, coherence Inflation: Types, Measurement, Kinds of price indices Employment and unemployment rates: Measurement National income: Estimates, Trends, Measurement, Problems in measuring National income	8	20
	Second Internal Examination		

IV	Industrial policies and structure: Leontief's inter-industry analysis, Planning, Problems in industrial development during the plan period, classification of industries based on ownership, Industrial policies, Industrial strategy for the future, New industrial policy 1991 Structure of Indian Industry: Public and private sector enterprises, Objectives of PSUs, Performance and short-comings, Private sector - growth, problems and prospects, SSI - Role of Indian economy, Disinvestments in Indian public sector units since 1991 Industry analysis: Textiles, Electronics, Automobile, FMCG, Telecom and Pharma sectors	7	15
V	Economic Policies: Privatization-problems and prospects Fiscal policy: Objectives, instruments, Union budget, Reforms-Rajah Chelliah Committee Recommendations, Taxes, Role of Government Monetary Policy: Money, Measures of money supply, Monetary system in India, Monetary policy -Tools for credit control, Structure of the banking system, RBI and its functions, Banking structure reforms - Narasimham Committee recommendations	8	20
	Trimester Examination		

Course No	Course Name	L-T-P	Credits	Year of Introduction
23	Marketing Management I	4-0-0	3	2015

Course Objectives

The objective of this course is to equip the students with the concepts and practices of modern marketing and to provide the understanding of different marketing processes for an effective decision making. The course also aims to develop the students' skills in applying the analytic perspectives, decision tools, and concepts of marketing to decisions involving segmentation, targeting and positioning; product offering; pricing; distribution channels and marketing communications

Syllabus

Introduction to Marketing Management, Marketing environment, Strategic Marketing Planning, Consumer Behaviour, Segmenting ,Targeting, Positioning and Branding, Life cycle Strategies, Product Decisions, Pricing Decisions.

Expected Outcome

On completion of the course, the students are expected to be familiar with the basic concepts and components of the marketing management and to be knowledgeable in marketing principles and thus enable them to make marketing decisions.

References

1. Arunkumar and NMeenakshi. *MarketingManagement.*Vikas Publishing, 2011.
2. Etzel,MJ, BJWalker andWilliam J Stanton. *Marketing (Fourteenth Edition).*McGraw Hill, 2007.
3. Evans, Joel R and Barry Berman. *Marketing in the 21st Century.*Cengage Learning, 2010.
4. Karunakaran, K.*MarketingManagement (Text and Cases)*. Himalaya Publishing House, 2010.
5. Kotler, Philip, et al. *MarketingManagement: A South Asian Perspective.* Pearson, 2012.
6. Lamb, CharlesW, et al. *Marketing.* Cengage Learning India, 2012.
7. Masterson, Rosalind and David Pickton. *Marketing: An Introduction.* Sage Publications, 2014.
8. Neelamegham, S.*Marketing in India: Text and Cases (4/e).* Vikas Publishing House, 2012.
9. Panda, TapanK.*MarketingManagement: Text and Cases Indian Context.* Excel Books India, 2009.
10. Pride, William M and OC Ferrel. *Marketing: Planning, Implementation and Control.* Cengage Learning, 2011.
11. Ramaswamy, VS and S Namakumari. *MarketingManagement: Global Perspective, Indian Context.* Maxmillan Publishers, 2009.
12. Saxena, Rajan. *MarketingManagement (Fourth Edition).*TataMcGraw Hill, 209.
13. Shahajan, S. *Applied Case Studies inMarketing.* Primus Books, 2011.

Course Plan – MARKETING MANAGEMENT - I

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Concept - nature and scope of marketing - evolution - Marketing vs selling concept – Consumer need, want and demand concepts Marketing environment: Micro and macro environment of marketing – marketing challenges in the globalized economic scenario	8	20
II	Consumer Behaviour: Consumer and business markets – buying motives – stages involved in buying decision process - factors influencing buying decision – types of consumer buying decisions – organizational buying vs household buying – changing pattern of consumer behavior	6	15
	FIRST INTERNAL EXAMINATION		
III	Market segmentation, targeting, positioning and branding. Segmentation – Meaning, factors influencing segmentation, market aggregation, basis for segmentation, segmentation of consumer and industrial markets.	8	25
	Targeting – Meaning, basis for identifying target consumers, target market strategies. Positioning – Meaning, Product differentiation strategies, tasks involved in positioning Branding – Concepts of branding, brand types, brand equity, branding strategies	8	10
	SECOND INTERNAL EXAMINATION		
IV	Marketing decisions, Product Decisions: Concept of product - product line and product mix - new product development- diffusion process - Product Lifecycle – product mix strategies, merchandise planning and strategies - product vs strategies	8	10
V	Pricing Decisions: - Pricing concepts, factors influencing price decisions - pricing strategies: value based, cost based, market based, new Packaging / Labeling: Packaging as a marketing tool, role of labeling in packaging product pricing - Price skimming & penetration pricing	**7**	20
	TRIMESTER EXAMINATION	**45**	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
24	Operations Management	4-0-0	3	2015

Course Objectives

This subject aims to impart to the students:

- *Ability to analyze the manufacturing operations of a firm*
- *Learn to understand and apply sales and operations planning, MRP and lean manufacturing concepts*
- *Deeper understanding on quality management tools for process improvement*

Syllabus

Scope of Operations Management, Evolution of OM, productivity Management, Forecasting - features of good forecast - classification of forecasting techniques, inventory management, Capacity Planning, Design capacity and Effective capacity, Location Planning, World Class Manufacturing Concepts, MRP, MRP II, quality concepts.

Expected Outcome

After the successful completion of the course the students will have the ability to analyze manufacturing operations of a firm, understand and apply sales and operations planning, understand supply chain operations and the basic understanding on process improvement techniques.

References

1. Adam, Everette E and Ronald J Ebert. *Production and Operations Management: Concepts, Models, and Behavior.* PHI, 2010.
2. Aswathappa, K and Sridhara Bhat. *Production and Operations Management.* Himalaya Publishing House, 2010.
3. Bozarth, Cecil. *Introduction to Operations and Supply Chain Management (3/e).* Pearson, 2011.
4. Chase, Richard B. *Operations Management for Competitive Advantage.* Tata McGraw Hill, 2004.
5. Chunawala, S A. *Basics of Production and Operations Management.* Himalaya Publishing House, 2001.
6. Finch, Byron J. *Operations Now: Supply Chain Profitability and Performance.* McGraw Hill, 2007.
7. Gaither, Norman G and Greg Frazier. *Operations Management.* Cengage Learning, 2002.
8. Garg, Ajay K. *Production and Operations Management.* Tata McGraw Hill, 2012.
9. Hill, Terry. *Operations Management.* Palgrave Macmillan, 2006.
10. Kachru, Upendra. *Production and Operations Management.* Excel Books, 2007.
11. Mahadevan, B. *Operations Management: Theory and Practice.* Pearson Education India, 2010.
12. Russell, Robert S and Bernard W Taylor. Operations Management: Along the Supply Chain (6/e). Wiley India, 2009.
13. Stevenson, William J. *Operations Management.* McGraw Hill, 2011.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Operations Management: Production-systems concept, transformation process, difference between products and services, 5P's and 9M's of OM, Operations as service. Evolution of OM - Craft, Mass and Lean Production. Operations strategy: Operations strategy in manufacturing, Operations strategy in services Process Analysis: Process Flowcharting, Types of process, process performance metrics	7	20
II	Employee productivity: Productivity and the organization, variables affecting labour productivity, Capacity- capacity utilization Work study-Method study-work measurement techniques Quality: Total Quality Management Defined Malcolm Baldrige National Quality Award, Quality Specifications, Costs of Quality, Continuous Improvement, SPC Tools, Benchmarking, Fail-safing ISO 9000, six sigma-Mumbai Dabbawallas	8	15
	First Internal Examination		
III	Materials management-Stores management, maintenance management, Inventory management, types of inventory, classification - ABC analysis, VED analysis, FSN analysis, HML analysis, Inventory costs, inventory models - EOQ, safety stocks, Re-order point, Problems in Basic EOQ model.	9	15
IV	Managerial use of Break-even analysis and make or buy Decisions Facility planning and plant layout, cellular manufacturing Supply Chain strategy: Elements of supply chain - Measuring supply chain performance, bull whip effect, outsourcing, mass customisation	6	15
	Second Internal Examination		
V	Master Production Scheduling (MPS), Materials Requirement Planning (MRP), Manufacturing Resource Planning (MRP II), Rough Cut Capacity Planning (RCCP), ERP. Contributions of Japanese Manufacturing - Kanban, Kaizen, Poka Yoke, JIT, 5S - TPS - Lean Manufacturing	8	20
V	World Class Manufacturing: Principles of WCM- Computer Integrated Manufacturing, Flexible Manufacturing Systems, Group Technology and Cellular Manufacturing, Quick Response manufacturing, concurrent engineering	7	15
	Trimester Examination		

Course No	Course Name	L-T-P	Credits	Year of Introduction
25	Financial Management I	4-0-0	3	2015

Course Objectives

The objectives of this course are to familiarise with fundamentals of financial management in an organization, Time value of money, risk Management, various sources of financing business investment, cost of capital and investment decisions

Syllabus

Introduction, meaning and goals, concept of time value, risk & return, various sources of financing business investments, concepts of cost of capital and criteria for investment decisions

Expected Outcome

The course expects that the students will become proficient in the following areas of financial Management

- Basic functions and goals of financial management
- Risk & return of projects
- Sources of finance
- Investment decision making criteria

References

1. Brealey, Richard A and Stewart C Myers. *Principles of Corporate Finance.* McGraw Hill India, 2012.
2. Brigham, Eugene F and Joel F Houston. *Fundamentals of Financial Management (13/e).* Cengage Learning, 2012.
3. Chandra, Prasanna *Financial Management, Theory & Practice.* Tata McGraw Hill, 2014.
4. Damodaran, Aswath. *Corporate Finance: Theory and Practice (4/e).* Wiley India, 2012.
5. Gitman, Lawrence J and Chad J Zutter. *Principles of Managerial Finance (14/e).* Pearson Education, 2007.
6. Kapil, Sheeba. *Financial Management.* Pearson Education India, 2010.
7. Khan, M Y and P K Jain. *Financial Management: text, problems and cases.* New Delhi: Tata Mc-Graw Hill, 2013
8. Kishore, Ravi M. *Financial Management: Comprehensive Text Book with Case Studies (7/e).* Taxmann Allied Services, 2009.
9. Kothari, Rajesh and Bobby Dutta. *Contemporary Financial Management.* Mcmillan Publishers, India, 2005.
10. Pandey, IM. *Financial Management.* Vikas Publishing House, 2009.
11. Reddy, G Sudarsana. *Financial Management.* Himalaya Publishing House, 2011.
12. Ross, Stephen, Randolf Westerfield and Bradford Jordan. *Fundamentals of Corporate Finance,* McGraw Hill, 2010.
13. Sharan, Vyuptakesh. *Fundamentals of Financial Management.* Pearson Education, 2012.
14. Srivastava, Rajiv and Anil Misra. *Financial Management.* Oxford University Press India, 2011.
15. Vanhome, James C. *Financial Management and Policy (12/e).* Pearson Education, 2002.
16. Vanhorne, James C and John M Wachowicz (Jr). *Fundamentals of Financial Management, (13/e).*Pearson Education, 2010.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester exams
1	Business Finance: Meaning and scope - objectives of financial management - Financial goal - profit maximization and wealth maximization - finance functions – role of finance manager - interface of financial management with other functional areas	6	15%
2	Concept of value and return - Time Value of money: Future value of single cash flow & annuity, present value of a single cash flow, annuity & perpetuity, Simple interest & compound interest, capital recovery & loan amortization Risk & Risk management, Definition, Computation, Types of risk, Beta , Computation of beta, Application of Beta	9	20%
First Internal Examination			
3	Sources of Finance - Primary market, Secondary market - long term, short term, and medium term funds – equity shares - preference shares - debentures and bonds - retained earnings - institutional borrowings - public deposits- lease financing - venture capital investing – commercial paper -Warrants - Angel investing - Private equity, Warrants and convertibles	6	15%
4	Cost of capital: Basic concepts - Cost of debenture capital, cost of preferential capital, cost of term loans, cost of equity capital (Dividend discounting and CAPM model), Cost of retained earnings, methods of computing cost of capital - Weighted average cost of capital (WACC) and Marginal cost of capital.	9	15%
Second Internal Examination			
5	Nature and types of investment decisions - capital budgeting process - selection of projects - estimation of cash flows - investment evaluation techniques - payback and discounted payback period - accounting rate of return NPV - IRR - capital rationing - project selection under rationing Capital Budgeting decisions under risk	15	35%
Trimester Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
26	Business Law	4-0-0	3	2015

Course Objectives

This subject provides an analysis of substantive law relevant to business. Topics include contracts, agency arrangements, credit transactions, and the relationship between the firm and its competitors, stockholders, customers, and other groups. The current legal scenario enveloping the Labour Laws, IPR, IT Act, Mergers & Acquisition, Arbitration & Conciliation Act etc. along with exploration of the judicial process and the current legal environment are examined. Throughout the subject emphasis is placed on the primary sources of law - cases and statutes

Syllabus

Sources of law, classification of law, mercantile law, legal procedures, features of contract, company law, negotiable instrument act, consumer protection act, Cyber laws and IPR laws, industrial laws.

Expected Outcome

After the successful completion of the course, the students will have the knowledge of law relevant to business contracts and also provide an insight to the issues associated with glob-alization, diversity, internet, intellectual property rights, limited liability business structures, company laws, negotiable instruments, to name a few areas which is undergoing tremendous changes in commercial laws

References

1. Bare Acts. *Government or Private Publications,* n.d.
2. Gulshan, S S and G K Kapoor. *Business Law Including Company Law (12/e).* New Age International, n.d.
3. Kapoor, N D. *Elements of Mercantile Law.* Sultan Chand & Sons, 2014.
4. Ramaiya. A Ramaiya. *Guide to the Companiees Act (18/e).* Lexis Nexis, 2014.
5. Sen, Arun Kumar and Jitendra Kumar Mitra. *Commercial Law (including company law) and Industrial Law.* World Press, 1977.
6. Wadhwa, Anirudh. Mulla: *Indian Contract Act (13/e).* Lexis Nexis, 2011.

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Sources of law - classification of law	2	5
II	Indian Contract Act 1872: Definition (Sec 2); Essential elements of a contract - offer, acceptance, considerations; Competency to enter in contracts (Sec 11 & 12); Consent - free consent, coercion, undue influence, fraud, misrepresentation, mistake (Sec 13-23); Legality of object & consideration; Types of contracts; Performance of contracts; Void agreement (Sec 24-30); Quasi contracts, discharges of contracts; Consequences of breach of contract (Sec 73-75) Bailment (S.148 - S.171 & S.180 & S.181) Pledge (S.173 - S.179) Indemnity & Guarantee (S.124, 125 128 - 147) Distinguish Indemnity & Guarantee Laws 0f Agency	8	20
III	Sale of Goods Act (1930)Â (Sec 2 - 11) Conditions and warranties; (Sec12 - 17, 59) Rights of an unpaid seller. (S.45 - S.58) Title to goods - (S.27 - 30) Rights & Duties of Buyer & Seller; (S.31 - 44)	6	10
	First Internal Examination		
III	The Companies Act 2013 Meaning, Definition & Characteristics of a company; Company distinguished from partnership; Kinds of companies; Types of Companies, Formation-S.3, Promoter, Remuneration, Rights & Liabilities of a Promoter, Memorandum of Association (S.4,S.10, S.13), Form, Purpose, Clauses, Alteration. Articles ofAssociation (S.5, S.10, S.14,) Provisions for Membership, Share capital etc., Contents, Form, Purpose, Clauses, Alteration, Procedure & Restrictions for Alteration, Distinction Between Memorandum & Articles Incorporation (S.7, S.9, S.12), Advantages & Disadvantages Prospectus - Public Offer S.25 - S.27, S.30 - S.40; Private Offer S.42. Kinds of shares S.43 44, Meetings & proceedings; S.173 -S.195 Directors S. 149 - 152, 164, 165. Boards powers and restrictions; S. 179, 180. Accounts & audit S.128 - 148. Lifting of Corporate Veil. Doctrine of Ultra Vires, Doctrine of Indoor management, Prevention of oppression &mismanagement S.241 Winding up of companies - Modes S.270, 271, 304. C.S.R. Meaning & Scope S.135. Mergers & Acquisitions - Meaning & Definition	10	30
IV	The Indian Partnership Act 1932 The Limited Liability Partnership Act 2008 Sole Proprietorship	6	10
	Second Internal Examination		

V	Consumer Protection Act 1986: Definitions, consumer dispute, deficiency, goods manufacturer, restrictive trade practices, service, unfair trade practices; Central Consumer Protection Council, State Consumer Protection Council; Consumer Redressal Forum.	4	5
	Negotiable Instruments Act 1881 Meaning and characteristics of negotiable instrument; Presumption; Promissory Notes, Bills of Exchange & Cheques; Negotiation (Sec 46 to 60); Crossing of cheque & dishonour of cheque (Sec 138 to 142)	4	5
	Law of Intellectual Property Rights - An Overview The Copy Rights Amendment Act 2012 The Trademarks Amendment Act 2010 The Designs Act 2000 The Patents Amendment Act 2005 The Information Technology Act	4	10
	Trimester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
27	Soft Skills II	0-2-0	-	2015

Course Objectives

The objective of this course is to enable students to understand what 'personality' means, understand the different kinds of personalities, to develop public speaking skills, time management and team work to prepare for the corporate life while getting the grip on basics of emotional intelligence for applying all throughout one's life

Syllabus

Personality, Self-motivation, time management, team work, emotional intelligence

Expected Outcome

1. *Enhancement of the holistic development of students and improvement of their employability skills.*
2. *To develop emotional intelligence*
3. *To develop professionals with idealistic, practical and moral values.*
4. *To develop time management skills*
5. *To get over the fear of public speaking*

References

1. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
2. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata Mc Graw Hill.
3. The Emotionally Intelligent Manager - David R. Caruso, Peter Salovey

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Definition of Personality - Determinants of Personality - biological, psychological and socio- cultural factors - Misconceptions and clarifications - Need for personality development	4	2
II	Time Management - definition - importance - functions Using to-do lists - procrastination - delegating effectively	4	6
III	Concept of team in work situation, promotion of team spirit, characteristics of team player - Awareness of one's own leadership style, performance and qualities	4	10
IV	Emotional Intelligence : what it means - role and benefit - awareness of emotions in self and others - and management of emotions in ourselves and in others (Use of EI tests to assess)	4	10
V	Public Speaking - Prepared Speech by students for 5 minutes	6	12

MASTER OF BUSINESS ADMINISTRATION

Programme
Under

APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

Trimester 1

April 2016

Subjects and credits in TRIMESTER I

Exam Slot	Course No.	Course Name	L-T-P	Internal Marks	End Trimester Marks	Exam Duration (hours)	Credits
	11	Quantitative Techniques	4-0-0	40	60	3	3
	12	Organizational Behaviour I	4-0-0	40	60	3	3
	13	Managerial Economics	4-0-0	40	60	3	3
	14	Business Communication	4-0-0	40	60	3	3
	15	Accounting for Managers	4-0-0	40	60	3	3
	16	Business and Society	4-0-0	40	60	3	3
	17	Soft-skills I	0-2-0	20			
	18	Project	0-0-3				
		TOTAL	24-2-3	260	360		18

FIRST TRIMESTER - SYLLABUS

Course No.	Course Name	L-T-P	Credits	Year of Introduction
11	Quantitative Techniques	4-0-0	3	2015

Course Objectives

This subject introduces the methods of statistical analysis for managerial decision making. The subject will provide a concise review of probability, descriptive statistics, random variables, and probability distributions. Application topics include statistical decision theory, confidence intervals, hypothesis testing, simple and multiple regression, correlation analysis and analysis of variance.

Syllabus

Random variables, Descriptive Statistic, Probability Distributions and Estimation, Testing of Hypothesis, Correlation and Regression Analysis

Expected Outcome

The successful completion of this course will impart the basic data analysis skills to the students. This will enable students to model business problems and analyse them with the help of fundamental statistical and theoretical backgrounds.

References

1. Richard I. Levin, David S. Rubin, *Statistics for Management*, Pearson Education, New Delhi 7th Edition, 2011.
2. Aczel A.D. and Sounderpandian J., *Complete Business Statistics*, 6th edition, Tata McGraw – Hill Publishing Company Ltd., New Delhi, 2012.
3. Ken Black, *Applied Business Statistics*, 7th Edition, Wiley India Edition, New Delhi, 2012.
4. Anderson D.R., Sweeney D.J. and Williams T.A., *Statistics for Business and Economics*, 11th edition, Thomson (South – Western) Asia, Singapore, 2012.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	*Random variables:* Random experiment – outcomes - sample space and events - definitions of probability (classical, relative frequency, subjective, and axiomatic) - addition rule - conditional probability - multiplication theorem – Bayes' theorem	9	15
II	*Descriptive Statistics:* Data presentation using tables & charts - measures of central tendency - measures of dispersion – absolute & relative measures – skewness - Karl Pearson's and moment measures of Skewness – Kurtosis	6	15
	First Internal Examination		
III	*Probability Distributions and Estimation:* Discrete and continuous distributions - Binomial, Poisson & Normal distributions - sampling techniques - sampling distribution of means and proportions - central limit theorem – statistical inferences - estimation - point and interval estimates for population parameters of large and small samples – confidence interval - determining the sample size.	8	15
IV	*Testing of Hypothesis:* Null & Alternative Hypotheses - level of significance - Type I & Type II errors - small sample & large sample tests - tests for quantitative & qualitative data - Hypothesis tests for difference of means & proportions for large & small samples.	7	15
	Second Internal Examination		
IV	One way & two way ANOVA for testing the difference of means of more than two samples – chi-square test for several proportions, association of attributes – goodness of fit test.	6	15
V	*Correlation and Regression Analysis:* Correlation - different types of correlation – Karl Pearson's correlation coefficient - Spearman's Rank correlation coefficient – concurrent deviation method – coefficient of determination - regression analysis - line of best fit - least square method - business applications - multiple regression. Use of statistical packages in hypothesis testing, correlation and regression analysis	9	25
	Final Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
12	Organizational Behaviour I	4-0-0	3	2015

Course Objectives

The course focuses on managing individuals at work. The objective is to equip the students with an essential knowledge base on behavioural dynamics of individuals with necessary models,, tools, and techniques, for diagnosing, predicting and controlling human behaviour and to develop the basic human relations skills as a prospective manager.

Syllabus

Fundamentals of Organizational Behaviour, Understanding Organizational Behaviour, Effectiveness in organizations, Social systems and organizational culture, Understanding and Managing Individual Behaviour, Job Design, Work and Motivation, Evaluation, Feedback and Rewards, Stress and Counselling.

Expected Outcome

On completion of the course, the students are expected to enable the students to learn what actions are appropriate for different situations and apply the theory in order to be effective leaders in the context of organisational behaviour theories, models and concepts

References

1. Robbins, Judge & Sanghi, *Organizational Behaviour,* 12th Ed. Prentice Hall India
2. McShane, Glinow, *Organizational Behaviour*, Tata McGraw Hill
3. Don Hellriegel; John W. Slocum; Richard W. Woodman, *Organizational Behavior*, 8th Ed., Thomson South-Western

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	Disciplines contributing to OB - Psychology, Sociology, Anthropology, Social Psychology, Economics & Political Science Approaches to the study of OB - Human Resource Approach, Contingency Approach, Productivity Approach, and System Approach - Fundamental principles, theories and concepts in organization design and development	9	20
II	Understanding Organizational Behaviour - Fundamental Concepts, Organizational processes, Organizational structure, Organizational Change and Innovation processes - Effectiveness in organizations - Models of Organizational Behaviour, Systems theory and time dimension of effectiveness, Developing competencies, Limitations of Organizational Behaviour, Continuing challenges	6	15
First Internal Examination			
III	Individual differences and work behaviour - Why individual differences are important, The basis for understanding Work Behaviour, Individual differences influencing Work Behaviour. Personality - Sources of personality differences, Personality structure, Personality and Behaviour, Measuring Personality Attitudes - The nature of Employee Attitudes, Effects of Employee Attitudes, Studying Job satisfaction, Changing Employee Attitudes. Perceptions, Attributions and Emotions - The perceptual process, Perceptual grouping, Impression management, Emotions, Emotional Intelligence - Motivation - Concept of Motivation, Content approaches, Process approaches, Motivation and psychological contract	15	30
IV	Managing Individuals at Work: Measuring personality attitudes; managing employee attitudes Managing Teams at Work: Definition of Group - group development- group structure - teams -Formal Organization and Informal Groups and their interaction	5	10
Second Internal Examination			
IV	Developing high performance teams - turning individuals into team players developing interpersonal awareness - Johari Window- Transactional Analysis - leadership - theories – developing leadership skills	4	10
V	Managing Power, Politics and Conflict: Power - basis of power - power tactics - Politics – consequences of political behavior - Conflict Management: Different views of conflict - conflict process - levels of conflict - Constructive and Destructive conflict - Conflict process - strategies for encouraging constructive conflict - Conflict resolution strategies	6	15
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
13	Managerial Economics	4-0-0	3	2015

Course Objectives

Managerial economics is a prerequisite course for acquainting students with the various principles of business decision making. This subject provides an introduction to the logic of marginal analysis, the analysis and application of demand, cost analysis, and elements of demand and supply. The subject also provides an introduction to the determination of aggregate income and employment with an analysis of fiscal and monetary policy. Policy issues relating to overall aggregate demand management will be discussed. It will create awareness on the micro and macroeconomic environment and will help to increase decision making skills of the graduates.

Syllabus

Basic Concepts in Managerial Economics, Demand Analysis, production and cost of production, Market Structure and Pricing, Profit, break-even analysis, Budget and Basic Budgeting Concepts

Expected Outcome

The successful completion of the course, the students will have fundamental knowledge in the economic aspects of demand, pricing, and production. The candidates will be able to analyse business systems in terms of the economies it creates to firms. The course will enable them to become efficient managerial decision makers when economic aspects play important role.

References

1. Yogesh, Maheswari, *Management Economics*,PHI learning,NewDelhi,2012
2. D.M. Mithani*,Managerial Economics*, 5/e, Himalaya Publishing House,Mumbai,2011
3. Geethika, Ghosh & Choudhury, *Managerial Economics*, 2/e, McGraw Hill. 2011
4. David K.H. Begg, Rudiger Dornbusch, Stanley Fischer, *Economics,* McGraw-Hill Publishing Co. 2008
5. Uma Kapila*, Indian Economy since Independence*,Accademic Foundation,Gaziyabadh, 2011
6. Koutsoyiannis, *Modern Micro Economics,* 2/e, Macmillan Press Ltd. 2003

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	*Basic Concepts in Managerial Economics:* Definitions, concepts, role of managerial economist in business decision making. *Demand Analysis:* Demand curve and Demand function, laws of demand, elasticity of demand and its estimation, Total and Marginal Revenue, Classification of goods based on income elasticity of demand, Price Elasticity, Income Elasticity and Cross Elasticity, Demand forecasting and forecasting methods.	6	15
II	*Production and Cost of Production:* Production function, cost and output relationship, cost function in the short run and in the long run, cost concepts, practical applications of cost functions. Marginal Costing and applications. Indifference Curves, ISO-Quants & ISO-Cost line. Cost volume Profit analysis: economies of scale, economies of scope, economies and dis-economies of production, business cycle and its implications.	9	20
	First Internal Examination		
III	*Market Structure and Pricing:* Meaning, perfect competition, monopolistic competition, monopoly, oligopoly, cartel, types of cartels. Limit Price Theories of J.S Bain, Sylos-Labni, Behavioral model of Cyrit and March, managerial theories of firm, Baumol's Sales Revenue Maximisation, O. Williamson's model on managerial enterprise, Marri's model of balanced growth, Break even analysis and its implications. Use of a case discussion will enhance the understanding of the students about these topics.	6	15
IV	*Profit:* Determinants of Short-term & Long-term profits. Classification – Measurement of Profit. Break Even Analysis – Meaning, Assumptions, Determination of BEA, Limitations, Uses of BEA in Managerial decisions	9	20
	Second Internal Examination		
V	*Budget and Basic Concepts*: Meaning, basic concepts, plan and non-plan expenditure, fiscal deficit, revenue deficit, inflation and types, bank rate, SLR, CRR, repo, reverse repo, market operations, quantitative credit control, exchange rate management, monetary fiscal policy and practices in India, Quantity theory of money, Fischer – Keynes - Triedman - Tobin Theories. A case discussion is desirable in these topics.	15	30
	End Semester Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
14	Business Communications	3-0-1	3	2015

Course Objectives

The objective of this course is to enable students to develop proficiency in the mechanics of writing and oral communication. The course orients at helping the learner improve their English proficiency with specific reference to the organizational communication parlance.

Syllabus

Oral Communication, Written Communication, Crisis Management and Negotiation, Business Letters and Reports, Case Method of Learning.

Expected Outcome

- Be familiar with the basic concepts and mechanics of Oral and Written Communication.
- Students develop English proficiency and paves way for career growth and better employment prospects.
- Learners develop effective crisis management skills juxtaposed with Negotiation tactics and elements of Behaviour and conversation control.

References

1. Chaturvedi P. D, & Mukesh Chaturvedi, *Business Communication: Concepts, Cases And Applications,* 2/e, Pearson Education, 2011
2. Mary Ellen Guffey, *Business Communication: Process and Product,* 3/e, Cengage Learning, 2002.
3. Rayudu C. S, *Communication,* 9/e,Himalaya Publishing House, 2010.
4. Penrose, Rasberry, Myers, *Advanced Business Communication,* 5/e, Cengage Learning, 2004.
5. Madhukar R. K, *Business Communication,* 2/e, Vikas Publishing House, 2010.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	Introduction: Meaning & Definition, Role, Classification – Purpose of communication – Communication Process – Characteristics of successful communication – Importance of communication in Organizations– Communication structure in organization – Application of principles of Communication in conflict resolution, Crisis Management & Negotiation - Communication in a cross-cultural setting	8	20
II	Oral Communication: Meaning – Principles of successful oral communication – Barriers to communication – Conversation control – Reflection and Empathy: two sides of effective oral communication. Modes of Oral Communication. Listening as a Communication Skill, Non-verbal communication.	7	20
	First Internal Examination		
III	Written Communication: Purpose of writing – Clarity in writing – Principles of effective writing – Approaching the writing process systematically: The 3X3 writing process for business communication: Pre writing – Writing – Revising – Specific writing features – Coherence – Electronic writing process.	7	15
IV	Business Letters and Reports: Introduction to business letters – Types of Business Letters - Writing routine and persuasive letters – Positive and Negative messages Writing Reports: Purpose, Kinds and Objectives of reports – Organization & Preparing reports, short and long reports Writing Proposals: Structure & preparation. Writing; Meetings – Planning meetings – objectives – participants – timing – venue of meetings. Meeting Documentation: Notice, Agenda, and Resolution & Minutes.	8	20
	Second Internal Examination		
V	Case Method of Learning: Understanding the case method of learning – Different types of cases – Difficulties and overcoming the difficulties of the case method – Reading a case properly (previewing, skimming, reading, scanning) – Case analysis approaches (Systems, Behavioural, Decision, Strategy) – Analysing the case – Dos and don'ts for case preparation – Discussing and Presenting a Case Study	15	25
	Final Examination		

Course No.	Course Name	L-T-P	Credits	Year of Introduction
15	Accounting for Managers	4-0-0	3	2015

Course Objectives

The objective of this course is to familiarize the students with the accounting practices and to develop analytical and interpretative skills necessary to take managerial decisions

Syllabus

Introduction, Cost, Managerial and Financial accounting, meaning of company, maintenance of book of accounts, analysis of financial statements, fund flow and cash flow statements, ratio analysis, marginal cost analysis techniques

Expected Outcome

After successful completion of the course, the students will be able to understand the accounting practices, able to prepare and analyse financial statements to help managerial decision making.

References

1. Charles T. Horngren, Gary L. Sundem, William O. Stratton, Dave Burgstahler, Jeff Schatzberg, *Introduction to Management Accounting*, 14/e, Pearson Prentice Hall, 2008
2. Gupta R. L. and Radhaswamy M., *Advanced Accounting*, Sultan Chand Publishers, New Delhi
3. Maheshwari S. N., *Accounting for Management*, 3/e, Vikas Publishing House, New Delhi, 2012
4. Jain S. P. and Narang K. L., *Advanced Cost Accounting*, Kalyani Publishers, New Delhi
5. Shashi K. Gupta and R. K. Sharma, *Management Accounting*, Kalyani Publishers, New Delhi

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	**Introduction to Accounting:** Introduction to Financial, Cost and Management Accounting- Generally accepted accounting principles, Conventions and Concepts - Mechanics of Accounting - Double entry system of accounting.	5	10
II	**Meaning of Company** - Maintenance of Books of Account-Statutory Books- Profit or Loss Prior to incorporation- Final Accounts of Company - Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet of companies, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill.	10	20
First Internal Examination			
III	**Analysis of financial statement:** Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios - Inter firm comparison - Common Size Statement - Comparative Statements and Trend Analysis.	10	25
IV	**Analysis of Financial Statements:** Funds Flow Statement – Meaning - Concept of Gross and Net Working Capital - Preparation of Schedule of Changes in Working Capital -	5	15
Second Internal Examination			
IV	Preparation of Funds Flow Statement and its analysis - Cash Flow Statement - Various cash and non-cash transactions - flow of cash - preparation of Cash Flow Statement and its analysis.	5	10
V	Introduction, Meaning of Cost, Objective of Costing, Methods of Costing, Technique of Costing, Classification of Cost, Elements of Cost, Statement of Cost Sheet, Standard costing- organization and establishing a standard costing system, Variance analysis - classification of variances, material cost, labour cost, overhead cost and sales variances. Disposition of variances. Marginal Cost - Marginal Costing - applications of Marginal Costing - advantages of Marginal Costing - break-even analysis - CVP Analysis - margin of safety - key factor.	10	20
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
16	Business and Society	4-0-0	3	2015

Course Objectives

The objectives for this course are the following:

1. To develop broader and more complete understanding of the business and society relationship
2. To help the student perceive and understand the importance of sound business ethics practices in the effective functioning of organizations.
3. To comprehend major stakeholder groups which interact with business organizations and the kinds of expectations they may hold with respect to their role in business enterprise and society.
4. To understand major corporate social responsibilities of business:
5. Impact of the human activities on the environment

Syllabus

Business Environment, Economic Growth, CSR, Public private Partnerships, Privatization, Environmental Management, Sustainable Development

Expected Outcome

The successful completion of this course will impart an understanding of the relationship between business and society. This will enable students to perceive sound business ethics and social responsibilities of business.

References

1. John Steiner, George Steiner, *Business, Government and Society: A Managerial Perspective,* 13/e,McGraw-Hill Higher Education, 2011
2. John F. Steiner, *Business, Government, and Society: A Managerial Perspective, Text and Cases* 12/e, McGraw-Hill/Irwin, 2008.
3. Francis Cherunilam, *Business and Government*, HPH, 2013.
4. Fernando A. C, *Corporate Governance: principles, policies and practices,* 2/e, Pearson Edn., India, 2011.
5. Ghosh B. N, *Business Ethics and Corporate Governance*, McGraw Hill Education (India) Private Limited, 2011.
6. Bala Krishnamurthy, Environmental Management: Text and Cases, PHI, New Delhi.
7. *Arindita Basak, Environmental Studies, Pearson Education, New Delhi.*
8. *Justin Paul, Business Environment -Text and Cases, Tata McGraw Hill Education, New Delhi, 2010*

COURSE PLAN

Unit	Topics	Hours allotted	% of marks In final Exam.
I	Roles of Business, Government, and Society: Interdependence and Conflict, Regulation of Business, Functions of State; Economic roles of government; Government and legal environment; Poverty, Inequality and Economic Growth: Industrial Development, Rural- Urban Dynamics, Population and Development, Finance for Development	9	15
II	Business in a Global Environment: Business as Blending of People Technology and Ethical Behaviour, Achieving Business Success through Social Responsibilities. Trade and Development, State and the Market, Privatization and Regulation, Institutions and Growth.	7	15
First Internal Examination			
III	Public Private Partnerships: The Rationale for Public Private Partnerships, Different Kinds of Public Private Partnerships with a special emphasis on the Build Operate and Transfer Model (BOT). Issues in Regulation that come about with privatization, Pricing mechanisms available to a regulator to ensure universal access and efficiency, Discussion of the privatization experience in different sectors, water, electricity, telecommunication, and railways with a special emphasis on India.	10	25
III	Coping with Global Competition, Conflict with Nation States. Non-Governmental organizations (NGO) - impact on Indian rural development, education and charity. Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Indian perspective	8	15
Second Internal Examination			
IV	Environmental Management - Definition, scope, importance and need - Concept of Ecosystem: Kinds of Resources: Renewable and Non Renewable resources- forests, water, mineral, food, energy, land resources - Role and Impact of Humankind: Population and development- pollution-definition-kinds-effects-climate change	5	15
V	Sustainable Development: Concept, principles- social, economic and environmental dimensions- hurdles, Indicators-Millennium Development Goals- Environment Management Systems: EMS- planning, implementation – environmental audit- environmental labeling- insight into current developments in energy conservation-3Rs	6	15
Final Examination			

Course No.	Course Name	L-T-P	Credits	Year of Introduction
17	Soft Skills I	0-2-0	0	2015

Course Objectives

The objective of this course is to enable students have a basic knowledge of the recent developments in Information technology and its application in effective communication. The course also emphasize on personal grooming and development with due accentuation to soft skills development to transform the learners to employment ready youth.

Syllabus

Personal Grooming & Development, Presentation and Negotiation Skills, Levels of Public Interaction

Expected Outcome

1. Enhancement of the holistic development of students and improvement of their employability skills.
2. To develop inter personal skills and be an effective goal oriented team player.
3. To develop professionals with idealistic, practical and moral values.
4. To develop communication and problem solving skills.
5. To re-engineer attitude and understand its influence on behavior.

References

1. Penrose, Rasberry, Myers, *Advanced Business Communication*, 5/e, Cengage Learning, 2004.
2. Lehman, DuFrene, Sinha, *BCOM,* 2/e, Cengage Learning,2012
3. Madhukar R. K, *Business Communication,* 2/e, Vikas Publishing House.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final (T3) Exam.
I	Self-Management Self Evaluation-Self Discipline-Self Criticism-Recognition of one's own limits and deficiencies - Independency-Self Awareness- Attitude: Factors influencing Attitude, Challenges and lessons from Attitude.	4	2
II	Goal Setting : Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals	3	6
First Internal Examination			
III	Listening Skills : Listening to specific Information, identifying main issues, seeing beyond surface meanings	3	6
IV	Ethics and Etiquette-Business Ethics-Etiquette in social as well as Office settings-Email etiquette-Telephone Etiquette	4	6
Second Internal Examination			
V	Presentation Skills – Book Reviews and Summary writing	8	10
Final Examination			

CURRICULUM TEMPLATE FROM SEMESTERS I TO VIII

Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

Sl. No	Category	Code	Credits
1	Humanities and Social Sciences including Management courses	HMC	8
2	Basic Science courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Program Core Courses	PCC	66
5	Program Elective Courses	PEC	19
6	Open Elective Courses	OEC	9
7	Project work and Seminar	PWS	10
8	Mandatory Non-credit Courses (P/F) with grade	MNC	-----
9	Mandatory Student Activities (P/F)	MSA	2
	Total Mandatory Credits	**162**	
10	Value Added Course (Optional)	VAC	20

No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Semester-wise credit distribution shall be as below:

Sem	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Credits	17	21	22	22	23	23	15	17	160
Activity Points	50				50				---
MSA	2								2
G.Total									**162**

Basic Science Courses: Maths, Physics, Chemistry, Biology for Engineers, Life Science etc

Engineering science courses: Basic Electrical, Engineering Graphics, Programming, Workshop, Basic Electronics, Basic Civil, Engineering Mechanics, Mechanical Engineering, Thermodynamics, Introduction to ---- Engineering, Design Engineering, Materials Engineering etc.

Humanities and Social Sciences including Management courses: English, Humanities, Professional Ethics, Management-I, (Organizational Behaviour)/ Finance & Accounting, Economics etc

Mandatory non-credit courses: Environmental Science, Constitution of India/Essence of Indian Knowledge Tradition, Industrial Safety Engineering, disaster management etc.

Course Code and Course Number

Each course is denoted by a unique code consisting of three alphabets followed by three numerals like **E C L 2 0 1.** The first two letter code refers to the department offering the course. EC stands for course in Electronics & Communication, course code MA refers to a course in Mathematics, course code ES refers to a course in Engineering Science etc. Third letter stands for the nature of the course as indicated in the following table.

Code	Description
T	Theory based courses (other the lecture hours, these courses can have tutorial and practical hours, e.g., L-T-P structures 3-0-0, 3-1-2, 3-0-2 etc.)
L	Laboratory based courses (where performance is evaluated primarily on the basis of practical or laboratory work with LTP structures like 0-0-3, 1-0-3, 0-1-3 etc.)
N	Non-credit courses

Course Number is a three digit number and the first digit refers to the Academic year in which the course is normally offered, i.e. 1, 2, 3, or 4 for the B. Tech. Programme of four year duration. Of the other two digits, the last digit identifies whether the course is offered normally in the odd (odd number), even (even number) or in both the semesters (zero). The middle number could be any digit. ECL 201 is a laboratory course offered in EC department for third semester, MAT 101 is a course in Mathematics offered in the first semester, EET 344 is a course in Electrical Engineering offered in the sixth semester, PHT 110 is a course in Physics offered both the first and second semesters, EST 102 is a course in Basic Engineering offered by one or many departments. These course numbers are to be given in the curriculum and syllabi.

SEMESTER I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS (CALCULUS AND MULTI VARIABLE CALCULUS)	3-1-0	4	4
B 1/2	BSC	ENGINEERING PHYSICS	3-1-0	4	4
	BSC	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	ESC	ENGINEERING MECHANICS	2-1-0	3	3
	ESC	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	ESC	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	ESC	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	MNC	LIFE SKILLS	2-0-2	4	--
S 1/2	BSC	ENGINEERING PHYSICS LAB	0-0-2	2	1
	BSC	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESC	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESC	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**23/24 ***	**17**

*Minimum hours per week

SEMESTER II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS (DIFFERENTIAL EQUATION AND LINEAR ALGEBRA)	3-1-0	4	4
B 1/2	BSC	ENGINEERING PHYSICS	3-1-0	4	4
	BSC	ENGINEERING CHEMISTRY	3-1-0	4	4
C 1/2	ESC	ENGINEERING MECHANICS	2-1-0	3	3
	ESC	ENGINEERING GRAPHICS	2-0-2	4	3
D 1/2	ESC	BASICS OF CIVIL & MECHANICAL ENGINEERING	4-0-0	4	4
	ESC	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	4-0-0	4	4
E	MNC	PROFESSIONAL COMMUNICATION	2-0-2	4	--
F	ESC	PROGRAMMING IN C	2-1-2	5	4
S 1/2	BSC	ENGINEERING PHYSICS LAB	0-0-2	2	1
	BSC	ENGINEERING CHEMISTRY LAB	0-0-2	2	1
T 1/2	ESC	CIVIL & MECHANICAL WORKSHOP	0-0-2	2	1
	ESC	ELECTRICAL & ELECTRONICS WORKSHOP	0-0-2	2	1
TOTAL				**28/29**	**21**

NOTE:

1. Engineering Physics and Engineering Chemistry shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics in SI and Engineering Chemistry in S2 & vice versa. Students opting for Engineering Physics in a semester should attend Physics Lab in the same semester and students opting for Engineering Chemistry in one semester should attend Engineering Chemistry Lab in the same semester.

2. Physics to be made separate for programs according to their requirements like
   Physics (Mechanics & Mechanics of Solids and Introduction to Quantum Mechanics): for AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY
   Physics (Waves and Optics, Electromagnetic and Solid State Mechanics): for AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA
   Physics Lab: Same syllabus for all courses
3. Engineering Mechanics and Engineering Graphics shall be offered in both semesters. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Mechanics in SI and Engineering Graphics in S2 & vice versa.
4. Basics of Civil & Mechanical Engineering and Basics of Electrical & Electronics Engineering shall be offered in both semesters. Basics of Civil & Mechanical Engineering contain equal weightage for Civil Engineering and Mechanical Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to branches of AEI, EI, BME, ECE, EEE, ICE, CSE, IT, RA can choose this course in S1.
   Basics of Electrical & Electronics Engineering contain equal weightage for Electrical Engineering and Electronics Engineering. Slot for the course is D with CIE marks of 25 each and ESE marks of 50 each. Students belonging to AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY can choose this course in S1. Students having Basics of Civil & Mechanical Engineering in one semester should attend Civil & Mechanical Workshop in the same semester and students having Basics of Electrical & Electronics Engineering in a semester should attend Electrical & Electronics Workshop in the same semester.

5. LIFE SKILLS
   Objective is to develop in the under-graduate students of engineering a level of communication competence. Coverage: Communication Skill, Critical Thinking & Problem Solving, Teamwork, Moral & Professional Values, Leadership Skills, Language Lab.

6. PROFESSIONAL COMMUNICATION
   Objective is to develop in the under-graduate students of engineering a level of competence in English required for independent and effective communication for their professional needs. Coverage: Listening, Barriers to listening, Steps to overcome them, Purposive listening practice, Use of technology in the professional world. Speaking, Fluency & accuracy in speech, Positive thinking, Improving self-expression, Tonal variations, Group discussion practice, Reading, Speed reading practice, Use of extensive readers, Analytical and critical reading practice, Writing Professional Correspondence, Formal and informal letters, Tone in formal writing, Introduction to reports. Study Skills, Use of dictionary, thesaurus etc., Importance of contents page, cover & back pages, Bibliography, Language Lab.

SEMESTER III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS	3-1-0	4	4
B	PCC/ESC	CORE/OTHER STREAM COURSE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PCC	CORE	3-1-0	4	4
E 1/2	ESC	DESIGN & ENGINEERING	2-0-0	2	2
	HMC	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC	SUSTAINABLE ENGINEERING	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M	VAC	Remedial/Minor course	3-1-0	4 *	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa. Professional ethics should include academic ethics, IPR etc.
2. *All Institutions shall keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.

SEMESTER IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	BSC	ENGINEERING MATHS	3-1-0	4	4
B	PCC/ESC	CORE/OTHER STREAM COURSE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PCC	CORE	3-1-0	4	4
E 1/2	ESC	DESIGN & ENGINEERING	2-0-0	2	2
	HMC	PROFESSIONAL ETHICS	2-0-0	2	2
F	MNC	CONSTITUTION OF INDIA	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**30**	**22/26**

NOTE:

1. Design & Engineering and Professional Ethics shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Design & Engineering in S3 and Professional Ethics in S4 & vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor course (Thursdays from 3 to 5 PM and Fridays from 2 to 4 PM). If a student does not opt for minor programme, he/she can be given remedial class.
3. Professional ethics shall include academic ethics, IPR etc.

SEMESTER V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PCC	CORE	3-1-0	4	4
B	PCC	CORE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	PEC	PROGRAM ELECTIVE I	3-1-0	4	4
E 1/2	HMC	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HMC	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	MNC	DISASTER MANAGEMENT	2-0-0	2	--
S	PCC	CORE LAB	0-0-3	3	2
T	PCC	CORE LAB	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**31**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.
2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 3 to 5 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

PROGRAM ELECTIVE I

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PEC	i	3-1-0	4	4
	PEC	ii	3-1-0		
	PEC	iii	3-1-0		
	PEC	iv	3-1-0		
	PEC	v	3-1-0		
	PEC	vi	3-1-0		

SEMESTER VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PCC	CORE	3-1-0	4	4
B	PCC	CORE	3-1-0	4	4
C	PCC	CORE	3-1-0	4	4
D	OEC	OPEN ELECTIVE I	2-1-0	3	3
E 1/2	HMC	INDUSTRIAL ECONOMICS & FOREIGN TRADE	3-0-0	3	3
	HMC	MANAGEMENT FOR ENGINEERS	3-0-0	3	3
F	PCC	COMREHENSIVE COURSE WORK	1-0-0	1	1
S	PCC	CORE LAB	0-0-3	3	2
T	PWS	MINIPROJECT	0-0-3	3	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**29**	**23/27**

NOTE:

1. Industrial Economics & Foreign Trade and Management for Engineers shall be offered in both S5 and S6. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Industrial Economics & Foreign Trade in S5 and Management for Engineers in S6 and vice versa.

2. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Tuesdays from 3 to 5 PM and Wednesdays from 2 to 4 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.

3. Comprehensive Course Work: The comprehensive course work in the sixth semester of study shall have a written test of 50 marks. The written examination will be of objective type similar to the GATE examination and will be conducted online by the University. Syllabus for comprehensive examination shall be prepared by the respective BoS choosing any 5 core courses studied from semester 3 to 5. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum.

4. Miniproject: To identify a topic of interest in consultation with Faculty/Advisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design/fabrication or develop codes/programs to achieve the objectives. Demonstrate the novelty of the project through the results and outputs. The progress of the mini project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations, aesthetics/ergonomic aspects taken care of in the project shall be given due weight. The final evaluation will be made based on the product, the report and a viva- voce examination, conducted internally by a 3 member committee appointed by Head of the Department.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Work knowledge and Involvement	: 20
Level of completion and demonstration of functionality/specifications	: 25
Guide	: 10
Project Report	: 15
Final Presentation & oral examination	: 20

SEMESTER VII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	PROGRAM ELECTIVE II	2-1-0	3	3
B	PEC	PROGRAM ELECTIVE III	2-1-0	3	3
C	OEC	OPEN ELECTIVE II	2-1-0	3	3
D	MNC	INDUSTRIAL SAFETY ENGINEERING	2-1-0	3	---
S	PCC	CORE LAB	0-0-3	3	2
T	PWS	SEMINAR	0-0-3	3	2
U	PWS	PROJECT PHASE I	0-0-6	6	2
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**28**	**15/19**

PROGRAM ELECTIVE II

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
D	PEC	i	3-1-0	4	4
	PEC	ii	3-1-0		
	PEC	iii	3-1-0		
	PEC	iv	3-1-0		
	PEC	v	3-1-0		
	PEC	vi	3-1-0		

PROGRAM ELECTIVE III

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 Noon). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Seminar: To encourage and motivate the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report.

   Total marks: 100, only CIE, minimum required to pass 50

Attendance	: 10
Guide	: 20
Technical Content of the Report	: 30
Presentation	: 40

3. Project Phase I: A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their guides. The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include:
   - Survey and study of published literature on the assigned topic;
   - Preparing an Action Plan for conducting the investigation, including team work;
   - Working out a preliminary Approach to the Problem relating to the assigned topic;
   - Block level design documentation
   - Conducting preliminary Analysis/ Modelling/ Simulation/ Experiment/ Design/ Feasibility;
   - Preparing a Written Report on the Study conducted for presentation to the Department;
   - Final Seminar, as oral Presentation before a departmental committee.

   Total marks: 100, only CIE, minimum required to pass 50

Guide	: 30
Interim evaluation, 2 times in the semester by a committee	: 50
The report evaluated by the above committee	: 20

SEMESTER VIII

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	PROGRAM ELECTIVE IV	2-1-0	3	3
B	PEC	PROGRAM ELECTIVE V	2-1-0	3	3
C	PEC	PROGRAM ELECTIVE VI	2-1-0	3	3
D	OEC	OPEN ELCTIVE III	2-1-0	3	3
E	PCC	COMPREHENSIVE VIVA VOCE	1-0-0	1	1
U	PWS	PROJECT PHASE II	0-0-12	12	4
R/M/H	VAC	Remedial/Minor/Honours course	3-1-0	4*	4
TOTAL				**28**	**17/21**

PROGRAM ELECTIVE IV

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
B	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

PROGRAM ELECTIVE V

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

PROGRAM ELECTIVE VI

SLOT	COURSE NO.	COURSES	L-T-P	HOURS	CREDIT
A	PEC	i	2-1-0	3	3
	PEC	ii	2-1-0		
	PEC	iii	2-1-0		
	PEC	iv	2-1-0		
	PEC	v	2-1-0		
	PEC	vi	2-1-0		

NOTE

1. *All Institutions should keep 4 hours exclusively for Remedial class/Minor/Honours course (Mondays from 10 to 12 and Wednesdays from 10 to 12 PM). If a student does not opt for minor/honours programme, he/she can be given remedial class.
2. Comprehensive Viva Voce: The comprehensive viva voce in the eighth semester of study shall have a viva voce for 50 marks. The viva voce shall be conducted based on the syllabus mentioned for comprehensive course work in the sixth semester. The viva voce will be conducted by the same three member committee assigned for final project phase II evaluation towards the end of the semester. The pass minimum for this course is 25. The course should be mapped with a faculty and classes shall be arranged for practising questions based on the core courses listed in the curriculum. The mark will be treated as internal and should be uploaded along with internal marks of other courses.

3. **Project Phase II:** The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up in Project 1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:
    - In depth study of the topic assigned in the light of the Report prepared under PhaseI;
    - Review and finalization of the Approach to the Problem relating to the assigned topic;
    - Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed;
    - Final development of product/process, testing, results, conclusions and future directions;

- Preparing a paper for Conference presentation/Publication in Journals, if possible;
- Preparing a Dissertation in the standard format for being evaluated by the Department;
- Final Presentation before a Committee

Total marks: 150, only CIE, minimum required to pass 75

Guide	: 30
Interim evaluation, 2 times in the semester by a committee	: 50
Quality of the report evaluated by the above committee	: 30
Final evaluation by a three member committee	: 40

OPEN ELECTIVE (OE)

The courses listed below are offered by the Department of ECE for students of following departments: AERO, AUTO, CE, FSE, IE, ME, MECHATRONICS, PE, METTULURGY, BT, BCE, CHEM, FT, POLY.

Course Title

A.1 Fuzzy systems and Applications
A.2 Analog Communication
A.3 Digital Image Processing
B.1 MEMS
B.2 Electronic Packaging
B.3 Electronic Materials
C.1 Electronic Instrumentation
C.2 Embedded Systems
C.3 Biomedical Engineering

Minor

Minor is an additional credential a student may earn if s/he does 20 credits worth of additional learning in a discipline other than her/his major discipline of B.Tech. degree. The objective is to permit a student to customize their Engineering degree to suit their specific interests. Upon completion of an Engineering Minor, a student will be better equipped to perform interdisciplinary research and will be better employable. Engineering Minors allow a student to gain interdisciplinary experience and exposure to concepts and perspectives that may not be a part of their major degree programs.

The academic units offering minors in their discipline will prescribe the set of courses and/or other activities like projects necessary for earning a minor in that discipline. A specialist basket of 3-6 courses is identified for each Minor. Each basket may rest on one or more foundation courses. A basket may have sequences within it, i.e., advanced courses may rest on basic courses in the basket. S/he accumulates credits by registering for the required courses, and if the requirements for a particular minor are met within the time limit for the course, the minor will be awarded. This will be mentioned in the Degree Certificate as "Bachelor of Technology in xxx with Minor in yyy". The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, that minor will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from third to eight semesters for all branches. The minor courses shall be identified by M slot courses.

(ii) Registration is permitted for Minor at the beginning of third semester. Total credits required is 182 (162 + 20 credits from value added courses)

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council. The classes for Minor shall be conducted along with regular classes and no extra time shall be required for conducting the courses.

(iv) There won't be any supplementary examination for the courses chosen for Minor.

(v) On completion of the program, "Bachelor of Technology in xxx with Minor in yyy" will be awarded.

For example: Students who have registered **for B.Tech Minor in Electronics & Communication Engineering** can opt to study the courses listed below:

3.1 Semiconductor Physics and Devices
3.2 Digital Circuits and Systems
3.3 Signals and Systems
3.4 Analog Communication
4.1 Electronic Circuits
4.2 Computer Organization
4.3 Digital Signal Processing
4.4 Digital Communication
5.1 Analog Integrated Circuits
5.2 Microprocessors and Micro Controllers
5.3 Digital Signal Processors and Applications
5.4 Antennas and Propagation
6.1 Digital Integrated Circuits
6.2 Embedded Systems
6.3 Statistical Signal Processing
6.4 Fiber Optic Communication
7/8.X Mini Project based on the chosen area

In third semester, a student can choose any one course grouped under3.X. If S/he chooses 3.1 in S3, s/he should choose 4.1 in S4, 5.1 in S5 and 6.1 in S6. Similarly, if the student chooses 3.2 in S3, s/he should choose 4.2 in S4, 5.2 in S5 and 6.2 in S6 and so on. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. Shifting of courses between semesters not permitted. In any case, they should carry out a mini project based on the chosen area in S7 or S8.

Honours

Honours is an additional credential a student may earn if s/he opts for the extra 20 credits needed for this in her/his own discipline. Honours is not indicative of class. KTU is providing this option for academically extra brilliant students to acquire Honours. Honours is intended for a student to gain expertise/specialise in an area inside his/her major B.Tech discipline and to enrich knowledge in emerging/advanced areas in the branch of engineering concerned. It is particularly suited for students aiming to pursue higher studies. Upon completion of Honours, a student will be better equipped to perform research in her/his branch of engineering. On successful accumulation of credits at the end of the programme, this will be mentioned in the Degree Certificate as “Bachelor of Technology in xxx, with Honours.” The fact will also be reflected in the consolidated grade card, along with the list of courses taken. If one specified course cannot be earned during the course of the programme, Honours will not be awarded. The individual course credits earned, however, will be reflected in the consolidated grade card.

The courses shall be grouped into maximum of 5 groups, each group representing a particular specialization in the branch. The students shall select only the courses from same group in all semesters. It means that the specialization is to be fixed by the student and cannot be changed subsequently. The internal evaluation, examination and grading shall be exactly as for other mandatory courses. The Honours courses shall be identified by H slot courses.

(i) The curriculum/syllabus committee/BoS shall prepare syllabus for courses to be included in the curriculum from fourth to eight semesters for all branches. The honours courses shall be identified by H slot courses.

(ii) Registration is permitted for Honours at the beginning of fourth semester. Total credits required is 182 (162 + 20 credits from value added courses).

(iii) Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, of which one course shall be a mini project based on the chosen area. The remaining 8 credits could be acquired through 2 MOOCs recommended by the Board of studies and approved by the Academic Council. The classes for Honours shall be conducted along with regular classes and no extra time shall be required for conducting the courses. The students should earn a grade of 'C' or better for all courses under honours.

(iv) There won't be any supplementary examination for the courses chosen for honours.

(v) On successful accumulation of credits at the end of the programme, "Bachelor of Technology in xxx, with Honours" will be awarded if overall CGPA is greater than or equal to 8.5, earned a grade of 'C' or better for all courses chosen for honours and without any history of 'F' Grade.

For example: Students who have registered for **B.Tech Honours in Electronics & Communication Engineering** can opt to study the courses listed below:

4.1 Advanced Digital Signal Processing
4.2 Digital System Design
4.3 Analog IC Design
4.4 Detection and Estimation
5.1 Digital Signal Processing For Medical Imaging
5.2 Asynchronous System Design
5.3 Mixed - Signal Circuit Design
5.4 Spectral Analysis of Signals
6.1Wavelet Signal Processing
6.2Low Power VLSI Circuits
6.3Electronic Design Automation Tools

6.4
7.1VLSI Digital Signal Processing Systems
7.2 Design of ASICS
7.3 RF Circuits
7.4
8.X Mini project based on chosen area

In fourth semester, a student can choose any one course grouped under4.X. If S/he chooses 4.1 in S4, s/he should choose 5.1 in S5, 6.1 in S6 and 7.1 in S7. Similarly, if the student chooses 4.2 in S4, s/he should choose 5.2 in S5, 6.2 in S6 and 7.2 in S7 and so on. There is option to skip any two courses listed here and to opt for equivalent MOOC courses approved by the Academic Council. Shifting of courses between semesters not permitted. In any case, they should carry out a mini project based on the chosen area in S8.

CLASSIFICATION

After successful completion of the programme, degree will be awarded as per the following classifications based on the CGPA.

a) Students who complete all the courses in the first attempt in four years and complete the requirements (additional 20 credits, each course having a grade of 'C' or better) with CGPA of 8.5 and above shall be awarded B.Tech (Honours) degree.

b) Students who complete the programme within ten consecutive semesters getting a CGPA of 8.5 and above will be declared to have passed in first class with distinction.

c) Students who complete all the courses in the first attempt and in four years and complete the requirements (additional 20 credits) shall be awarded Minor.

d) Students who get a CGPA of 6.5 and above, but below 8.5 and who complete the course within 12 semesters will be declared to have passed in first class.

ONLINE EXAMINATION

Online examination can be conducted for comprehensive exam, Life skills, SUSTAINABLE ENGINEERING, CONSTITUTION OF INDIA, DISASTER MANAGEMENT, INDUSTRIAL SAFETY ENGINEERING.

INDUCTION PROGRAM

There will be three weeks induction program for first semester students. It is a unique three-week immersion Foundation Programme designed especially for the fresher's which includes a wide range of activities right from workshops, lectures and seminars to sports tournaments, social work and much more. The programme is designed to mould students into well-rounded individuals, aware and sensitized to local and global conditions and foster their creativity, inculcate values and ethics, and help students to discover their passion. Foundation Programme also serves as a platform for the fresher's to interact with their batchmates and seniors and start working as a team with them. The program is structured around the following five themes:

The programme is designed keeping in mind the following objectives:

- **Values and Ethics**: Focus on fostering a strong sense of ethical judgment and moral fortitude.
- **Creativity**: Provide channels to exhibit and develop individual creativity by expressing themselves through art, craft, music, singing, media, dramatics, and other creative activities.
- **Leadership, Communication and Teamwork**: Develop a culture of teamwork and group communication.
- **Social Awareness**: Nurture a deeper understanding of the local and global world and our place in at as concerned citizens of the world.
- **Physical Activities & Sports**: Engage students in sports and physical activity to ensure healthy physical and mental growth.

The A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019

This may be called the A. P. J. Abdul Kalam Technological University Academic Regulations for B. Tech, 2019. These are subject to the provisions of the APJ Abdul Kalam Technological University Act, 2015, the statutes and ordinances if any issued in the subject from time to time. It is the express understanding that these regulations are subject to the approval of the concerned statutory bodies of the University. These regulations shall be applicable for students admitted from 2019 onward.

1. Preamble	
R1.1	The University has the right to modify the regulations from time to time.
R1.2	In all matters related to the regulations, the decision of the University and its interpretation given by the BOG shall be final and binding.
2. Admission	
R2.1	Admission policy, eligibility for admission and admission procedure shall be decided by the University or the competent statutory authority for admissions from time to time.
R2.2	If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the University or the statutory body concerned, the Vice Chancellor may revoke the admission of the candidate and report the matter to the BOG.
R2.3	No student shall be permitted, under any circumstances, to change the branch/stream to which he/she is admitted by the competent authority for admission.
R2.4	A student admitted to a particular institute shall continue studying in that institute till the completion of the course, unless he/she is permitted an inter college transfer as per R9.1 to 9.12.
3. Structure of B.Tech. Program.	
R3.1	The duration of the B.Tech. Program shall be 4 years (8 semesters)
R3.2	The maximum duration shall be six academic years spanning 12 semesters.
R3.3	Every academic year shall have two semesters "1st July to 31st December (Odd semester)" and "1st January to 30th June (Even semester)". Each semester shall have minimum of 72 working days. The vacation of the faculty and staff shall be as per the Government orders from time to time.
R3.4	Every branch of the B.Tech Program shall have a curriculum and syllabi for the courses approved by the Academic Council. Syllabus for any course shall be normally modified / updated once in four years. However, innovative elective courses can be included as

and when required, on the recommendations of the respective Board of Studies and subject to the approval of the Academic Council. All revisions shall be based only on the recommendations of the Board of Studies concerned.

R3.5 The academic programs of the University follow the credit system. The general pattern is as below:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 to 2 Hours Practical(P) per week	1 credit
3 to 4 Hours Practical(P) per week	2 credit
The workload of a faculty member shall be the actual number of hours engaged by the faculty member.	

R3.6 The curriculum of any branch of the B.Tech. Program shall have a total of 160 academic credits and 2 additional pass/fail credits.

R3.7 Every course of B. Tech. Program shall be placed in one of the nine categories as listed in table below.

S. No.	Category	Code	Breakup of Credits
1	Humanities and Social Sciences including Management courses	HSMC	08
2	Basic Science courses	BSC	26
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	22
4	Professional core courses	PCC	66
5	Professional Elective courses relevant to chosen specialization/branch	PEC	19
6	Open subjects – Electives from other technical and /or emerging subjects ` as specified in the curriculum concerned.	OEC	09
7	Project work, seminar and internship in industry or elsewhere	PROJ	10
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	MC	Non credit
9	Mandatory Student Activities (Pass/Fail)	SA	2
		Total Credits	162

R3.8	No semester shall have more than six lecture-based courses and two laboratory and/or drawing/seminar/project courses in the curriculum. Credit per semester shall not be less than 15 or greater than 25 and cumulative credits shall not be less than 162.
R3.9	The medium of instruction shall be English. All examinations, project/seminar reports and presentations shall be in English.
4. Academic Monitoring and Student Support.	
R4.1	Advisory System: There shall be one Senior Faculty Advisor (SFA) for a class and a faculty advisor (FA) each for 25 to 35 students in the class. The Principal shall assign a regular faculty member with minimum five years of experience as the Senior Faculty Advisor (SFA) in discussion with the Head of Department concerned.
R4.2	The documents regarding all academic and non academic matters of students under an advisory group shall be kept under the custody of Faculty Advisor/Senior Faculty Advisor.
R4.3	All requests/applications from a student or parent to higher offices are to be forwarded/recommended by his/her Faculty Advisor/Senior Faculty Advisor. Students and parents shall first approach their Faculty Advisor/ Senior Faculty Advisor for all kinds of advices, clarifications and permissions on academic matters. It is the official responsibility of the institution to provide the required guidance, clarifications and advices to the students and parents strictly based on the prevailing academic regulations.
R4.4	The SFA shall arrange separate or combined meetings with advisors; course faculty, Parents and students as and when required and discuss the academic progress of students under their advisory group. The Senior Faculty Advisor/ Faculty Advisor shall also offer guidance and help to solve the issues on academic and non-academic matters including personal issues of the students in their advisory group. Advisory meetings shall preferably be convened: 1. Immediately after the commencement of the semester. 2. Immediately after announcing the marks of first internal evaluation test. The internal marks, activity points earned during the semester and eligibility of attendance shall be uploaded in the University portal only after displaying the same in the department notice board at least for two working days. This is for the information and feed back of the students. Any concerns raised by the students regarding attendance and internal marks and activity points shall be looked into in the combined meetings of advisors, course faculty and the students concerned. The principal/ HoD shall ensure the proper redressal of the concerns raised by the students regarding internal assessment and attendance. The FA/SFA shall be the custodian of the minutes and action taken reports of the advisory meetings.

R4.5	The SFA shall get the minutes and action taken reports of advisory meetings approved by the Head of Department and the Principal. It shall be the duty of the HoD and the Principal to produce it before the University as and when required.
R4.6	The FA/SFA shall keep a hard copy of the consolidated statement of attendance, activity points and internal marks of the students in their advisory group. It shall be kept with the HoD without fail for all sorts of inspections.
R4.7	Regular communication with the parents of students in respect of progress in academic matters and other general issues shall be the responsibility of the Senior Faculty Advisor/ Faculty Advisor.
R4.8	The Principal shall inform/forward all regulations, guide lines, communications, announcements etc issued by the University regarding student academic and other matters to the HoDs/ Senior Faculty Advisors for information and timely action.
R4.9	It shall be the official responsibility of the Principal to arrange necessary orientation programmes to the HoDs, SFAs and SAs regarding student counselling, the prevailing University norms, regulations, guidelines and procedures on all academic and other University related matters.
5. Academic Auditing of affiliated institutions.	
R5.1	There shall be academic auditing in each affiliated college at stipulated intervals. The academic auditing shall be conducted jointly by an Internal Quality Assurance Cell (IQAC) within the college and external academic auditor(s) appointed by the University. The Internal Quality Assurance Cell (IQAC) in each college shall oversee and monitor all the academic activities including all internal evaluations and examinations. This cell shall prepare academic audit statements in the formats prescribed by the University for each semester at regular intervals. These reports shall be presented to the external academic auditor(s), who shall use it as reference for independent auditing. The external auditor(s) shall submit the final audit report to the University in the prescribed format. Academic auditing shall cover:- 1. Course delivery and adherence to the course plan, syllabus coverage, quality of question papers used for internal examinations, internal evaluation, maintenance of laboratory experimental set ups and equipments, practical assignments, mini projects and conduct of practical classes and their evaluation. 2. Co-curricular and Extra-curricular activities available for students, the monitoring mechanism of activity points to be earned by the students. 3. Academic functioning of the college encompassing students, faculty and college administration covering punctuality, attendance, discipline, academic, environment, learning ecosystem, academic accountability, academic achievements and benchmarking. 4. The audit shall also cover the quality criteria prescribed by NBA/NAAC.

6. Assessment

R6.1 There shall be End Semester Examinations (ESE) in every semester for all courses as prescribed under the respective curriculum, except the Lab/ workshops courses for 1 & 2 semesters. The End Semester Examinations shall be conducted by the University. Semester classes shall be completed at least ten days before the commencement of the End Semester Examination.

R6.2 The End Semester Examinations (ESE) shall be held twice in a year – May/June session (for even semesters) and November/December session (for odd semesters). However, the End Semester Examinations of the VII and VIII Semesters shall be conducted in both the sessions.

R6.3 Candidates in each semester shall be evaluated both by Continuous Internal Evaluation (CIE) and End Semester Examinations (ESE). The ratio of Continuous Internal Evaluation (CIE) to End Semester Examinations (ESE) shall be as below :

1. Theory Courses : 1 : 2
2. Laboratory Courses : 1 : 1
3. Project : CIE only
4. Seminar : CIE only

R6.4 Continuous Internal Evaluation (CIE)): The Continuous Internal Evaluation shall be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum two). The faculty member (s) concerned shall carry out the Continuous Internal Evaluation (CIE) for the course allotted to him/her. The CIE marks for individual subjects shall be computed by giving weightage to the following parameters unless otherwise specified in the curriculum.

Course	Attendance	Tests	Assignment/ Class work/ Course project.
Theory	20%	50%	30%
Drawing/ Practical	20%	40%	40%

There shall be minimum two internal evaluation tests, each of 2hrs duration. Each test shall cover 50% of the syllabus and shall be for 50marks. Retest shall be permitted to the students who could not appear for the internal tests due to genuine grounds. Three days shall be utilised for conducting the internal evaluation test.

Project work	a. Work assessed by the project guide – 30% b. Three member Continuous Internal Evaluation Committee – 40% (Guide shall be one member in the CIE committee) c. Final Evaluation by a three member Committee comprising of the department project coordinator, guide and an external expert. The external expert shall be an academician or from industry. The industry expert is preferred : 30% d. One third of the project credit shall be completed in VII semester and two third in VIII semester.

	Seminar	The report and the presentation shall be evaluated by a team of internal members comprising three senior faculty members based on the style of presentation, technical content, adequacy of reference, depth of knowledge and overall quality of the report. a) Attendance : 10% b) Guide : 20% c) Technical content : 30% d) Presentation : 40%

The CIE marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full, only if the candidate has secured 90% attendance or above in the subject. If a student has attendance for a subject below 90%, reduction in the marks for the attendance shall be made proportionally. The CIE marks obtained by the student for all subjects in a semester are to be published at least 5 days before the commencement of the University examinations. Duty leave shall be accounted for awarding the internal marks for attendance.

R6.5	Students, who have completed a course but could not write the end semester examination, shall be awarded "I' Grade, provided they meet other eligibility criteria (R6.6). They shall register (exam registration) and appear for the end semester examination at the next opportunity and earn the credits without having to register (course registration) for the course again.
R6.6	The main eligibility criteria for registering to the End Semester Examination are attendance in the course and no pending disciplinary action. The minimum attendance for appearing for the End Semester Examination is 75% in each course. Students who do not meet these eligibility criteria are awarded an FE grade.
R6.7	The students with FE grade shall register for the courses during the normal semesters in which the courses are offered. However, for the seventh and eighth semester FE grade students can register for the courses in the next immediate chance, if offered by their institute.
R6.8	A student who does not register for all the courses listed in the curriculum for a semester shall not be eligible to enroll for the next higher semester.
R6.9	The maximum number of credits a student can register (course registration) for, in a semester is limited to 08 credits in excess of the total mandatory credits allotted in the curriculum for that semester.
R6.10	A student will be eligible for the award of B. Tech. Degree of the University on satisfying the following requirements: 1. Fulfilled all the curriculum requirements within the stipulated duration of the course. 2. Earned the required minimum credits as specified in the curriculum for the branch of study (R3.6 and R3.7). 3. No pending disciplinary action.

R6.11	Students registered for a course have to attend the course regularly and undergo the Continuous Internal Evaluation (CIE) and appear for the End Semester Examinations (ESE). Credits for the course are deemed to be earned only on getting at least a pass grade 'P' or better in the composite evaluation.
R6.12	Pass minimum for a course shall be 40% for the End Semester Examination and 50% of CIE and ESA put together. Letter grade 'F' will be awarded to the student for a course if either his/her mark for the End Semester Examination (ESE) is below 40 % or the overall mark [Continuous Internal Evaluation (CIE) + End Semester Examination (ESE)] is below 50 %.
R6.13	Students who received F grade in an End Semester Examination shall have to appear for the End Semester Examination at the next opportunity and earn the credits. They shall not be permitted to register for the course again.
R6.14	Continuous Internal Evaluation mark percentage shall not exceed 30% over the End Semester Examination mark %. CIE marks awarded to a student shall be normalised accordingly. For example if the end semester mark % is 40, then the maximum eligible CIE mark % is 40+30 = 70 %.)
R6.15	Grading is based on the overall % marks obtained by the student in a course, as given in 6.16. The grade card shall only give the grades against the courses the student has registered. Semester grade card shall give the grade for each registered course, Semester Grade Point Average (SGPA) for the semester as well as Cumulative Grade Point Average (CGPA).
R6.16	**Grade and Grade Points**

Grades	**Grade Point (GP)**	**% of Total Marks obtained in the course**	
S	10	90% and above	
A+	9.0	85% and above but less than 90%	
A	8.5	80% and above but less than 85%	
B+	8.0	75% and above but less than 80%	
B	7.5	70% and above but less than 75%	
C +	7.0	65% and above but less than 70%	
C	6.5	60% and above but less than 65%	
D	6.0	55% and above but less than 60%	
P (Pass)	5.5	50% and above but less than 55%	
F (Fail)	0	Below 50% (CIE + ESE) or Below 40 % for ESE	
FE	0	Failed due to lack of eligibility criteria (R6.6)	
I	0	Could not appear for the end semester examination but fulfills the eligibility criteria.	
Classification of B. Tech Degree.	First Class with Distinction		CGPA 8.0 and above
	First Class		CGPA 6.5 and above
Equivalent percentage mark shall be = 10 * CGPA – 2.5			

R6.17

Minimum Cumulative Credit Requirements for Registering to Higher Semesters

Semester	Allotted Credits	Cumulative Credits	Minimum Cumulative Credits required for B. Tech	Minimum Cumulative Credits required for B. Tech Lateral Enrty.
First	17	17	Not Applicable	Not Applicable
Second	21	38	Not Insisted	Not Insisted
Third	22	60	Not Insisted	Not Insisted
Fourth	22	82	Not Insisted	Not Insisted
Fifth	23	105	21 Credits from S1& S2	Not Insisted
Sixth	24	129	Not Insisted	Not Insisted
Seventh	15	144	47 Credits from S1 to S4	09 Credits from S3 to S4
Eight	16	160	Not Insisted	Not Insisted

R6.18 There is no provision for improving the grade. However, the student is permitted to check the answer books of the End Semester Examination after the results are declared, on payment of the prescribed fee. Any discrepancy in evaluation could be brought to the notice of the Controller of Examination, who shall initiate appropriate action as per the University Examination Manual.

R.6.19 The students can apply for revaluation of the answer books of the end semester examination after the results are declared. The final mark awarded will be the better of the two marks. If the difference in marks obtained in revaluation and the original valuation is more than 15% of the maximum marks, it shall be sent for third valuation. The final mark shall then be the average of the closer of the two marks obtained in the three valuations to the advantage of the student or the mark obtained in the original valuation whichever is higher. The Controller of Examination shall examine such cases and conduct proper enquiry to see whether any of the examiners is responsible for negligent valuation of answer script and initiate suitable action as per the University Examination Manual.

R6.20 Grade cards shall be made available in the student login for the registered courses, in every semester. On earning the required credits for the degree, the University will issue the final consolidated grade sheet for the B. Tech program including CGPA.

R6.21 **Calculation of SGPA/CGPA**

Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) are calculated as follows.

SGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the curriculum of that semester. The failed and incomplete courses shall also be considered in the calculation.

CGPA = $\Sigma(C_i \times GP_i)/\Sigma C_i$, where ‘Ci’ is the credit assigned for a course and ‘GPi’ is the grade point for that course. Summation is done for all courses specified in the

	curriculum up to that semester for which the 'CGPA' is needed. Here the failed courses shall also be accounted. CGPA for the B. Tech programme is arrived at by considering all course credits that are needed for the degree and their respective grade points. For students admitted under lateral entry scheme, credits for the first and second semester courses shall not be accounted for the calculation of CGPA. Equivalent percentage mark shall be = 10 * CGPA – 2.5
R6.22	Any act of violation of University directions, indiscipline, misbehavior, or unfair practice in examinations from the part of students, faculty members, staff, institution, management or any other source shall be viewed very seriously. It is the legal responsibility of the principal and the college management to see that the examinations are conducted strictly as per the directions of the University and as specified in the examination Manual. Malpractices in examinations observed or reported by an official employed by the University, faculty member, invigilator or anybody shall be immediately reported to the Principal. The principal shall in turn conduct a preliminary enquiry giving the student concerned a chance to explain his/her case. The Principal shall then forward the case with his/her preliminary enquiry report and remarks to the Controller of Examinations along with all related documents and evidences within two working days. The Controller of examination shall decide the course of action on the issue as per the prescribed norms in the University Examination Manual.
R6.23	A student shall earn 2 credits by actively involving in co – curricular and extra – curricular activities as per the guidelines issued by the University from time to time. On getting minimum 100 activity points the student passes the course and earns the two credits which shall not be counted for the calculation of CGPA but mandatory for the award of the Degree. For the students admitted under lateral entry scheme the 2 credits shall be considered to be earned on getting 75 activity points. The students are required to keep a file containing documentary proofs of activities done by him/her attested by the Senior Faculty Advisor/ Faculty Advisor.
7. Break of Study	
R7.1	A student is permitted to avail break of study: i) In case of accident or serious illness needing prolonged hospitalization and rest. ii) In case the student has a bright idea and would like to initiate a start-up venture or develop a product. iii) In case of any personal reasons that need a break in study. iv) For internship leading to employment. For break of study due to illness, student shall submit all necessary medical reports together with the recommendation of the doctor treating him giving definite reasons for break of study and its duration. Before joining back, the student should submit the fitness certificate from the doctor who treated him. Students who want to initiate a start-up venture or a product development, have to

	submit a project report, clearly indicating the purpose, action plan, technical details, funding details and future plans to the college Principal. The Principal shall evaluate the proposal by constituting an expert team consisting of a technocrat and a bank executive and take an appropriate decision based on the team's recommendation. The break of study for the start up shall be permitted only after the 4th semester for a maximum duration of two semesters. This is however permitted only on successfully completing the courses listed out in the first two semesters. Students who require a break in study due to personal reasons shall convince the Principal on the genuine need for it by giving authentic evidence for the same. Students who require break in study for 'internship leading to employment' shall produce the offer letter obtained from the employer concerned. The principal shall verify the authenticity of the offer and submit his recommendation to the University sufficiently in advance for approval. Only campus placed students with an annual compensation more than 6 lakhs are eligible to avail this facility. In the semester system followed by the University, break of study for an academic year is the preferred option than break of study for a semester. The student can avail the break of study only with the prior approval of the University. The Principal shall upload the request of the student with all relevant documents to the University portal for the approval with his/her recommendations. Students shall have to rejoin on the first working day of the same semester on which he/she had started availing the break of study.
	8.Attendance
R8.1	Students are expected to attain 100% attendance for all courses. However, under unavoidable circumstances they are permitted to avail leave. Total leave of absence shall not exceed 25% of the academic contact hours for a course and 75% attendance is mandatory for registering to the end semester examination. On medical ground the college Principal can relax the minimum attendance requirement to 60%, to write the end semester examination. This is permitted for one or more courses registered in the semester. Principal shall keep all records which led to his decision on attendance, for verification by the Academic Auditors/ University officials. This provision is applicable only to any two semesters during the entire program period. In case of prolonged illness, break of study is permitted as per R7.1.
R8.2	The Principals are authoriesd to grant attendance relaxation (duty leave) to the students in officially sponsored national level competitions/championships/ tournaments when called upon to do so, up to a maximum of 10%. Such students should produce the participation certificate countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extracurricular activities: within ten days of the event. The participation certificate thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the certificate if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account. The student shall get official prior permission from the University for representing the University.

8.3	The Principals are authoriesd to grant attendance relaxation (duty leave) to the students for organising extra/ co-curricular activities, up to a maximum of 05%. Such students should produce the required documents countersigned by the University Sports Coordinator/ the Director of Physical Education in the case of sports activities and the Senior Faculty Advisor in the case of other extra/ co-curricular activities: within ten days of the events. The documents thus produced shall be forwarded to the Principal with the due recommendation of the respective Head of the Department. Under any circumstances, the principal shall not consider the documents, if the overall attendance of the candidate is less than 60%. Late applications received shall not be considered on any account.
9.Inter College Transfer	
R9.1	Inter college transfer shall be applicable only for regular B. Tech students.
R9.2	The transfer shall be permitted just before the commencement of third semester.
R9.3	The transfer shall be with effect from the first working day of the third semester.
R9.4	The transfer shall be only within the sanctioned strength of the receiving college.
R9.5	The following Category of students shall not be eligible for inter college transfer 1. Govt. of India Nominee. 2. Management Quota in Aided colleges. 3. Management Quota in private Self Financing Colleges 4. Students admitted under NRI/PIO quota. 5. Lateral Entry students. 6. Students admitted under TFW Scheme. 7. Students admitted in any supernumerary seats. 8. Any other category which are ineligible as per the conditions for admission prescribed by Govt. of Kerala/Govt. of India.
R9.6	The transfer shall be permitted: 1. Between Govt/ Govt. Aided Colleges. 2. Between Self – Financing Colleges. (Including Govt. Controlled SFC).
R9.7	Notification inviting application for inter college transfer shall be issued by the University just before the commencement of the third semester.
R9.8	The candidate should fulfill the academic eligibility requirement for promotion to the third semester.
R9.9	If the number of applicants is more than the vacant seats available, the transfer may be based on the Kerala Engineering Entrance Rank.
R9.10	The students shall opt only one college for inter college transfer.
R9.11	The selected candidates shall remit a fee of Rs 3000/- (No fee for SC/ST students) within the stipulated date to the University. However, this rule is not applicable to the students transferred to other institutes under “Shift College” University order.
R9.12	The College transfer once approved by the receiving college will be final and binding on the applicant. No student will be permitted, under any circumstances, to refuse the change of college once offered.

10.Migration from other Universities	
R10.1	Migration to the University from other Universities shall be permitted only if the parent University and the APJ Abdul Kalam Technological University enters into a bipartite agreement/ MoU for this purpose. However, this condition is not applicable to the students in any of the Engineering colleges/ institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala.
R10.2	The student shall be permitted to migrate only if he/she fulfills the University eligibility criteria for admission to the course applied for migration.
R10.3	The migration shall be permitted only up to the fifth semester of the B. Tech program and half the duration of the program in the case of other programs.
R10.4	The admission shall be offered on migration basis through lateral transfer of credits. Lateral credit transfer shall be as recommended by the concerned Board of Studies.
R10.5	The students shall be allowed to migrate to the University subject to satisfying the rules and regulations of the University as regards to, maximum number of backlogs, grade points, minimum credit requirement for promotion to higher semesters, etc.
R10.6	The student shall be offered admission in any of the affiliated colleges/institutions of the University subject to availability of seats. The student shall produce no objection certificate from the concerned college/institute in this regard.
R10.7	The students offered admission shall have to take transitory courses/ additional courses of the previous semesters to satisfy the program requirement as recommended by the concerned board of studies.
R10.8	The students offered admission shall pay the migration fees and the University fees as prescribed by the University. The application processing fee (University fee) shall be Rs 5000/- (Rupees five thousand only) and the migration fees shall be Rs 20000/- (Rupees twenty thousand only). The migration fee is charged for the meeting expenses of the concerned Board of studies to decide on the student suitability for migration and to recommend the transitory courses/ additional courses to be done by the student to fulfill the academic requirement of the University. The processing fee shall be paid along with the application, and the migration fee shall be paid to the University at the time of offering admission. The fee once paid shall not be refunded under any circumstances. The students in any of the Engineering colleges / institutions, which, before the commencement of KTU Act remained affiliated to Universities except Deemed to be Universities in the State of Kerala, are exempted from paying the processing fee and the migration fee.
R10.9	The migrated students shall follow the rules and regulations of the University.
R10.10	The students offered admission shall produce a migration certificate from the parent University at the time of admission.
R10.11	The student offered admission shall produce a character certificate from the parent institute/University at the time of admission.
R10.12	Regulations, Scheme and Syllabus of the respective specialization attested by the Registrar of the parent University or equivalent authority shall be submitted to the University along with the application seeking migration to the University.
R10.13	Attested copies of all certificates and mark lists from 10^{th} onwards shall be submitted along with the application for migration (Original certificates and mark lists shall be

	produced as and when required by the University).
R10.14	Assessment of the student suitability for migration in terms of programs, backlogs, grade points, credit requirements, etc shall be done by the concerned Board of Studies.
R10.15	Assessment of the transitory courses/ additional courses to be done by the student as per the academic requirement of the University shall be as recommended by the concerned Board of Studies.
11. Minor in Engineering.	
R11.1	All B. Tech students shall be eligible to register for Minor in Engineering.
R11.2	The Minor in Engineering registration shall be along with the registration of the 3rd semester.
R11.3	If a student fails in any course of the minor, he/she shall not be eligible to continue the B.Tech Minor. However, the additional credits and grades thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R11.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech Degree with Minor.
R11.5	Out of the 20 Credits, 12 credits shall be earned by undergoing a minimum of three courses, during the specified period. The total number of contact hours for these courses shall be 126 Hrs (42Hrs/course). The duration of a course shall be minimum 14 weeks. The remaining 8 credits could be acquired through two MOOCs recommended by the Board of studies and approved by the Academic Council.
R11.6	Curriculum and the syllabus of the four courses shall be approved by the Board of studies and the Academic Council.
R11.7	The assessment of the courses other than MOOCs and earning of credits shall be as per R6.1 to R6.23. The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R11.8	Under graduate Degree with minor shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech program and Minor in Engineering.
12. B. Tech (Honours)	
R12.1	All B. Tech students are eligible to register B.Tech (Honours). However, their mandatory CGPA at the end of eighth semester shall be 8.5 or higher to be eligible for the award of B. Tech (Honours).
R12.2	The B. Tech (Honours) registration shall be along with the registration of the 4th semester.
R12.3	If a student fails in any course including the course chosen for B. Tech (Honours), he/she shall not be eligible to continue the B.Tech(Honours). However, the additional credits thus far earned by the student shall be included in the grade card but shall not be considered in calculating the CGPA.
R12.4	The student shall earn additional 20 credits to be eligible for the award of B. Tech (Honours) Degree.

R12.5	Out of the 20 Credits, 12 credits shall be earned by undergoing minimum three specified B. Tech (Honours) Elective courses of the respective stream. Credits for the B. Tech (Honours) Elective courses are deemed to be earned only on getting at least a grade 'C' or better in the composite evaluation. A student shall not be permitted to select the normal elective courses of the respective B. Tech programs for attaining the credit requirements of B. Tech (Honours). The remaining 8 credits could be acquired through two MOOCs of the respective streams recommended by the Board of studies and approved by the Academic Council.
R12.6	The assessment and certification of the MOOCs shall be as per the prescribed norms of the MOOCs. The candidate shall produce the certification issued by the MOOCs conducting agency in proof of credit attainment.
R12.7	The institutions offering B. Tech Honours programs shall not charge any additional fee from the students.
R12.8	B. Tech (Honours) Degree shall be issued by the University to the students who fulfill all the academic eligibility requirements for the B. Tech and B. Tech (Honours) programs.
	13. Grace Marks for Sports /Arts Competitions.
R13.1	Only bona-fide, regular candidates are eligible for the award of Grace Marks.
R13.2	The criterion for the award of Grace Marks is representing the University in officially sponsored national level competitions/championships/ tournaments when called upon to do so. The student shall get official prior permission from the University for representing the University.
R13.3	The maximum grace marks that can be awarded to a candidate in a particular semester for all activities put together shall be 5% of the aggregate maximum End Semester Examination marks of all theory courses for which the University conducts End Semester Examinations.
R13.4	The maximum grace marks that can be awarded to a student for a theory course in a particular semester for all activities put together shall not exceed 10% of the maximum aggregate marks of End Semester Examination of the course.
R13.5	The Grace Marks shall not be awarded to a student for Practical/ Lab/ Viva Voce/ internal assessment/ Seminar etc even though she/he fails for the same.
R13.6	Eligible Grace Marks shall be distributed equally on all theory papers/courses of an examination. However, re – distribution of Grace Marks shall be allowed only in the case of those courses of an examination for which the candidate has passed. Re-distribution is possible from passed courses to failed courses only. Re-distribution of Grace Marks is not permissible from failed courses to other courses for a pass.
R13.7	The Grace Marks shall be awarded for all theory papers/courses/subjects in a semester.
R13.8	Re- distribution shall be done only for enabling a candidate to obtain the minimum marks required for a pass.
R13.09	Grace Marks shall not be re – distributed from one semester to another semester.
R13.10	If the candidate does not secure the minimum marks required for a pass even after effecting re- distribution, eligible moderation fixed by the respective board if any, shall be awarded to that candidate in addition to the Grace Marks for a pass.
R13.11	Eligible Grace Marks shall be awarded for the regular examination of the performing semester only. Grace Marks shall not be awarded for supplementary examinations.

R13.12	The performing semester shall be considered from 1st July to 31st December (Odd semester) and 1st January to 30th June (Even Semester).
R13.13	Grace Marks shall be awarded on the basis of performance in the respective semester.
R13.14	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
R13.15	Only a single highest achievement during the period of a semester shall be considered for awarding the grace marks.
14.Grace Marks for Persons With Disability (PWD)	
R14.1	A person with disability means a person suffering from not less than 40% of any disability as certified by the District Medical Board. To be eligible for the grace marks, the certificate of disability specifying the percentage of disability shall be produced before the Principal at the time of admission.
R14.2	The Grace Marks that can be awarded for PWD candidates shall be 25% of the marks scored by the candidate in each course at the time of finalization of the results.
R14.3	Transfer of marks from one paper to another shall not be permitted. Fractions of marks if any, while computing the Grace Marks shall be rounded off to the next higher integer.
R14.4	PWD candidates who are eligible for Grace Marks shall be awarded Grace Marks for regular and supplementary chances until they pass the whole examination.
R14.5	Grace Marks shall be awarded only for the marks of the End Semester Examinations conducted by the University.
R14.6	The request for Grace Marks shall be submitted to the Controller of Examinations through the principal along with all relevant documents, within the time limit prescribed by the University. The request for Grace Marks received after the time limit shall not be entertained on any account.
15. Transitory provision.	
15.1	Notwithstanding anything contained in these regulations, the Vice-Chancellor shall, for a period of two years from the date of coming into force of these regulations, has the power to provide by order that these Regulations shall be applied to any B. Tech program with such modifications as may be necessary.

LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY

MINUTES OF PRINCIPAL'S COUNCIL MEETING		
Subject: Academic and Administrative Matters	Meeting Number: **94**	
Venue: Principal's Chamber	Date: **27.11.18**	Time: 1.30 PM

Members Present

1. Dr. Syam Prakash V. (Principal)
2. Dr.RetnakumariAmma (HoD, ASH)
3. Dr.K. Kunnara Pillai (HoD, MBA)
4. Prof.Beshiba Wilson (HoD, CSE)
5. Prof.Swapna M. (HoD, EEE)
6. Prof. Selna Joseph (HoD, MCA)
7. Prof.Saharinath A.R. (HoD, ME)
8. Dr.Dinakardas C.N. (HoD, ECE)
9. Prof.InduRajan (for HoD, CE)

Sl. No.& Date	Subject and Decision	Action by	Action Date
558 08.05.18	The data of previous university results (KTU) of students must be madeavailable with staff advisors for entering in CMS. The date for data entry will be intimated soon. Amendment on 11.06.18: The last dates for entry of previous University marks(starting from S1) in CMS are given below: • S2 B.Tech – 25.06.18 • S4 B.Tech – 02.07.18 • S6 B.Tech – 09.07.18 Amendment on 10.07.18:The problem encountered in the entry of previous University marks in CMS has been rectified. The last dates for entry of previous University marksin CMS has beenextended as mentioned below: • 2017 -2021 batch - S1B.Tech – 18.07.18 • 2016 -2020 batch - S1, S2, S3B.Tech – 25.07.18 • 2015 -2019 batch - S1, S2, S3, S4, S5B.Tech – 30.07.18 Amendment on 22.11.18:All pending entries (if any) must be completedon or before 10.12.18.	Prof.PriyaSekhar S. (CMS Coordinator)	09.07.18
700 16.10.18	Staff advisors of S3, S5 and S7 B.Tech are requested to maintain the complete documents required for assigning activity points for students. An external audit will be conducted by the audit team of LMCST on or before 09.11.18 to verify the documents regarding the activity points assigned to students. Amendment on 22.11.18 : Decided to complete the internal auditing of activity points on or before 10.12.18.	Prof.Bindu M.V. (KTU Internal Auditor)	09.11.18
708 23.10.18	Staff advisors are requested to ensure the correctness of the following mandatory fields entered by students in CMS: • Name of student • Name of Parent • Mobile number of Parent *Note: If based on acceptable reasons, the details of fathercannot be provided, please ensure that the details of mother are entered correctly.*	Staff advisors	03.11.18
715 30.10.18	Staff advisors are requested to discuss aboutthe necessary measures to be taken before the start of next semester, for increasing the activity points, with students who have currently earned less activity points: i.e; S1 B.Tech < 20, S3 B.Tech < 40, S5 B.Tech <60 and S7 B.Tech < 100. The action plan must be submitted to Principal on 07.11.18.	Staff advisors	07.11.18
734 13.11.18	To appreciate the students involvement in extracurricular and co-curricular activities, HoDs are requested to submit the list of students who have scored more activity points (S7 > 150 and S1,S3,S5 > 100 points).	HoDs	18.11.18

737 22.11.18	A meeting of faculty members with Principal is scheduled for 30.11.18 (Friday) at 2.30 pm in LOMAA Hall.	Faculty	30.11.18
745 27.11.18	Project proposals (3 copies each) for INNOVATE and TECHFEST 2019 of KSCSTE and KTU must be submitted on or before 12 noon on 29.11.18 (Thursday) to Principal for screening by the expert committee.	Principal	29.11.18
746 27.11.18	The list of S6 and S8 B.Tech students along with the electives opted must be submitted to Principal before 9.30am on 29.11.18.	HoDs	29.11.18
747 27.11.18	Last date for submitting the condonation request with supporting documents by students is 30.11.18.	Staff Advisors/HoDs	30.11.18
748 27.11.18	The TMA Student Chapter of LMCST is organizing a talk on "The Prospectus of management Studies" by Col. R.G.Nair at 11.00am on 29.11.18 at LMCST.	Dr. K. Kumara Pillai (MBA)	29.11.18
749 27.11.18	The list of interdepartmental subjects to be handled by faculty from other departments for the next semester (Jan to May 2019) must be forwarded to Principal on or before 30.11.18.	HoDs	30.11.18
750 27.11.18	The statement of sessional marks signed by students must be forwarded to Principal on or before 29.11.18.	Staff Advisors/HoDs	29.11.18
751 27.11.18	Formulated the Arts club with following faculty members : • Prof.Beshiba Wilson (CSE)- Mentor • Prof.Renu V. (EEE) – Coordinator • Prof.Resmi V. Prasad (ME) – Co-coordinator • Prof.Divya S. Nair (ASH) - Co-coordinator • Prof.Neethu Mohan (MCA) Prof.Bincy Louis (ECE) • Prof.Sheeba B.S. (MBA) Prof.Revathy Krishna (CE) • Prof.Greeshma R.G. (CSE) Decided to form a literary club to conduct literary activities at LMCST.	Principal	27.11.18
752 27.11.18	Decided to conduct the College day in the month of February 2019.	Principal	Feb, 2019
753 27.11.18	Appreciation to Ms.Sivakami (S5 MCA) and Ms.Neeraja Radhakrishnan (S7 CSE) for being placed in Hexaware Technologies on 27.11.18 through LMCST Placement Cell.	Principal	27.11.18
754 27.11.18	Appreciation to the entire Placement Cell especially Prof.Anjana Thampy (CSE), Prof.Justin G. Russel (MCA), Prof.ShammyArun Mathew (ECE) and Prof.Sajith Krishnan (ME) for the successful conduct of the recruitment drive of EJ Gates Infotech Private Limited on 23.11.18 at LMCST. Special mention to Prof.Jayaram V. (ME) –Placement Coordinator, for the overall coordination of the event.	Principal	27.11.18
755 27.11.18	Appreciation to the MBA team under the leadership of Dr.K.Kumara Pillai, for having won the second prize for Best Finance team in the National Management Fest of UIM, Varkala on 23.11.18.	Principal	27.11.18

Actions Taken

722 30.10.18	The final sessional marks of KTU students must be published on or before 23.11.18.	Faculty	23.11.18
723 30.10.18	The second course / class committee must be conducted on 26.11.18.	Faculty	26.11.18
738 22.11.18	As per the general observation of KTU external auditor, it is suggested to use numerical values for the awarding of assignment marks (Assignment I, II and III) to students.	Faculty	22.11.18