# 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 |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 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 AND DESIGN OF MACHINERY | 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 | COMPUTATIONAL FLUID DYNAMICS | 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/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 |
| Seminar Diary | : 10 |
| Guide | : 20 |
| Report | : 20 |
| Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

| | |
|---|---|
| Guide | : 30 |
| Interim evaluation by the Evaluation committee | : 20 |
| Final evaluation by the Evaluation committee | : 30 |
| Phase – I Report (By 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 | INDUSTRIAL HYDRAULICS | 2-1-0 | | |
| | MET434 | PRESSURE VESSEL AND PIPING DESIGN | 2-1-0 | | |
| | MET444 | DATA ANALYTICS FOR ENGINEERS | 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 | PROJECT PLANNING AND MANAGEMENT | 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 a 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 the final evaluation 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 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 SCIENCE AND 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: 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 |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 | 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 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.

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**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 |
| Seminar Diary | : 10 |
| Guide | : 20 |
| Report | : 20 |
| Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

| | |
|---|---|
| Guide | : 30 |
| Interim evaluation by the Evaluation committee | : 20 |
| Final evaluation by the Evaluation committee | : 30 |
| Phase – I Report (By 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 a 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 the final evaluation 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 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 292 | NETWORK ANALYSIS AND SYNTHESIS | 4 | 4 | EET 292 | NETWORK ANALYSIS AND SYNTHESIS | 4 | 4 |
| S5 | EET393 | DIGITAL SIMULATION | 4 | 4 | EET 393 | DIGITAL SIMULATION | 4 | 4 | EET 393 | 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 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 |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 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 | MICROWAVES AND ANTENNAS | 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 | Instrumentation | 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 |
| Seminar Diary | : 10 |
| Guide | : 20 |
| Report | : 20 |
| Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

| | |
|---|---|
| Guide | : 30 |
| Interim evaluation by the Evaluation committee | : 20 |
| Final evaluation by the Evaluation committee | : 30 |
| Phase – I Report (By 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 | WIRELESS COMMUNICATION | 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 a 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 the final evaluation 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 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 AUTOMATION | 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: 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 |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 allotted to be 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 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 | NATURAL DISASTERS AND MITIGATION | 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/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 |
| Seminar Diary | : 10 |
| Guide | : 20 |
| Report | : 20 |
| Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

| | |
|---|---|
| Guide | : 30 |
| Interim evaluation by the Evaluation committee | : 20 |
| Final evaluation by the Evaluation committee | : 30 |
| Phase – I Report (By 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 a 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 the final evaluation 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 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 & Valuation | 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.

## 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 |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 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 |
| Seminar Diary | : 10 |
| Guide | : 20 |
| Report | : 20 |
| Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

| | |
|---|---|
| Guide | : 30 |
| Interim evaluation by the Evaluation committee | : 20 |
| Final evaluation by the Evaluation committee | : 30 |
| Phase – I Report (By 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 a 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 the final evaluation 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 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.

# 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

**Table 2: Departments and their codes**

| SL No | Department | Course Prefix | SL No | Department | Course Prefix |
|---|---|---|---|---|---|
| 1 | Aeronautical Engineering | AO | 23 | Electronics and Communication Engineering | EC |
| 2 | Agriculture Engineering | AG | 24 | Electronics and Computer Engineering | ER |
| 3 | Applied Electronics and Instrumentation | AE | 25 | Electrical and Computer Engineering | EO |
| 4 | Artificial Intelligence | AI | 26 | Electrical and Electronics Engineering | EE |
| 5 | Artificial Intelligence and Data Science | AD | 27 | Food Technology | FT |
| 6 | Artificial Engineering and Machine Learning | AM | 28 | Humanities | HU |
| 7 | Automobile Engineering | AU | 29 | Industrial Engineering | IE |
| 8 | Biomedical Engineering | BM | 30 | Information Technology | IT |
| 9 | Biotechnology | BT | 31 | Instrumentation & Control | IC |
| 10 | Chemical Engineering | CH | 32 | Mandatory Courses | MC |
| 11 | Chemistry | CY | 33 | Mathematics | MA |
| 12 | Civil Engineering | CE | 34 | Mechanical Engineering | ME |
| 13 | Civil and Environmental Engineering | CN | 35 | Mechatronics | MR |
| 14 | Computer Science and Business Systems | CB | 36 | Metallurgy | MT |
| 15 | Computer Science and Design | CX | 37 | Mechanical (Auto) | MU |
| 16 | Computer Science and Engineering | CS | 38 | Mechanical (Prod) | MP |
| 17 | Computer Science and Engineering (Artificial Intelligence) | CA | 39 | Naval & Ship Building | SB |
| 18 | Computer Science and Engineering (Artificial Intelligence and Machine Learning) | CM | 40 | Physics | PH |
| 19 | Computer Science and Engineering (Data Science) | CD | 41 | Polymer Engineering | PO |
| 20 | Computer Science and Engineering (Cyber Security) | CC | 42 | Production Engineering | PE |
| 21 | Cyber Physical Systems | CP | 43 | Robotics and Automation | RA |
| 22 | Electronics & Biomedical | EB | 44 | Safety & Fire Engineering | 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 | 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 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.

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**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 | MCN 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 ORGANIZATIO N A ND 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 | MCN 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 | MCN 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) |

**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 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 | MCN 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 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/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 |
   | Seminar Diary | : 10 |
   | Guide | : 20 |
   | Report | : 20 |
   | Presentation | : 40 |

3. Project Phase I: The course 'Project Work' is mainly intended to evoke the innovation and invention skills in a student. The course will provide an opportunity to synthesize and apply the knowledge and analytical skills learned, to be developed as a prototype or simulation. The project extends to 2 semesters and will be evaluated in the 7th and 8th semester separately, based on the achieved objectives. One third of the project credits shall be completed in 7th semester and two third in 8th semester. It is recommended that the projects may be finalized in the thrust areas of the respective engineering stream or as interdisciplinary projects. Importance should be given to address societal problems and developing indigenous technologies. The assignment to normally include:

   - Literature study/survey of published literature on the assigned topic
   - Formulation of objectives
   - Formulation of hypothesis/ design/ methodology
   - Formulation of work plan and task allocation.
   - Block level design documentation
   - Seeking project funds from various agencies
   - Preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility study
   - Preparation of Phase 1 report

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

   | | |
   |---|---|
   | Guide | : 30 |
   | Interim evaluation by the Evaluation committee | : 20 |
   | Final evaluation by the Evaluation committee | : 30 |
   | Phase – I Report (By 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 | 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 | ii PROGRAMMING PARADIGMS | 2-1-0 | | |
| | CST 434 | iii NETWORK SECURITY PROTOCOLS | 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 | ii CLIENT SERVER ARCHITECTURE | 2-1-0 | | |
| | CST 436 | iii PARALLEL COMPUTING | 2-1-0 | | |
| | CST 446 | iv DATA COMPRESSION TECHNIQUES | 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

Guide : 30

Interim evaluation, 2 times in the semester by a 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 the final evaluation 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 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 | REINFORCEMENT LEARNING | 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.

# M TECH CSE 2020-22

## Third semester - 2021-22

## Electives offered and list of students opted the course

**Elective IV : 10CS7111 Software Project Management**

**Elective V: 10CS7129 Information Storage Management**

| Sl No | Name |
|---|---|
| 2 | SONIYA BENNY |
| 3 | SREELAKSHMI PR |
| 4 | SUHADA C |

# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## S8 CSE ELECTIVES

| | | Enter **YES** for the Selcted Elective Subject | | | | |
|---|---|---|---|---|---|---|
| **REG NO** | **NAME** | **CS462 Fuzzy Set Theory and Applications** | **CS464 Artificial Intelligence** | **CS466 Data Science** | **CS468 Cloud Computing** | **CS472 Principles of Information Security** |
| VML18CS001 | ABHIJITH B LAL | | | | | Yes |
| VML18CS002 | ABHIJITH GOPINATH NAMBIAR | | | | | Yes |
| VML18CS003 | ABHINAND SREELATHAN | | | | | Yes |
| VML18CS004 | ABHIRAM CHANDRAN | | | | | yes |
| VML18CS005 | ABIN BABU | | | | | yes |
| VML18CS006 | AJAY JOY | | | | | yes |
| VML18CS007 | AKHIL JOLLY | | | | | Yes |
| VML18CS008 | ALOYSIUS JOY | | | | | Yes |
| VML18CS009 | AMAL SUKUMARAN | | | | | Yes |
| VML18CS010 | AMRITHA P.A | | | | | yes |
| VML18CS011 | ANAGHA. K | | | | | Yes |
| VML18CS012 | ANAMIKA PRASANTH | | | | | yes |
| VML18CS014 | ANKITHA K | | | | | yes |
| VML18CS015 | ANUSREE CHITHRABHANU | | | | | yes |
| VML18CS016 | ANUSURYA CHACKO | | | | | yes |
| VML18CS017 | ARYANANDA P | | | | | Yes |
| VML18CS018 | ASHIN C | | | | | yes |
| VML18CS019 | ASHIQUE PREM | | | | | yes |
| VML18CS020 | ASWIN ANIRUDHAN | | | | yes | |
| VML18CS021 | ASWIN UNNI SUNIL | | | | | yes |
| VML18CS023 | C M NIVED RAJ | | | | | yes |
| VML18CS024 | DEEKSHITH C | | | | | YES |

| | | | | | | |
|---|---|---|---|---|---|---|
| VML18CS025 | DON MARTIN | | | | | yes |
| VML18CS026 | H. POOJA | | | | | Yes |
| VML18CS027 | IMMANUEL MONSON | | | | | Yes |
| VML18CS028 | JINTO JOSE | | | | | Yes |
| VML18CS031 | JOSEPH M.J. | | | | | yes |
| VML18CS032 | JOYAL WILSON | | | | | yes |
| VML18CS033 | JUSTIN KURIAN | | | | | yes |
| VML18CS034 | KARTHIK E K | | | | | yes |
| VML18CS035 | KAVYA K K | | | | | Yes |
| VML18CS036 | KRISHNA PRIYA | | | | | Yes |
| VML18CS037 | KRISHNAPRIYA PREMAKUMAR | | | | | YES |
| VML18CS038 | K V MAHIJITH | | | | | Yes |
| VML18CS039 | MARIA T.V | | | | | Yes |
| VML18CS040 | MERIAM PHILIP | | | | | |
| VML18CS041 | MUHAMMED MUSTHAFA T P | | | | | Yes |
| VML18CS042 | NAMRUTHA RAJ | | | | | yes |
| VML18CS043 | NIHAL MANOJ | | | | | yes |
| VML18CS044 | PRINSE JUDIT DAS | | | | yes | |
| VML18CS045 | RAMDEV C M | | | | yes | |
| VML18CS046 | RANA FATHIMA | | | | | yes |
| VML18CS047 | R GAYATHRI | | | | | yes |
| VML18CS048 | RIMAL RAJ P V | | | | | YES |
| VML18CS049 | ROSE ALPHONS BENNY | | | | | Yes |
| VML18CS050 | SANITHA K.P | | | | | yes |
| VML18CS051 | SHAMJITH SAJI | | | | | yes |
| VML18CS052 | SONU PAUL | | | | | yes |
| VML18CS053 | SREELAKSHMI A K | | | | | Yes |
| VML18CS054 | SREELAKSHMI P V | | | | | Yes |
| VML18CS055 | SREERAG RAJAN | | | | | yes |
| VML18CS056 | THEERTHA P | | | | | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| VML18CS057 | THEJAS SUJITH | | | | | Yes |
| VML18CS058 | UNNIMAYA P | | | | | yes |
| VML18CS059 | UTHARA NARAYANAN CK | | | | | Yes |
| VML18CS060 | VIBIN JAMES VARGHESE | | | | | yes |
| VML18CS061 | VIGNESH PV | | | | | Yes |
| VML18CS062 | VISHNU THIRUMANGALATH | | | | | Yes |
| VML18CS063 | YADU KRISHNAN K V | | | | | yes |
| | | | | | | 55 |

## STUDENT ELECTIVE SUBJECT SELECTION (S6 CSE A)

| PRN | NAME | CST-312 Foundations of machine learning | CST-322 Data anaytics | CST 332 Foundations of security in computing | CST 342 Automated verification | CST 362 Programming in python | CST 372 Data and computer communications |
|---|---|---|---|---|---|---|---|
| VML19CS001 | Aalap Ragesh | | | | | Yes | |
| VML19CS003 | Abhinav C | | | | | Yes | |
| VML19CS004 | Abhincy Thomas | | | | | Yes | |
| VML19CS006 | Adheena K M | | | | | Yes | |
| VML19CS009 | Aditya Tejus | | | | | Yes | |
| VML19CS011 | Adwaith Krishna | | | | | Yes | |
| VML19CS013 | Aiswar K | | | | | Yes | |
| VML19CS014 | Akash Ajith | | | | | Yes | |
| VML19CS016 | Akshay Chandra | | | | | Yes | |
| VML19CS018 | Akshay Sasi | | | | | Yes | |
| VML19CS020 | Albin Thomas | | | | | Yes | |
| VML19CS022 | Alenteena Sebastian | | | | | Yes | |
| VML19CS025 | Ambili Jacob | | | | | Yes | |
| VML19CS027 | Anamika Prakash A | | | | | Yes | |
| VML19CS029 | Anjana Suresh | | | | | Yes | |
| VML19CS032 | Ann Rose Issac | | | | | Yes | |
| VML19CS033 | Antony Thomas | | | | | Yes | |
| VML19CS034 | Anumitha S Pradiu | | | | | Yes | |
| VML19CS036 | Anurag C Ashok | | | | | Yes | |
| VML19CS038 | Arjun K V | | | | | Yes | |
| VML19CS041 | Aswin Augustine | | | | | Yes | |
| VML19CS043 | Augustin Robins | | | | | Yes | |
| VML19CS045 | Berly Xavier | | | | | Yes | |
| VML19CS047 | Darshitha K | | | | | Yes | |
| VML19CS049 | Dennis Benny | | | | | Yes | |
| VML19CS051 | Dheeraj K | | | | | Yes | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| VML19CS053 | Diya S | | | | | Yes | |
| VML19CS056 | E P Gopika | | | | | Yes | |
| VML19CS057 | Faez Muhammed M | | | | | Yes | |
| VML19CS059 | Farzeen Rahman | | | | | Yes | |
| VML19CS060 | Haripriya M | | | | | Yes | |
| VML19CS062 | Hrithwik P V | | | | | Yes | |
| VML19CS064 | Jestin Raju | | | | | Yes | |
| VML19CS066 | Joshua Mathew | | | | | Yes | |
| VML19CS068 | Keerthana K | | | | | Yes | |
| VML19CS070 | Manu Mathew Jiss | | | | | Yes | |
| VML19CS072 | Mohammed Razi Riyaz | | | | | Yes | |
| VML19CS073 | Muhsina Musthafa | | yes | | | | |
| VML19CS076 | Nihal V George | | | | | Yes | |
| VML19CS077 | Nikhil Remesh | Yes | | | | | |
| VML19CS079 | Pournami V | | | | | Yes | |
| VML19CS082 | Rahnas K T | | | | | Yes | |
| VML19CS085 | Riya Rose | | | | | Yes | |
| VML19CS087 | Rose Mariya Joy | | | | | Yes | |
| VML19CS088 | Sahad Abdul Rahman | | | | | Yes | |
| VML19CS090 | Sangeeth K | | | | | Yes | |
| VML19CS092 | Shahan Abdulla K | | | | | Yes | |
| VML19CS093 | Shani Thomas | | yes | | | | |
| VML19CS095 | Sharon Rose Babu | | | | | Yes | |
| VML19CS097 | Shinil Shaju | | | | | Yes | |
| VML19CS099 | Shythya Pv | | | | | Yes | |
| VML19CS100 | Sidharthan A K | | | | | Yes | |
| VML19CS102 | Sidharth K V | | | | | Yes | |
| VML19CS105 | Snigdha Sathyanathan | | yes | | | | |
| VML19CS107 | Sona P | | | | | Yes | |
| VML19CS109 | Sreehari Jayesh | | | | | Yes | |
| VML19CS111 | Sruthi P K | | | | | Yes | |
| VML19CS113 | Uvais Hassan | | | | | Yes | |
| VML19CS115 | V R Arya | | | | | Yes | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Yes | |

# ELECTIVE SUBJECTS OFFERED

## S7 CSE 2018-22 BATCH

| USN | STUDENT NAMES | CS461 Computational Geometry | CS463 Digital Image Processing | CS465 Bio-Informatics | CS467 Machine Learning | CS469 Computational complexity | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| VML18CS001 | ABHIJITH B LAL | | | Yes | | | |
| VML18CS002 | ABHIJITH GOPINATH NAMBIAR | | | yes | | | |
| VML18CS003 | ABHINAND SREELATHAN | | | yes | | | |
| VML18CS004 | ABHIRAM CHANDRAN | | | yes | | | |
| VML18CS005 | ABIN BABU | | | yes | | | |
| VML18CS006 | AJAY JOY | | | YES | | | |
| VML18CS007 | AKHIL JOLLY | | | Yes | | | |
| VML18CS008 | ALOYSIUS JOY | | | YES | | | |
| VML18CS009 | AMAL SUKUMARAN | | | yes | | | |
| VML18CS010 | AMRITHA P.A | | | YES | | | |
| VML18CS011 | ANAGHA. K | | | YES | | | |
| VML18CS012 | ANAMIKA PRASANTH | | | yes | | | |
| | | | | | | | |
| VML18CS014 | ANKITHA K | | | YES | | | |
| VML18CS015 | ANUSREE CHITHRABHANU | | | Yes | | | |
| VML18CS016 | ANUSURYA CHACKO | | | YES | | | |
| VML18CS017 | ARYANANDA P | | | YES | | | |
| VML18CS018 | ASHIN C | | | yes | | | |
| VML18CS019 | ASHIQUE PREM | | | Yes | | | |
| VML18CS020 | ASWIN ANIRUDHAN | | | | yes | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| VML18CS021 | ASWIN UNNI SUNIL | | | | yes | | |
| | | | | | | | |
| VML18CS023 | C M NIVED RAJ | | | YES | | | |
| VML18CS024 | DEEKSHITH C | | | YES | | | |
| VML18CS025 | DON MARTIN | | | YES | | | |
| VML18CS026 | H. POOJA | | | YES | | | |
| VML18CS027 | IMMANUEL MONSON | | | yes | | | |
| VML18CS028 | JINTO JOSE | | | yes | | | |
| | | | | | | | |
| VML18CS031 | JOSEPH M.J. | | | yes | | | |
| VML18CS032 | JOYAL WILSON | | | yes | | | |
| VML18CS033 | JUSTIN KURIAN | | | yes | | | |
| VML18CS034 | KARTHIK E K | | | yes | | | |
| VML18CS035 | KAVYA K K | | | Yes | | | |
| VML18CS036 | KRISHNA PRIYA | | | YES | | | |
| VML18CS037 | KRISHNAPRIYA PREMAKUMAR | | | | YES | | |
| VML18CS038 | K V MAHIJITH | | | | yes | | |
| VML18CS039 | MARIA T.V | | | YES | | | |
| VML18CS040 | MERIAM PHILIP | | | yes | | | |
| VML18CS041 | MUHAMMED MUSTHAFA T P | | | Yes | | | |
| VML18CS042 | NAMRUTHA RAJ | | | YES | | | |
| VML18CS043 | NIHAL MANOJ | | | | yes | | |
| VML18CS044 | PRINSE JUDIT DAS | | | | yes | | |
| VML18CS045 | RAMDEV C M | | | | yes | | |
| VML18CS046 | RANA FATHIMA | | | yes | | | |
| VML18CS047 | R GAYATHRI | | | yes | | | |
| VML18CS048 | RIMAL RAJ P V | | | yes | | | |
| VML18CS049 | ROSE ALPHONS BENNY | | | YES | | | |
| VML18CS050 | SANITHA K.P | | | YES | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| VML18CS051 | SHAMJITH SAJI | | | yes | | | |
| VML18CS052 | SONU PAUL | | | yes | | | |
| VML18CS053 | SREELAKSHMI A K | | | YES | | | |
| VML18CS054 | SREELAKSHMI P V | | | YES | | | |
| VML18CS055 | SREERAG RAJAN | | | yes | | | |
| VML18CS056 | THEERTHA P | | | Yes | | | |
| VML18CS057 | THEJAS SUJITH | | | | YES | | |
| VML18CS058 | UNNIMAYA P | | | YES | | | |
| VML18CS059 | UTHARA NARAYANAN CK | | | yes | | | |
| VML18CS060 | VIBIN JAMES VARGHESE | | | yes | | | |
| VML18CS061 | VIGNESH PV | | | Yes | | | |
| VML18CS062 | VISHNU THIRUMANGALATH | | | yes | | | |
| VML18CS063 | YADU KRISHNAN K V | | | yes | | | |