KIT - Kalaignarkarunanidhi Institute of Technology

An Autonomous Institution

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' GRADE & NBA (AERO, CSE, ECE, EEE, MECH & MBA)

An ISO 9001 : 2015 Certified Institution, Coimbatore - 641 402.

Regulations, Curriculum & Syllabus - 2023

(For Students admitted from the Academic Year 2023-24 and onwards)

BACHELOR OF ENGINEERING DEGREE

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

Department of Electronics and Communication Engineering

Vision and Mission of the Department

Vision	
◎	To impart standard education, training and research in the field of Electronics and Communication Engineering and to produce globally proficient engineers.

Mission	
◎	Provide quality and contemporary education in the domain of ECE to produce globally competitive engineers.
◎	Facilitates industry institution interaction in teaching & learning, consultancy and research activities to accomplish the technological needs of the society.
◎	Develop entrepreneurship qualities and good management practices by adhering to the professional ethical code.

Program Educational Objectives (PEO's)	
PEO 1	Graduates will exhibit knowledge in Electronics and Communication Engineering and related fields for professional achievement in industry and academia or to become an entrepreneur.
PEO 2	Graduates will acquire the skills to identify and engage in query, develop new innovations and products in allied area of Electronics and Communication engineering system.
PEO 3	Graduates will develop technological requirement for the society through lifelong learning.

Programme Outcomes (PO's)	
Students graduating from Electronics and communication Engineering should be able to	
PO 1	**Engineering knowledge :** Apply the fundamental knowledge of mathematics, science and Engineering for the solution of complex Electronics and communication engineering problems.
PO 2	**Problem analysis :** Identify, formulate, research literature, and analyse complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / Development of Solutions :** Design solutions for complex electronics engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems :** Using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5	**Modern tool usage :** Create, select, and apply appropriate techniques, resources, and modern electronics and communication engineering tools including prediction and modeling to complex electronics and communication engineering activities with an understanding of the limitations.
PO 6	**The Engineer and society :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability :** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
PO 8	**Ethics :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work :** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	**Communication :** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance :** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning :** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcome (PSO's)
After the successful completion of the U.G. programme in Electronics and Communication Engineering, Graduates will be able to

PSO 1	Analyze and Design Electronic Systems for Signal Processing and Communication Applications.
PSO 2	Identify and Apply Domain Specific Tools for Design, Analysis, Synthesis and Validation of VLSI and Communication Systems.

Approved by BoS Chairman

UG Regulations

1. SHORT TITLE AND COMMENCEMENT

⟩ These Regulations shall be called the "KIT-Kalaignarkaraunanidhi Institute of Technology, Coimbatore, Regulations for the Award of B.E. / B.Tech., Degree".

⟩ They have been evolved, drafted and implemented after deliberations in and approvals from UGC, Anna University and Academic Council of the Institute, and are subject to changes/ modifications from time to time; (major modifications at a frequency of FOUR years in synchronization with the curriculum structure revision and minor changes as and when applicable).

⟩ The latest / first version shall be applicable for the students enrolling for B.E. / B.Tech degree programme at this Institution from the Academic year 2023-24 and onwards.

⟩ The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of students (including those already undergoing the programme) as may be decided by the Academic Council.

2. PREAMBLE

The regulations prescribed herein have been made by KIT, an autonomous institution, approved by AICTE,New Delhi and affiliated to the Anna University, Chennai, to facilitate the smooth and orderly conduct of its academic programmes and activities at the B.E/B.Tech., level. It is expected that the regulations will enable the students to take advantage of the various academic opportunities at the Institute and prepare themselves to face the challenges in their professional careers ahead. It may be noted that :

a. The provision made herein shall be applicable to all the B.E/ B.Tech. programmes offered at the institution, at present.

b. They shall also be applicable to all the new B.E /B.Tech. programmes which may be started in the future.

c. Academic and non-academic requirements prescribed by the Academic Council have to be fulfilled by a student for eligibility towards award of B.E. / B.Tech. Degree.

3. PRELIMINARY DEFINITIONS AND NOMENCLATURE

In this Regulations, unless the context otherwise requires :

Table - 1 : Preliminary Definitions and Nomenclature

Sl.No.	Name	Definition
1.	**Programme**	Refers to Degree Programme that is B.E. / B.Tech.
2.	**Branch**	Refers to branch or specialization of B.E. / B.Tech. Programme, like Computer Science and Engineering, Mechanical Engineering, etc.,
3.	**Course**	Refers to a theory or practical subject that is normally studied in a semester, like Mathematics, Physics, etc.,

4.	**Principal / Head of the Institution**	Refers to the authority of the institution who is responsible for all academic activities, for the implementation of relevant rules and regulations.
5.	**Controller of Examinations (CoE)**	Refers to the authority of the college who is responsible for all activities of the Examinations.
6.	**Head of the Department (HoD)**	Refers to the Head of the Department concerned.
7.	**University**	Refers to Anna University, Chennai
8.	**KIT**	Refers to KIT-Kalaignarkarunanidhi Institute of Technology, Coimbatore.
9.	**Curriculum**	Refers to the various components / courses studied in each programme that provide appropriate outcomes (knowledge, skill and behavior / attitude) in the chosen branch of study.
10.	**L - T - P - C**	Refers to **L**ecture, **T**utorial, **P**ractical and **C**redits respectively
11.	**Programme Coordinator**	Refers to the coordinator of the programme concerned. He / she acts as interface between programme and key stakeholders, students, faculty and employer. He/She is responsible for planning the academic activities of the programme along with the course coordinator(s) and the HoD. He/She also prepares, evaluates and analyses the attainment of the programme outcomes along with Programme Advisory Committee.
12.	**Faculty Advisor**	The Faculty Advisor is responsible for providing general advice on the Academic matters, monitor the attendance and academic performance of the students and counsel them periodically. If necessary, the Faculty Advisor may also inform the parents about the progress/ performance of the students concerned through HoD.
13.	**Course Coordinator**	Course Coordinator is responsible for teaching the course, evaluating and analysing the performance of the students. The students is also responsible for the assessment of the Course Outcomes / Program Outcomes / Program Specific Outcomes. They can also recommend to organize workshops / seminars/guest lectures / industrial visits to meet the Course Outcomes and Program Outcomes.

14.	**Class committee**	Class committee for each semester of a programme comprises of HoD, Programme Coordinator, Faculty Advisor, Course Coordinators (as applicable) and Student Representatives.
15.	**Academic Evaluation Committee (AEC)**	The committee includes Principal, CoE, HoD concerned (For details refer **Appendix V**)
16.	**Department Evaluation Committee (DEC)**	The committee included HoD (need basis), senior faculty member(s) of department from various levels, class advisor, Mentor of the students. (For details refer **Appendix V**)
17.	**CIA**	Refers to Continuous Internal Assessment.
18.	**ESE**	Refers to End Semester Examination
19.	**CBCS**	Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve their target number of credits by using their choice both in terms of pace and sequence of courses. The students are given the privilege to choose any course as an elective which they have not studied before.
20.	**GPA**	Refers to Grade Point Average
21.	**CGPA**	Refers to Cumulative Grade Point Average
22.	**CEC**	Refers to Career Enhancement Courses
23.	**PCC**	Refers to Professional Certificate Courses
24.	**VAC**	Refers to Value Added Courses

4. ADMISSION

4.1 B.E. / B.Tech. Degree Programme (I Semester)

The Candidates should have passed the Higher Secondary Examinations of (10+2) Curriculum (Academic Stream) prescribed by the Government of Tamil Nadu with Mathematics, Physics and Chemistry as three of the four subjects of study under Part-III or any examination of any other University or authority accepted by the Syndicate of Anna University as equivalent thereto.

(OR)

Should have passed the Higher Secondary Examination of Vocational stream (Vocational groups in Engineering / Technology) as prescribed by the Government of Tamil Nadu.

4.2 Lateral Entry Admission

The candidates who possessed the Diploma in Engineering / Technology awarded by the State Board of Technical Education, TamilNadu or its equivalent are eligible to apply for Lateral

entry admission to the third semester of B.E. / B.Tech., as per the rules fixed by Government of TamilNadu.

(OR)

The candidates who possess the Degree in Science (B.Sc.,) (10+2+3 stream) with Mathematics as a subject at the B.Sc. Level are eligible to apply for Lateral entry admission to the third semester of B.E. / B.Tech. Such candidates may be two additional Engineering subject(s) in the third and fourth semesters as prescribed by the AEC, if necessary.

4.3 Re - admission

Students, who have discontinued for reasons other than disciplinary action, may be readmitted as per guidelines given by DoTE, Government of Tamil Nadu and Anna University. DEC shall study and recommend on the exception and addition of courses to be registered for, by the student concerned during re-admission. The details shall be forward to AEC for approval and the committee's decision shall be final.

The eligibility criteria shall be as prescribed by Anna University, Chennai and Government of Tamil Nadu from time to time.

5. PROGRAMMES OFFERED

5.1 A student may be offered admission to any one of the branches of study approved by the Authorities. Degree programme affiliated to Anna University, under CBCS for students admitted from 2023 onwards in the following branches of Engineering and Technology as in Table 1.

Table 1. List of B.E. / B.Tech. programmes offered

B.E.	B.Tech
Aeronautical Engineering	Agricultural Engineering
Biomedical Engineering	Artificial Intelligence and Data Science
Computer Science and Engineering	Bio Technology
Electronics and Communication Engineering	Computer Science and Business Systems
Electrical and Electronics Engineering	
Mechanical Engineering	
Computer Science and Engineering (Artificial Intelligence and Machine Learning)	

5.2 In addition to the regular four years B.E./B.Tech programmes, the following are offered by the Institution :

5.2.1 B.E. / B.Tech with Honors

Students can earn, BE/BTech degree with honors in the chosen discipline of Engineering by opting for six additional courses across the list of professional electives / verticals offered by their parent department.

5.2.2 B.E. / B.Tech Honors (with specialization)

Students can earn, B.E. / B.Tech degree, honors (with specialization) in the chosen discipline of Engineering by opting for six additional courses from one of the verticals offered by their parent department.

5.2.3 B.E. / B.Tech with minor degree

Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering can earn, B.E. / B.Tech with minor degree by opting for six additional courses from one of the verticals offered by the department other than their parent Department.

6. ACADEMIC STRUCTURE OF PROGRAMMES

6.1 Medium of Instruction

The medium of instruction for the entire programme will be English.

6.2 Categorization of Courses

The B.E / B.Tech programmes shall have a curriculum with syllabi comprising of theory, theory cum practical, practical courses in each semester, professional skills training/industrial training, project work, soft skills, internship, etc., that have been approved by the respective Board of Studies and Academic Council of the College. All the programmes have well defined Programme Outcomes (PO), Programme Specific Outcomes (PSO) and Programme Educational Objectives (PEOs) as per Outcome Based Education (OBE). The content of each course is designed based on the Course Outcomes (CO). The courses shall be categorized as follows :

i.   **Humanities and Social Sciences including Management (HSMC)** Courses include Technical English, Communication skills, Humanities and Management.

ii.   **Basic Sciences (BS)** Courses include Mathematics, Physics, Chemistry, etc.

iii.   **Engineering Sciences (ES)** Courses include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer, etc.

iv.   **Professional Core (PC)** Courses include the core courses relevant to the chosen specialization/branch of study.

v.   **Professional Elective (PE)** Courses include the elective courses relevant to the chosen specialization/ branch of study.

vi.   **Open Elective (OE)** Electives from other technical and/or emerging courses are given as a separate list of Elective Courses offered by the Engineering / Science Departments and a student can choose a Course as Open Elective from the above list of Courses.

vii.   **Career Enhancement Courses (CEC)** include Project, Industrial Training / Practical Training/ Internship/ Summer Projects / Seminars /Professional Practices /Case Study, Value added courses.

viii. **Mandatory Courses (MC)** include Environmental Science and Engineering, Induction Programme, Constitution of India, Essence of Indian traditional language.

*Minor variations are allowed as per the need of the respective discipline.

6.3 Curriculum

The curriculum will comprise courses of study as given in respective department in accordance with the prescribed syllabi. The hours / week listed in syllabus for each of the course refer to periods/week. The curriculum consists of (a) Basic Sciences, (b) Humanities and Social sciences (c) Engineering Sciences (d) Professional cores (e) Professional electives (f) Open electives (g) Employability Enhancement courses (h) Mandatory courses and (i) Induction programme and as per AICTE guidelines.

6.4 Electives

Every student shall opt for electives from the list of electives of the respective degree programme in consultation with the Tutor, Programme Co- ordinator and the HoD. A student shall undergo two open elective courses and six professional elective courses. Professional electives will be offered from 5th semester to 8th semester. Minimum number of credits to be earned for open elective courses is 6. Minimum number of credits to be earned for professional elective courses is 18. Open electives are the elective courses offered by a department for students of other branches and professional electives are courses offered by a department to the students of their own branches only.

6.5 Project Work

Every student shall be required to undertake a suitable project in industry / research organization / department in consultation with the Head of the Department and the faculty guide and submit the project report thereon at the end of the semester in which the student registered, on date announced by the College / Department. A student shall register for the Project Work I in the 7th semester and for Project Work II in the 8th semester.

6.6 Induction Programme

All students shall undergo induction programme in the first semester for a duration of three weeks as per the guidelines of All India Council for Technical Education (AICTE). A student completing the induction programme will be awarded completed grade and only the students who complete the induction programme shall be considered as eligible for award of degree subject to satisfying other conditions. A student who does not complete the induction programme in the first semester shall Redo the same in the subsequent semesters.

6.7 Number of credits per semester

Curriculum of a semester shall normally have a blend of theory Courses and practical Courses. In addition, Career Enhancement Course(s) may also be included. Each course may have credits assigned as per clause 5.8. However, the total number of credits per semester shall not exceed 36 (including CEC, credit transfer from SWAYAM/NPTEL courses, re-registration courses, courses registered for honors/honors with specialization/minor degree, and excluding Value Added courses, reappearance courses).

6.8 Credit Assignment

Each course offered is given a L-T-P-C structure, depending on the number of Lecture (L), number of periods for Tutorial periods (T), number of periods for practical (P), C- credits required for an efficient teaching – learning process. A student is expected to put-in his / her

own efforts in proportion with periods spent in classroom, as defined in L-T-P-C structure. On successful completion of the course a student is said to have earned a specified number of credits defined for each course. Each course is assigned certain number of credits based on the following table :

Table 2 : Credit Assigned

Contact period per week	Credits
1 Lecture (**L**)	1
1 Tutorial Period (**T**)	1
1 Practical Period (**P**) (Laboratory Periods / CEC / Projects)	1 / 2

6.9 CAREER ENHANCEMENT COURSES (CEC)

6.9.1 Industrial Training / Practical Training/ Internship/ Summer Projects / Seminars / Professional Practices / Case Study.

The students may undergo industrial training/Internship if mandated in the curriculum for periods as specified in the curriculum during the summer/winter vacation, the training being taken on a continuous basis for the periods mentioned. The industry / organization is to be selected with the approval of the Department Evaluation Committee (DEC). The students may undergo Internship at a Research organization / University/ Industry (after due approval from the Head of the Institution) for the period prescribed in the curriculum during the summer / winter vacation, in lieu of Industrial training

The Industrial training/ Practical Training/ Internship/ Summer Projects / Seminars / Professional Practices / Case Study which is successfully completed by the student in a particular semester during the course of study is eligible for including in the grade sheet in the immediate next semester by registering it. The final year project period at industry / research organization will not be considered as industrial Training/internship.

6.9.2 Industrial Visit

Every student is required to go for at least one Industrial visit every year starting from the second year of the Programme subject to the approval of the Head of the Department and Principal. The Heads of Departments shall ensure that necessary arrangements are made in this regard.

6.9.3 Professional Certificate Courses

Students have to undergo one credit courses offered by experts from industry / research organizations and approved by academic council. Students can register such courses from his/her second year of study as and when these courses are conducted by the Departments. A student can also permitted to register for these courses of other Departments.

If a student does not successfully complete the registered industry supported one credit courses in a semester, the registration of that course will be considered as withdrawn. Further, it will not be treated as arrear and if he / she wishes, he/she can re-register for the same course in the ensuing semesters and successfully complete it as and when it is offered subsequently.

6.9.4 Online Courses offered through SWAYAM / NPTEL

Students may be permitted to register maximum of two online courses, subject to a maximum of six credits, registered through SWAYAM instead of Professional/Open Elective Courses (For Honors / Honors with Specialization / Minor degree, additional two SWAYAM / NPTEL online courses with 3 credits each, are permitted for credit transfer) of regular B.E/B. Tech Programme with the approval of BOS through DEC. The online course of minimum 3 credits can be considered instead of one Professional / Open elective course.

DEC finalizes the courses to be permitted for credit transfer through SWAYAM / NPTEL prior to the commencement of the semester. The courses selected through the SWAYAM/ NPTEL may not be necessarily the courses which are offered in the list of Professional/Open Elective courses, as part of the curriculum.

The Committee also intimates the students about the selected courses prior to the commencement of the semester, identify and designate a Course Coordinator for the online course(s) offered. The Course Coordinator guides the students throughout the course, submits the certificates and marks earned by the students to the office of the CoE during credit transfer request by the student.

The student has to register for the credit transfer of the online course during the course registration. The online course(s) which is/are successfully completed by the student in a particular semester during the course of study is eligible for credit transfer in the immediate next semester by registering it (i.e. an online course is eligible for credit transfer in the immediate next semester only)

6.9.5 Soft Skills

Every Student is required to go for soft skill courses during first year of study. The soft skill course includes the communication skill, interpersonal skill and career development courses, etc. (Non Credit).

6.9.6 Value added courses

Value added courses shall be offered by the Department with the prior approval from BoS. The credits earned through value added course shall be over and above the total credit requirement prescribed in the curriculum for the award of degree. Students can earn maximum of six credits from a value added courses subject to maximum of one value added course per semester. The permitted credit structure for a value added course is 3. Industry offered and skill development courses shall be considered under this category. These value added courses can also be undergone through online platform approved by the Board of Studies through DEC. The course(s) (if pursued through online mode) which is/are successfully completed by the student in a particular semester during the course of study is eligible for including in the grade sheet in the immediate next semester by registering it.

Students may be permitted to register maximum of one value added course, subject to the maximum of three credits registered through, value added course.

Instead of one professional /open elective courses of regular B.E/B.Tech. programme with the approval of Bos through DEC. The value added course of minimum 3 credits can be considered instead of one professional /open elective course.

6.9.7 Course Numbering Scheme

Each course is denoted by a unique code consisting of 9 alphanumeric characters. The details of the numbering scheme are in APPENDIX A.

6.9.8 Credit Requirement for Programmes

The total number of credits that a student earns during the period of study is called the total credits. For the successful completion of the B.E/B.Tech Programme, a regular student must earn 169 credits (varies with the programme) in minimum of eight semesters, while a lateral-entry student must earn 127 credits in a minimum of six semesters.

7. DURATION OF THE PROGRAMMES

A student is normally expected to complete the B.E / B.Tech. Programme in 4 years i.e 8 semesters, but in any case (including authorized break of study on one year) not more than 7 years i.e. 14 Semesters (vide clause 18).

A Lateral entry student is normally expected to complete the B.E. / B.Tech programme in 3 years (6 semesters), but in any case (including authorized break of study of one year) not more than 6 years i.e. 12 semesters. The duration of B.E. / B.Tech programme for a lateral entry student shall be three academic years with semester pattern. The courses of study for the lateral entry Diploma candidates shall be in accordance with the prescribed syllabus of third to eighth semesters of the full time four year B.E. / B.Tech. Degree Programme of the respective branches. The courses of study for the lateral entry science graduates shall be in accordance with the prescribed syllabi of the full time four year B.E. / B.Tech. Degree programme of the respective branches. The additional courses offered will be decided by the respective Chairman, Board of Studies.

Each semester normally consists of 90 working days, including test or 450 hours or 540 periods of each 50 minutes duration. The HOD shall ensure that every course coordinator imparts instruction as per the number of contact periods specified in the syllabus covering the full content of the syllabus for the course being taught.

The total duration for completion of the programme reckoned from the commencement of the first semester to which the student was admitted shall not exceed the maximum duration specified

Due to Pandemic / Abnormal situations the Scheme of Examinations and Evaluation will be followed as per the guidelines issued by the Government of Tamil Nadu and Anna University, Chennai.

The total period for completion of the programme reckoned from the commencement of the first semester to which the candidate was admitted shall not exceed the maximum period specified in this clause irrespective of the period of break of study in order that he/she may be eligible for the award of the degree

For the purpose of regulations, the academic year will be divided into two semesters, the odd semester normally spanning from June to November and the even semester from December to May.

8.   COURSE REGISTRATION

Each student, on admission shall be assigned to a Faculty Advisor, who shall advice and counsel the student about the details of the academic programme and the choice of courses considering the student's academic background and career objectives.

In the first semester of study, each student on admission shall register for all the courses prescribed for the first semester in the curriculum.

From the first semester onwards, every student shall enroll for all the courses of the next Semester in the current Semester itself. The enrollment for all the courses of the next semester will commence 10 working days prior to the last working day of the current Semester.

From second semester onwards, the student shall confirm the enrollment by registering for the courses within the first ten working days after the publication of results including revaluation results of the previous semester examinations. However, the student has to register for the courses for which the student has not enrolled, if these are the courses in which the student has failed.

The registration process for the courses offered in the online registration mode in the forthcoming semester, will commence preferably 10 working days prior to the last working day of the current semester.

A department shall offer a course only if a minimum of 10 students register for that course. This minimum number may vary from course to course and shall be specified by the department from time to time.

Students who rejoined the programme after availing permitted Break of Study or Readmitted by DOTE / University need not submit new Enrollment Form, but they have to submit the course registration form. The Transfer and Lateral Entry Students who joined the programme in a particular semester have to submit the course registration form within the first 10 working days after the date of joining.

After registering for a course, a student shall attend the classes, satisfy the attendance requirements, earn Continuous Internal Assessment Marks and appear for the End Semester Examination (ESE) or as specified in the curriculum.

8.1   Credit details for Course Registration

A student has to earn the total credits specified in the curriculum of the respective programme of study, in order to be eligible to obtain the degree. However, if the student wishes, then he/she is permitted to earn more than the total number of credits prescribed in the curriculum.

The number of credits, most students are expected to register for, in a semester, will be about 20 - 30 credits (excluding arrears). so that they complete the programme within the specified duration of the programme. The minimum credits a student can register for, in a regular semester shall be 12 and the maximum credit a student can register is 36 (excluding arrears). Students shall register for project work in the 7th and 8th semester or 8th semester only.

Table 4 : Credit Range

PROGRAMME	PRESCRIBED CREDIT RANGE
B.E. / B.Tech. (Regular)	169
B.E. / B.Tech. (Lateral Entry)	127
B.E. / B.TECH (Honours)	(169 / 127) + 18 Credits

8.2   Flexibility to Add / Drop courses

8.2.1 A student has to earn the total number of credits specified in the curriculum of the respective Programme of Study in order to be eligible to obtain the degree. However, if a student wishes, he / she is permitted to earn more than the total number of credits prescribed in the curriculum of the Programme.

8.2.2 The students shall undergo the eighth semester courses other than the Project Work in the sixth and seventh semesters, provided they do not have current arrears and have a CGPA of 7.50 and above at the end of Semester IV. The Faculty Advisor, HoD, in consultation with the faculty handling the said courses shall forward the proposal to the CoE for approval at least 4 weeks before the commencement of the sixth semester of the programme. Total numbers of credits of such courses shall not exceed 3.

8.2.3 The students should not have standing arrears and have a CGPA of 7.50 and above for registering additional courses. However, the maximum number of credits the student can register in a particular semester cannot exceed 36 credits (Including the CEC, credit transfer from SWAYAM/ NPTEL courses, Re-registration courses, course registered for Honors/Honors with Specialization/ Minor degree and Excluding the courses for which the student has done reappearance registration, value added courses).

8.2.4 From the second to final semesters, the student has the option of dropping existing theory courses in a semester during registration. The total number of credits of such courses shall not exceed 6 per semester. The student is permitted to drop the course(s) within 30 days of the commencement of the academic schedule.

8.3   Reappearance Registration / Re-enrollment Registration

8.3.1 If a student fails in a Theory (except electives) / Theory with Practical component/ Practical course(s), the student shall do reappearance registration for that course in the subsequent semester and attend end semester examination.

8.3.2 If the theory course, in which the student has failed, is a Professional Elective or an Open Elective course, the student may register for the same or any other Professional Elective or Open Elective Course respectively in the subsequent semesters. Such changes can be done only with due approval by the HoD.

8.3.3 The student who fails in Project work shall register for the same in the subsequent semester, satisfy attendance requirement, earn continuous assessment marks and appear for the ESE.

8.3.4 If a student is prevented from writing ESE due to lack of attendance (overall attendance is below 65%), the student has to rejoin the programme in the next academic year after getting readmission order from DOTE/University. The student shall attend the classes and fulfil the attendance requirements as per clause 8, earn continuous assessment marks and appear for the ESE.

8.3.5 B.E. / B. Tech. (Honours) Specialisation in the same discipline, B.E. / B. Tech. (Hons) and B.E. / B. Tech. minor in other specialization

i. **B.E. / B.Tech. Honours (Specialisation in the same discipline) :**

    a. The student should have earned additionally a minimum of 18 credits from a vertical of the same programme.

    b. Should have passed all the courses in the first attempt.

    c. Should have earned a minimum CGPA of 7.50.

ii. **B.E / B.Tech. Honours**

    a. The students should have earned additional courses (minimum of 18 credits) from more than one vertical of the same programme.

    b. Should have passed all the courses in the first attempt.

    c. Should have earned a minimum CGPA of 7.50.

iii. **B.E. / B.Tech. (Minor in other specialisation)**

    The student should have earned additionally a minimum of 18 credits in any one of the verticals of other B.E/B.Tech programmes.

    Students can earn maximum of 6 credits in online mode (SWAYAM platform), out of these 18 credits as approved by Board of Studies

B.E. / B. Tech. (Hons) Specialization in the same discipline, B.E / B.Tech. Honors and B.E. / B.Tech. minor in other specialization degree will be optional for students.

For the categories 6.10.1 (i) to 6.10.1(ii), the students will be permitted to register the courses from V Semester onwards provided the marks earned by the students until III semester should be of CGPA 7.50 and above and cleared all the courses in the first attempt.

For the category 6.10.1 (iii), the students will be permitted to register the courses from Semester V onwards provided the marks earned by the students until Semester III is CGPA 7.50 and above

If a student decides not to opt for Honours, after completing certain number of additional courses, the additional courses studied shall be considered instead of the Professional Elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of Professional Elective courses required as per the curriculum, the courses with higher grades shall be considered for the calculation of CGPA. Remaining courses shall be printed in the grade sheet, however, they will not be considered for calculation of CGPA

If a student decides not to opt for Minor, after completing certain number of courses, the additional courses studied shall be considered instead of Open Elective courses which are part of the curriculum. If the student has studied more number of such courses than the

number of open electives required as per the curriculum, the courses with higher grades shall be considered for calculation of CGPA. Remaining courses shall be printed in the grade sheet. However, they will not be considered for calculation of CGPA.

9.   REQUIREMENTS FOR APPEARING FOR CIA, ESE

9.1   A student who has fulfilled the following conditions shall be deemed to be eligible to appear for the CIA - I, CIA - II, CIA - III and ESE. Ideally, every student is expected to attend all the classes and earn 100% attendance. Students who have earned not less than 75% attendance course wise taking into account the number of periods required for that course as specified in the curriculum. Table 5 illustrates the mandatory attendance requirement for CIA - I, CIA - II, CIA - III and ESE.

Table 4 : Mandatory Attendance Requirement for CIA - I, CIA - II, CIA - III and ESE

Test / Examination Type	Period of Calculation	Minimum % of attendance required
CIA - I	**First Semester** From the date of joining of course to three working days before the start of CIA – I	60%
	Second to Eighth semester From the date of commencement of the class to one week before the start of CIA - I	75%
CIA - II	From the date of joining (1st semester) / date of commencement of class (2nd to 8th Semester) to one week before the start of CIA - II	75% (for students maintaining 80% or more attendance between CIA - I and CIA - II, but falls short of the 75% cumulative requirement, the requirement may be relaxed if recommended by the AEC)
CIA - III	From the date of joining (1st semester) / date of commencement of class (2nd to 8th Semester) to one week before the start of CIA - III	75% (for students maintaining 80% or more attendance between CIA - II and CIA - III, but falls short of the 75% cumulative requirement, the requirement may be relaxed if recommended by the AEC)

ESE	From the date of joining (1st semester) / date of commencement of class (2nd to 8th Semester) to the last day of instruction	75%

Every course coordinator is required to maintain an ATTENDANCE AND ASSESSMENT RECORD' for every semester which consists of attendance marked in each Theory / practical/ EEC class etc, the assessment marks and the record of class work (topics covered), separately for each course handled by the course coordinator. This should be submitted to the HoD periodically (at least two times in a semester) for checking the syllabus coverage and the records of assessment marks and attendance. The HoD will affix his/her signature and date after due verification. At the end of the semester, the record should be verified by the HoD who shall keep this document after the approval from the Principal for five years. The records of attendance and assessment of both current and previous semesters should be available for inspection whenever required.

9.1.1 A student shall normally be permitted to appear for ESE of the course if he / she has satisfied the attendance requirements (vide Clause 8). He /she is eligible to register for ESE in that semester by paying the prescribed fee.

9.1.2 A Candidate who has fulfilled the following conditions shall be deemed to have satisfied the requirements for completion of a semester. Ideally every student is expected to attend all classes of all the courses and secure 100% attendance. However, in order to give provision for certain unavoidable reasons such as Medical / participation in sports, the student is expected to attend atleast 75% of the classes. Therefore, he/she shall secure not less than 75%.

9.1.3 However, a candidate who secures overall attendance between 65% and 75% in the current semester due to medical reasons (prolonged hospitalization / accident / specific illness) / Participation in Sports events may be permitted to appear for the current semester examinations subject to the condition that the candidate shall submit the medical certificate/ sports participation certificate attested by the Head of the Institution. The same shall be forwarded to the Controller of Examinations for record purposes.

9.1.4 Candidates who secure less than 65% overall attendance and candidates who do not satisfy the clause 8 shall not be permitted to write the ESE and not permitted to move to the next semester. They are required to repeat the incomplete semester in the next academic year, as per the norms prescribed.

9.1.5 The students who are consistently good in academics ONLY be considered for the grant of ODL under Co-curricular activities by the competent authorities. The following activities shall be considered for the sanction of ODL ;

⊙ **Sports and Games :** TIES, Inter Collegiate, Inter Zonal, Inter University, State Level, National Level and Open Tournaments.

⊙ **NCC :** Camps and expeditions, NSS camps

⊘ Cultural Programme at State, National and International Level

⊘ **Seminar / Symposia :** Paper presentation/Quiz

⊘ Leadership courses organized by other organizations & Alumni Association activities, Association activities, Placement activities.

⊘ Training programs / Internship at industries and Higher learning Institutions

⊘ Personal damage incurred during the extracurricular activities

⊘ The ODL requisition letter shall be forwarded to the Principal through the HoD of the student by the staff-in-charge of the respective activities before completion of every activity.

⊘ The ODL sanctioned letters shall be submitted to the Department Office. The faculty-in-charge of the department office will check the eligibility for the award of attendance at the end of semester and the same may be submitted to DEC for approval.

9.1.6 The student should register all the courses of current semester and all the arrear courses in the previous semesters. If any student fails to register and pay the examination fees within the due date, he/she shall not be permitted to attend the ESE. However, he/she will be permitted to continue their studies in the next higher semester, provided that the student satisfies the requirements as stipulated in this clause of this regulation.

9.1.7 Those students who are not deemed to have completed the semester with references to the conditions specified above shall undergo the semester again in all the courses in the respective semester during next academic year. He/she shall seek re-admission as per the norms of the affiliating University/DOTE (Directorate of Technical Education).

The days of suspension for a student on disciplinary grounds will be considered as days of absence for calculating the percentage of attendance for each individual course.

10. TEMPORARY BREAK OF STUDY FROM A PROGRAMME

10.1 Break of study is normally not permitted. However, if a student intends to temporarily discontinue the programme in the middle of a semester / year for valid reasons (such as Internships, accident or hospitalization due to prolonged ill health) and wishes to re-join the programme in the next academic year, he / she shall apply in advance to the Principal through the HoD, stating the reasons. The application shall be submitted not later than the last date for registering for the ESE. Break of study is permitted only once during the entire period of the degree programme.

10.2 The student permitted to re-join the programme after the break shall be governed by the rules and regulations in force, at the time of re-joining.

10.3 The duration specified for passing all the courses for the purpose of classification of degree(vide clause 17) shall be increased by the period of such break of study permitted

10.4 If a student is detained for want of requisite attendance, academic progress and good conduct, the period spent in that semester shall not be considered as permitted Break of Study and Clause 10 is not applicable for such cases.

11. ASSESSMENT PROCEDURES FOR AWARDING MARKS

All B.E. / B.Tech. Programmes consists of different categories of courses as mentioned in table 5. Appearance in ESE is mandatory for all courses excluding the courses for which only continuous assessment is recommended as mentioned in table 5.

Performance in each course of study shall be evaluated based on (i) Continuous assessments throughout the semester and (ii) ESE at the end of the semester. (i.e.) Each course shall be evaluated for a maximum of 100 marks as shown below :

Table 5 : Categories of Courses

S. No.	Category of course	CIA	ESE
1.	Theory	40	60
2.	Theory cum Practical	50	50
3.	Practical	60	40
4.	Project Work	40	60
5.	Online SWAYAM/NPTEL Courses (Optional)	Marks offered by SWAYAM / NPTEL shall be directly considered	
6.	All CEC Courses (Except Practical Courses and Project Work)	100	–
7.	Mandatory Courses (Except Induction Program #)		
8.	Professional Certificate Courses * (Optional)		

Students can earn maximum of 6 credits in online mode (SWAYAM platform), out of these 18 credits as approved by Board of Studies.

B.E. / B. Tech. (Hons) Specialization in the same discipline, B.E. / B.Tech. Honors and B.E. / B.Tech. minor in other specialization degree will be optional for students.

For the categories 6.10.1 (i) to 6.10.1 (ii), the students will be permitted to register the courses from V Semester onwards provided the marks earned by the students until III semester should be of CGPA 7.50 and above and cleared all the courses in the first attempt.

For the category 6.10.1 (iii), the students will be permitted to register the courses from Semester V onwards provided the marks earned by the students until Semester III is CGPA 7.50 and above

If a student decides not to opt for Honours, after completing certain number of additional courses, the additional courses studied shall be considered instead of the Professional Elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of Professional Elective courses required as per the curriculum, the courses with higher grades shall be considered for the calculation of CGPA. Remaining courses shall be printed in the grade sheet,however, they will not be considered for calculation of CGPA.

If a student decides not to opt for Minor, after completing certain number of courses, the additional courses studied shall be considered instead of Open Elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of open electives required as per the curriculum, the courses with higher grades shall be considered for calculation of CGPA. Remaining courses shall be printed in the grade sheet. However, they will not be considered for calculation of CGPA.

11.1 Assessment for Theory Courses Including Mandatory Courses

Theory Courses including mandatory courses are to be assessed out of 100 marks, the maximum marks for CIA is fixed as 40 and the ESE carries 60 marks.

The ESE for theory courses including mandatory courses will be of 3 hours duration and shall normally be conducted for a maximum of 100 marks during the Odd and Even Semesters. Every student should appear for the ESE for all the courses excluding the courses for which only continuous assessment is recommended.

A minimum of two tests would be conducted in a day (in the case of tests and they would be of two hours duration each) students will have two hours of coaching session followed by the CIA. In case a student misses the assessment due to medical reasons (hospitalization / accident / specific illness) or due to participation in the College / University / State / National / International level academic and sports events with prior permission from the HOD, a Reassessment may be given at the end of the semester after getting approval from the HOD through the Course Coordinator concerned.

To arrive the Continuous Assessment Marks, the following guidelines should be followed.

Table 6 : Theory Courses : Continuous Assessment Marks

CIA I (100 Marks)		CIA II (100 Marks)		CIA III (100 Marks)		Total
Individual Assignment / Case Study / Seminar / Mini project	Written Test	Individual Assignment / Case Study / Seminar / Mini project	Written Test	Individual Assignment / Case Study / Seminar / Mini project	Written Test	Continuous Assessment Marks
40	60	40	60	40	60	300*

*The weighted average shall be converted into 40 marks for Internals

A minimum of three CIA will be conducted as a part of continuous assessment during the semester by the respective department. Each Continuous assessment is to be conducted for 100 marks and will have to be distributed in two parts viz., Individual Assignment/Case study/ Seminar/Mini project and Test with each having a weightage of 40% and 60% respectively. The tests shall be in written mode. The total Continuous assessment marks of 300 shall be converted into a maximum of 40 marks and rounded to the next integer.

11.2 Assessment for Practical Courses

For practical including virtual practical Courses, out of 100 marks, the maximum marks for CIA is fixed as 60 and the ESE carries 40 marks.

Every practical exercise / experiment shall be evaluated (as per the rubrics approved by the class committee) based on conduct of experiment / exercise and records. There shall be at least one model test. The criteria for arriving at the CIA marks of 60 is as follows

Table 7 : Practical Courses : Continuous Internal Assessment Marks :

Continuous Assessment (100 Marks)*	
Evaluation of Laboratory experiment, results & Record	Test
75	25

*Continuous Assessment marks shall be converted into 60 marks

The ESE for practical courses shall be of 3 hours duration and normally be conducted for a maximum of 100 marks during the odd and Even Semesters.

11.3 Assessment for Theory with Practical Courses

Weightage of Continuous Assessment and end semester examination marks will be 50% each. The distribution of marks for the theory and laboratory components in the Continuous Assessment and end semester examination for different types of courses are provided in the table 8.

Table 8 : Theory Courses with Practical Component: Continuous Assessment Marks

L	T	P	C	Continuous Internal Assessment			ESE
				I	II	III	
1	0	4	3	Laboratory (15%)	Laboratory (15%)	Theory (20%)	Laboratory only (50%)
1	0	2	2	Laboratory (15%)	Laboratory (15%)	Theory (20%)	Laboratory only (50%)
2	0	2	3	Theory (15%)	Theory (15%)	Laboratory (20%)	Theory (25%) Laboratory (25%)
3	0	2	4	Theory (15%)	Theory (15%)	Laboratory (20%)	Theory (35%) Laboratory (15%)
2	0	4	4	Theory (15%)	Theory (15%)	Laboratory (20%)	Theory (15%) Laboratory (35%)

The procedure for the conduct of Continuous Assessment for theory and laboratory components shall be as per the clause 10.1 and 10.2 respectively. The weighted average shall be converted into 50 marks for Continuous Internal Assessment.

11.4 Assessment for Project Work

The Project work such as mini project and final year project shall be carried out under the supervision of a faculty in the department concerned.

The students who completed their final semester courses (except project work) in advance, shall be permitted to carry out their final semester Project Work for six months in an industry/research organization on the recommendations of the HoD. In such cases the approval should be obtained from the industry concerned, the project work shall be jointly guided by a supervisor of the department and an expert as joint supervisor from the respective organization. The student shall be instructed to meet the supervisor periodically and to attend the review committee meetings and shall submit attendance particulars from the joint supervisor for evaluating the progress

For Project Work, out of 100 marks, the maximum marks for CIA is fixed as 40 and the ESE (Project Report evaluation and Viva-Voce examination) carries 6 0 marks. Project work may be carried out by a single student or a group of students (not exceeding 4).

There shall be three reviews during the semester. The student shall make presentation on the progress made by him / her before the "Project Review Committee". The total marks obtained in the three reviews shall be reduced for 40 marks and rounded to the next integer. The HoD shall constitute a "Project Review Committee" for each Programme. There shall be a minimum of three members in the Review Committee. The Project Guide will be one of the members of the Review Committee.

The student(s) is expected to submit the Project Report on or before the notified date. The ESE for Project Work shall consist of evaluation of the final Project Report submitted by the student(s) of the Project group and viva-voce examination by an external examiner and internal examiner.

The project report shall carry a maximum of 20 marks. The project report shall be submitted as per the approved guidelines as given by the CoE. Same marks shall be awarded to every student within the project group for the project report. The viva-voce examination shall carry 40 marks. Marks are awarded to each student of the project group is based on the individual performance in the viva- voce examination.

The CIA and ESE marks for Project Work and the Viva-Voce Examination will be distributed as indicated below.

Table 9 : Project Work : CIA and ESE

Continuous Internal Assessment Marks (40)			End Semester Examinations Marks (60)			
Review I	Review II	Review III	Project Report		Viva-Voce Examination	
			Internal	External	Internal	External
10	15	15	10	10	20	20

The last date for submission of the project report is on the last working day of the semester. If a student fails to submit the project report on or before the specified deadline or the student has submitted the project report but did not appear for the viva-voce examination, it will be considered as fail in the Project Work and the student shall re-register for the same in the subsequent semester.

11.5 Interdisciplinary Project

For the final year Mini/ main project, students may be allowed to do interdisciplinary projects. The interdisciplinary project team consists of 4 members in a Team, consisting 3 students from 3 different branches or 4 students from same branch. First Project Guide shall be allotted from parent department and the second members shall be allotted from the respective domain (other department). The CIA of the project will be carried out by the Interdisciplinary Project Review committee by the respective departments. The Project Reviews, CIA Marks and ESE marks will be same as the Regular Project. Interdisciplinary Project Review Committee will be constituted by the CFRD Head and approved by the principal.

Table 10 : Interdisciplinary Project : Review Committee Constitution

Department X	Project Guide nominated by the HoD
Department Y	One faculty nominated by the respective HoD

The weightage for the project guides and project review committee members to award Continuous Assessment marks is indicated below.

Table 11: Interdisciplinary Project : CIA Marks

Project Guide	Member(s)
50%	50%

The ESE marks will be distributed as indicated below.

Table 12: Interdisciplinary Project : ESE Marks

Report Evaluation (20 Marks)	Viva - Voce (40 Marks)	
External Examiner : 1	External Examiner : 1	External Examiner : 1
20 Marks	20 Marks	10 Marks

Internal and External Examiners are from the two different departments (X & Y) of the students.

11.6 Assessment for Industrial Training / Practical Training / Internship

The Industrial training / Practical Training / Internship shall carry 100 marks and shall be evaluated through CIA only. At the end of Industrial training / Practical Training / Internship, the student shall submit a detailed report including attendance on the training undergone and a certificate from the organization concerned. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a three-member Departmental

Evaluation Committee constituted by the HoD consisting of Programme Coordinator, Faculty Advisor concerned and Senior Faculty. The evaluation report duly signed by the departmental evaluation committee and HoD shall be submitted to the office of the CoE.

11.7 Assessment for Professional Certificate Courses

The Seminar / Case Study shall carry 100 marks and shall be evaluated through CIA only. Every student is expected to present a minimum of 2 seminars per semester before the evaluation committee and for each seminar, marks can be equally apportioned. A three member committee appointed by the Head of the Department, consisting of the course coordinator and two experts from the Department, will evaluate the seminar and at the end of the semester, the marks shall be consolidated and taken as the final mark. The evaluation shall be based on the seminar paper (40%), presentation (40%) and response to the questions asked during presentation (20%).

11.8 Assessment for Value Added Courses

The Value Added Courses shall carry 100 marks and shall be evaluated through Continuous Assessments only. Two assessments shall be conducted during the Semester by the department concerned. The total marks obtained in the tests shall be reduced to100 marks and rounded off to the nearest integer. The HOD may identify a faculty member as Coordinator for the Course. The Departmental Consultative committee consisting of the HOD, staff handling the course, Programme Coordinator and a Senior Faculty member nominated by the HOD shall monitor the evaluation process.

The Value Added Courses shall carry 100 marks and shall be evaluated through Continuous Assessments only. Two assessments shall be conducted during the Semester by the department concerned. The total marks obtained in the tests shall be reduced to100 marks and rounded off to the nearest integer. The HOD may identify a faculty member as Coordinator for the Course. The Departmental Consultative committee consisting of the HOD, staff handling the course, Programme Coordinator and a Senior Faculty member nominated by the HOD shall monitor the evaluation process. The B.E. /B.Tech. Candidates who enrolled for value added courses have to earn minimum of 75% attendance, failing which the registration for courses will be cancelled.

11.9 Assessment for SWAYAM/NPTEL Courses

The students may be permitted to credit online courses which are offered through SWAYAM/NPTEL platform with the approval of BoS concerned (vide Clause 5.9.4) The course shall carry 100 marks and the marks awarded by the SWAYAM/NPTEL shall be directly considered for grading of the course. No grades shall be awarded for the attendance in the grade sheet for the online course. The attendance requirement as mentioned in Clauses 8 of Regulations 2023 is not applicable for the SWAYAM/NPTEL courses.

11.10 Research Publication

The student can register for the Research Publication as a value added course of respective credits with the approval of BoS concerned. Maximum of two students can form a team under the guidance of a faculty member and complete the publication in SCI / SCI

expanded / SCOPUS indexed / UGC Care list. Credits for the publication will be awarded as mentioned in Table 13. The students are not allowed for credit transfer for the research publication. The research publication completed in a semester during the course of study is eligible for including in the grade sheet in the immediate next EVEN / ODD by registering it.

Table 13 : Research Publication : Award of Grade

Sl.No	Category of Journal	Credits
1.	One Research Publication in SCI/SCI-Expanded Journal	3
2.	One Research Publication in SCOPUS indexed Journal	2
3.	One Research Publication in UGC Care list Journal	1

12. MARKS DISTRIBUTION

12.1 Question paper pattern

Table 14 : End Semester Examinations

1 Mark (Objective or any type)	2 Marks	13 Marks	Total Marks
15	10	5 (Either or Type)	100
For Engineering Graphics only			
20 Marks			**Total Marks**
5 (Either or Type)			100

13. PASSING REQUIREMENTS

13.1 A student who secures not less than 50% of total marks prescribed for the course [CIA + ESE] with a minimum of 45% of the marks prescribed for the ESE, shall be declared to have passed the course and acquired the relevant number of credits. This is applicable for theory, theory with practical component and practical courses (including project work).

13.2 If a student fails to secure a pass in a theory course / theory with practical component / practical course (except electives), the student shall register and appear only for the end semester examination in the subsequent semester. In such case, the CIA marks obtained by the student in the first appearance shall be retained and considered valid for all subsequent attempts till the student secures a pass. However, from the third attempt onwards if a student fails to obtain pass marks (CIA + ESE), then the student shall be declared to have passed the examination if he/she secures a minimum of 50% marks prescribed for the end semester examinations alone.

13.3 If the course, in which the student has failed, is a Professional Elective or Open Elective course, the student may be permitted to register for the same or any other elective course in the subsequent semesters.

If any other Professional Elective or Open Elective course is opted by the student, the previous registration is cancelled and henceforth it is to be considered as a new Professional Elective or

Open Elective course. The student has to register and attend the classes, earn the continuous assessment marks, fulfill the attendance requirements as per clause 7 and appear for the ESE.

13.4 If a student fails to secure a pass in project work, the student shall register for the course in the subsequent semester/when offered next and repeat the course (vide clause 7.3.3).

13.5 The passing requirement for the courses which are assessed only through purely internal assessments (CEC courses except Project Work and practical), is 50% of the internal assessment (continuous assessment) marks only

13.6 Valued Answer Script review by the students

All the students are allowed to review their valued answer scripts with the faculty in-charge of the course on the specified date (usually the reopening day). Any discrepancies in the valuation can immediately be brought to the notice of the CoE through concerned HoD.

13.7 Revaluation

A student can apply for revaluation in a theory course within 2 working days from the date of review of valued answer scripts by the students on payment of a prescribed fee along with prescribed application to the CoE through the HoD. The CoE will arrange for the revaluation and the following procedure is followed in awarding Grade Points after revaluation:

i. If there is a change from fail to pass for a Candidate in a Course, Grade Point is awarded as per the applicable (relative/absolute) grading.

ii. If a passed candidate in a course obtains more marks after revaluation, Revised Grading is used only when the candidate gets Higher Grade, otherwise no change in the grade awarded before the revaluation.

The results will be intimated to the student concerned through the HoD within 5 working days from the last date of application of revaluation. Revaluation is not permitted for practical course, practical component of theory with practical component courses and project work.

13.8 Photocopy

Photo Copies of answer script for theory subjects can be obtained from the office of the Controller of Examinations on payment of a prescribed fee specified for this purpose through proper application.

13.9 Challenge revaluation

Challenging the revaluation is permitted for those students who have applied for photocopy of answer script. The copy of the answer script is to be valued by a competent authority and the valued script should be submitted to the office of the COE along with prescribed fee for challenging the revaluation within 2 working days after the declaration of the Re-valuation results.

14. AWARD OF LETTER GRADES

14.1 The award of grades will be decided based on relative grading principle. The relative grading is applicable to ONLY those students who have passed the examination as per the passing requirements enumerated above (vide clause 12). For those students who have not passed the examination, Reappearance (U) shall be awarded as shown in the below Table 15.

For those students who have passed the course, the relative grading shall be done. The marks of those students who have passed only shall be considered for relative grading. The evolved relative grading method normalizes the results data using the BOX-COX transformation method and computes the grade range for each course separately and awards the grade to each student. For a given course, if the students' strength is greater than 30, the relative grading method shall be adopted. However, if the students' strength is less than 30 then the absolute grading shall be followed with the grade range as specified below.

Table 15 : Grades and Range of Marks

O	A+	A	B+	B	C	RA
91 - 100	81 - 90	71 - 80	61 - 70	56 - 60	50 - 55	< 50

The performance of a student shall be reported using letter grades, each carrying certain points as detailed below.

Table 16 : Grades and Grade Points

LETTER GRADE	GRADE POINTS	RESULT
O (Outstanding)	10	PASS
A+ (Excellent)	9	
A (Very Good)	8	
B+ (Good)	7	
B (Average)	6	
C (Satisfactory)	5	
U (Re-appearance)	0	RA (Re-appearance)
SA (Shortage of Attendance)	0	RC (Repeat Course)
WD (Withdrawal)	0	EA (Extended Appearance)
AB (Absent)	0	RA (Re-appearance)
WH (Withheld)	0	RA (Re-appearance)

A student is deemed to have passed and acquired the corresponding credits in a particular course if he/she obtains any one of the following grades: "O", "A+", "A", "B+","B", "C". 'SA' denotes shortage of attendance and hence prevented from writing the ESE. 'SA' will figure both in the Grade Sheet as well as in the Result Sheet.

"U" denotes that the student has failed to pass in that course. "WD" denotes withdrawal from the exam for the particular course. WH denotes the result withheld for the particular course. The grades U,WD and WH will figure both in the Grade Sheet as well as in the Result Sheet. In both cases, the student has to appear for the ESE.

If the grade U/AB is given to the courses which are evaluated through CIA and ESE, is not required to satisfy the attendance requirements, but has to appear for the end semester examination and fulfill the passing requirements to earn a pass in the respective courses.

If the grade U/AB is given to the courses which are evaluated only through Continuous assessment, the student shall register for the course again in the subsequent semester, fulfill the passing requirements to earn pass in the course. However, attendance requirement need not be satisfied.

15. METHODS FOR REDRESSAL OF GRIEVANCES IN EVALUATION

Students who are not satisfied with the grades awarded in the ESE of Theory for regular and arrear exams can seek redressal as illustrated in Table 17

Table 17 : Grievance Redressal Mechanism

Sl. No.	Redressal Sought	Methodology	
		Regular Exam	**Arrear Exam**
1.	Revaluation	⊙ Apply for viewing of answer booklet and then apply for revaluation after course expert recommendation	
2.	Challenge of Evaluation	⊙ Apply for viewing of answer booklet and then apply for revaluation after course expert recommendation. ⊙ Next apply for challenge of evaluation	
Note : All applications to be made to COE along with the payment of the prescribed fee.			

Challenge of Evaluation – Flow Process

Table 18 : Challenge of Evaluation – Flow Process

Step 1	A student can make an appeal to the CoE for the review of answer scripts after paying the prescribed fee
Step 2	CoE will issue the viewing of answer scripts to the student
Step 3	The faculty who had handled the subject will evaluate the script and HoD will recommend.
Step 4	A committee consisting of 2 evaluators appointed by CoE will review and declare the result.
Step 5	If the result is in favour of the student, the fee collected will be refunded to the student.
Step 6	The final mark will be announced by CoE.

16. Grading System for Mandatory Courses

Mandatory Courses are courses that are required to be completed to fulfill the degree requirements (e.g. Life skills, Environmental science, etc.). They are normally non – credit based. These courses will not be taken in to consideration for the GPA / CGPA calculations. Each of these courses is assessed continuously and internally for a total mark of 100. The pass mark is 50%. Students, who fail to pass this course, are required to repeat the course, when offered next.

16.1 For mandatory non-credit courses the student must satisfy the minimum attendance requirement & passing criteria as specified for the course. These courses do not carry credits but needs to be completed to fulfill the degree requirements.

16.2 For the mandatory non-credit courses student completing the course will be awarded Pass grade (P) grade and those who fail to satisfy the attendance requirement or fail to satisfy the minimum passing requirement of 50% marks, will be awarded Fail (F) grade and the student must re-register for the course when it is offered next.

16.3 Grade Sheet

After the results are declared, grade sheets will be issued to each student, which will contain the following details:

- ⟫ The College Name and Affiliating University.
- ⟫ The list of courses registered during the semester and the grades scored.
- ⟫ The Grade Point Average (GPA) for the semester.
- ⟫ The Cumulative Grade Point Average (CGPA) of all courses registered from first semester onwards.
- ⟫ On completion of a semester, each student is assigned a GPA which is computed as below for all courses registered for, by the student during that semester.

- ⟫ $$GPA = \frac{\sum (C_i \times GP_i)}{\sum C_i}$$

where C_i is the credit for a course in that semester and GP_i is the Grade Point earned by the student for that course. The **SGPA** is rounded off to two decimals.

The overall performance of a student at any stage of the Degree programme is evaluated by the **CGPA** up to that point of time.

$$CGPA = \frac{\sum (C_i \times GP_i)}{\sum C_i}$$

where C_i is the credit for each course in each of the completed semesters at that stage and GP_i is the grade point earned by the student for that course. The **CGPA** is rounded off to two decimals.

16.4 Formula for Calculating Percentage

CGPA x 9.5 = % of Marks

17. ELIGIBILITY FOR THE AWARD OF DEGREE

A student shall be declared to be eligible for the award of the B.E. / B.Tech. Degree provided the student has

i. Successfully gained the required number of total credits as specified in the curriculum corresponding to the particular programme within the stipulated time.

ii. Successfully completed the course requirements, appeared for the ESE and passed all the subjects prescribed in all the 8 semesters within a maximum period of 7 years and 6 years in the case of Lateral Entry reckoned from the commencement of the first (third in the case of Lateral Entry) semester to which the candidate was admitted.

iii. Successfully passed any additional courses prescribed by the Academic council

iv. Successfully completed the NCC / NSS / NSO / YRC requirements if any.

v. Successfully passed any additional courses prescribed by the Department & concerned whenever readmitted under regulations 2023 (R23) (vide Clause 3.3)

vi. No disciplinary action pending against the student.

vii. The award of Degree must have been approved by the Academic Council.

17.1 Classification of the Degree Awarded

17.1.1 First Class with Distinction

Degree (i)	Duration of programme (ii)	Duration permitted (iii)	Additional credits above the requirement of curriculum (iv)	CGPA (v)	Pass in (vi)	Break of study (vii)	Prevention due to lack of attendance	Withdrawal from writing ESE (viii)
B.E. / B.Tech. (Regular)	4 years	5 years	-	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. (Lateral Entry)	3 years	4 years	-	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. (Honours) Specialisation in the same discipline	3 / 4 years (Lateral entry, Regular, respectively)	4 / 5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the same programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. (Honours)	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the same programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. minor in other specialisation	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the other programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt

17.1.2 First Class

Degree (i)	Duration (ii)	Duration permitted (iii)	Additional credits (iv)	CGPA (v)	Pass in (vi)	Break of study (vii)	Prevention due to lack of attendance	Withdrawal from writing examination (viii)
B.E. / B.Tech. (Regular)	4 years	5 years	-	6.50	-	One year authorised break of study included in the Duration permitted (iii)	Included in the Duration permitted (iii)	–
B.E. / B.Tech. Lateral Entry	4 years	5 years	-	6.50	-	One year authorised break of study included in the Duration permitted (iii)	Included in the Duration permitted (iii)	–

B.E. / B.Tech. (Honours) Specialisation in the same discipline	3 / 4 years (Lateral entry, Regular, respectively)	4 / 5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the same programme	7.50	First attempt	One year authorised break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. (Honours)	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the same programme	7.50	First attempt	One year authorised break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E. / B.Tech. minor in other specialisation	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the other programme	6.50	-	One year authorised break of study Included in the Duration permitted (iii)	Included in the Duration permitted (iii)	–

18. PROVISION FOR WITHDRAWAL FROM EXAMINATION

18.1 A student may, for valid reasons, (medically unfit / unexpected family situations / sports approved by Head of the Institution) be granted permission to withdraw from appearing for the End Semester Examination in any course or courses in ANY ONE of the semester examinations during the entire duration of the degree programme. The application shall be sent to COE through the Head of the Institutions with required documents.

18.2 Withdrawal application is valid if the student is otherwise eligible to write the examination (Clause 10) and if it is made within TEN days after the date of the examination(s) in that course or courses and recommended by the Head of the Institution and approved by the Controller of Examinations. For a student to withdraw from a course / courses, he/she should have registered for the course, fulfilled the attendance requirements (vide clause 10) and earned continuous assessment marks.

18.3 Notwithstanding the requirement of mandatory TEN working days notice, applications for withdrawal for special cases under extraordinary conditions will be considered on the merit of the case.

18.4 If a student withdraws from writing end semester examinations for a course or courses, he/she shall register for the same in the subsequent semester and write the end semester examination(s).

18.5 If a student applies for withdrawal from Project Work, he/she will be permitted for the withdrawal only after the submission of project report before the deadline. However, the student may appear for the viva voce examination within 30/60 days after the declaration of results for Project Work and the same shall not be considered as reappearance.

18.6 Withdrawal shall not be considered as an appearance for deciding the eligibility of a student for First Class with Distinction.

18.7 Withdrawal is permitted for the ESE in the final semester as per Clause 7.1.

19. BREAK OF STUDY FROM A PROGRAMME

19.1 A student is permitted to go on break of study for a single break of one year only.

19.2 The student can apply for break of study in advance, in any case, not later than the last date of the first assessment period. The application duly filled by the student shall be submitted through the HoD with the approval of the Principal.

19.3 The students permitted to rejoin the Programme after break of study / readmission due to lack of attendance, shall be governed by the curriculum and Regulations in force at the time of rejoining. The students rejoining in new regulations shall apply in the prescribed format through HoD at the beginning of the readmitted semester itself for prescribing additional/equivalent courses, if any, from any semester of the regulations in-force, so as to bridge the curriculum in-force and the old curriculum.

19.4 The total period for completion of the programme reckoned from, the commencement of the first semester to which the student was admitted shall not exceed the maximum period specified in Clause 6 irrespective of the period of break of study in order that the student may be eligible for the award of the Degree (vide Clause 16).

19.5 In case there is any period of break of study more than the permitted duration of break of study, the student shall be permitted to continue the Programme only if the approval is obtained from the Director of Technical Education / University through the concerned HoD / Principal before the end of the Semester in which the student has taken break of study.

19.6 If a student has not reported to the department for a period of two consecutive Semesters without any intimation, the name of the student shall be deleted permanently from the college enrollment.

19.7 During the break of study period, the students shall pay the prescribed tuition fees failing which the name of the student shall be deleted permanently from the enrollment. Such students are not entitled to seek readmission under any circumstances.

20. RANKING OF A STUDENT

A candidate who qualifies for the degree by passing the examination in all courses of the entire Programme in first attempt within a period of Four or Five consecutive academic years applicable for the students joined after permitted Break of Study from the date of admission to the Programme can be given his/her position in the class as rank. The Rank is determined from IIIrd semester to VIIIth semester end semester examination CGPA. Students transferred from other institutions to KIT in IIIrd Semester and Lateral entry students are eligible for rank. Students transferred from other institutions beyond IIIrd Semester and students with history of arrears during the entire programme are not eligible for rank.

21. PROCEDURE FOR USING SCRIBE

If a candidate is physically handicapped (in case of accidents / ill health) at the time of examination, he/she may be permitted to use a scribe to write the examination. The compensatory (additional) time should be half hour for three hour duration of examination. The Scribe shall be a non-engineering student / graduate.

22. FACULTY MENTOR

To help the students in palnning their courses of study and for general advice on the academic matters, the HoD will attach a certain number of students (maximum 25) to a faculty member of the department. He / She shall function as Faculty Mentor for these students throughout their period of study. The faculty mentor shall,

⊙ Advice the students in registering and reappearance registering of courses

⊙ Monitor their attendance, academic progress and discipline of the students

⊙ Counsel periodically or during the faculty mentor meeting scheduled in the class time table.

⊙ Inform the students about the various facilities and activities available to enhance the student's curricular and co-curricular activities

⊙ If necessary, the faculty mentor may also discuss with or inform the parents about the progress of the students through HoD or in Parent-Teacher meeting.

23. CLASS COMMITTEE

The objective of the Class Committee is to improve the teaching-learning process.

The functions of the class committee include :

⊙ Resolving difficulties experienced by students in the classroom and in the laboratories.

⊙ Clarifying the regulations of the degree programme and the details of rules therein.

⊙ Discussing the progress of academic schedule and deviations if any.

⊙ Evaluating the performance of the students of the class after each test and finding the ways and means of improvement.

⊙ Every class in first year of study shall have a class committee consisting of faculty members who are teaching in that class, student representatives

⊙ Cross section of students from boys and girls and a chairperson who is a faculty not handling the course for the class.

From III semester onwards, Class committee comprises of all the faculty members who are handling courses in that particular semester and two student representatives from each course. A chairperson who is a faculty not handling course for that particular semester, nominated by the HoD shall coordinate the activities of this committee.

⊙ The class committee shall be constituted by the HoD/Chief mentor on the first week of commencement of the semester.

⊙ The class committee shall meet three times in a semester as specified in the academic calendar.

⊙ The Principal may participate in any class committee meeting of the institution

⊙ During these meetings, the representative of the class shall meaningfully interact and express the opinions and suggestions of the other students of the class to improve the effectiveness of the teaching-learning process.

⊙ The Chairperson is required to prepare the minutes of the meeting, signed by the members and submit the same to HoD within five working days of the meeting. HoD will in turn consolidate and forward the same to the Principal, within five working days of the meeting.

⊙ In each meeting, the action taken report of the previous meeting is to be presented by the Chairperson of the class committee.

24. COMMON COURSE COMMITTEE

⊙ A theory course handled by more than one teacher shall have a "Common Course Committee" comprising of all teachers teaching that course and few students who have registered for that course. There shall be two student representatives from each batch of that course. One of the

teachers shall be nominated as Course Coordinator by the HOD concerned and duly approved by the Principal

⊙ The first meeting of the Common Course Committee shall be held within fifteen days from the date of commencement of the semester. The nature and weightage of the continuous assessments shall be decided in the first meeting, within the framework of the Regulations. Two or three subsequent meetings in a semester may be held at suitable intervals. During these meetings, the student members shall meaningfully interact and express their opinions and suggestions of all the students to improve the effectiveness of the teaching-learning process. It is the responsibility of the student representatives to convey the proceedings of these meetings to the whole batch.

⊙ In addition, the "Common Course Committee" (without the student representatives) shall meet to ensure uniform evaluation of continuous assessments after arriving at a common scheme of evaluation for the assessments.

Wherever feasible, the common course committee (without the student representatives) shall also prepare a common question paper for the CIA tests. The question paper for the ESE is common and shall be set by the Course Coordinator in consultation with all the teachers or the external member as appointed by the CoE.

25. DETAILS OF FACULTY PEDAGOGICAL AND STUDENT ASSESSMENT RECORD

Every teacher is required to maintain a Faculty Record Book/ course file consisting of the following details as shown below ;

⊙ Time-table, course syllabus, program outcomes, course outcomes.

⊙ Details of attendance of each student marked in each theory/practical/project work class.

⊙ CIA marks,Details of Assignment/ seminar given, course delivery details, corrective and preventive actions on test performance of students and any other additional details.

The record book should be submitted to the HoD periodically (at least three times in a semester) for checking the syllabus covered, the test marks and attendance. The HoD shall put his/her signature and date in the record book after due verification. At the end of the semester, the record book shall be verified by the Principal who will also ensure safe custody of the document for at least four years. The university or any inspection team appointed by the University/UGC/AICTE may verify the records of attendance.

26. DISCIPLINE

Every student is required to maintain discipline and decorum both inside and outside the institution campus. They shall follow all the rules and regulations and should not indulge in any activity which can tarnish the reputation of the Institution. The Principal shall refer any act of indiscipline by students to the Discipline and Welfare Committee and other appropriate committees for action.

27. SPECIAL CASES

In the event of any clarification in the interpretation of the above rules and relations, they shall be referred to the Standing Committee. The standing committee will offer suitable interpretations/ clarifications/amendments required for special case on such references and get them ratified in the next meeting of the Academic Council. The decision of the Academic Council is final.

ANNEXURE - I

COURSE NUMBERING SCHEME

B	2	3	M	E	T	7	0	9
Programme	Regulation		Department Code		Course Type	Semester	Sequence Number	

Programme :

Bachelor Degree (B.E. / B.Tech) - B

Masters Degree (M.E. / M.Tech) - M

Regulation :

R – 23

Department Code

AE - Aeronautical Engineering

AG - Agricultural Engineering

BT - Bio Technology

BM - Bio Medical Engineering

CS - Computer Science and Engineering

EC - Electronics and Communication Engineering

EE - Electrical and Electronics Engineering

ME - Mechanical Engineering

AD - Artificial Engineering & Data Science

CB - Computer Science & Business System

AM - Computer Science & Engineering (AIML)

CA - Masters in Computer Application

MB - Masters in Business Administration

CH - Chemistry

EN - English

PH - Physics

MA - Mathematics

MC - Mandatory Course

CE - Career Enhancement course

Course Type

T - Theory

P - Practical / Project / Internship

E - Elective

O - Open Elective

C - Credit

N - Online courses

S - Special Electives

Semester

1 - First Semester

2 - Second Semester

3 - Third Semester

4 - Fourth Semester

5 - Fifth Semester

6 - Sixth Semester

7 - Seventh Semester

8 - Eighth Semester

Sequence Number

00-99

ANNEXURE - II

POLICY ON MALPRACTICES

GENERAL

⊙ It shall be the endeavour of all concerned to prevent, control and take remedial action to bring about the occurrences of malpractices to "Zero" in Examinations (both Internal and External), Assignments and in all Academic class works.

⊘ Therefore, a comprehensive approach to the malady of malpractices has to be adopted to create a mindset of integrity and honesty, and at the same time take sufficiently stern action to make it clear that such attempts are fraught with comparably very high risk.

⊘ In keeping with this stance, the following measures are to be taken by all concerned from class room level to the Examination Halls :

A.   PREVENTION

    a.   Class room level :

    All faculty members are to involve themselves in a psychological growth of students by personal example and self-respect and strive towards.t

    ⊘ Developing a sense of honour in the minds of students so that they look down upon earning undeserved marks.

    ⊘ Imbibing a sense of self-respect and internal dignity that prevents him/her from succumbing to the temptation of easy marks by cheating.

    ⊘ Generating an awareness of the risks to their character and career if convicted, while also explaining the process and strict rules and regulations adopted by the educational system to prevent malpractices.

    ⊘ Taking stern view of copied assignments and attempts at malpractices in internal examinations also merits equal seriousness as semester examinations.

    ⊘ Setting sufficiently strong deterrent rules in place and regulations like intimation to parents and warning to students in the presence of parents etc. even in case of efforts at malpractices in internal tests and/or repeated acts despite warnings in case of assignments also.

    Examination Halls

    ⊘ Detailed instructions on Invigilation, question paper setting and evaluation and such other instructions will be issued for Invigilation, vigilance, which are to be brought to the notice of all students prior to the examinations.

B.   PENAL ACTION FOR MALPRACTICES

    All instances of malpractices will be forwarded to the Principal / Chief Superintendents. The offences will be investigated by a Standing Enquiry Committee constituted by Principal, The committee is to summon and give the student an opportunity to present / plead his/her case. The Committee may also summon anybody else, if it so deems necessary for the conduct of enquiry, in the interest of proper investigation and dispensation of the case. The tenure of the committee would be a complete Academic year.

    The Committee is to be guided by the following :

    ⊘ The seriousness of the malpractice, in terms of deviousness, and culpability / criminality of motive.

    ⊘ The seriousness in terms of effort and degree of deviousness and culpability / criminality of effort.

    ⊘ Any FIR / Police case that has been registered in the first instance by the Principal/ Chief Superintendent.

    ⊘ Any other special consideration either mitigating or to the contrary.

C. PENALTY FOR OFFENSES

The penalties awarded will depend on the seriousness of the offence. A list of offences and penalties are placed at **Annexure III**.

The enquiry report with findings and recommendations of the committee are to be forwarded to the Controller who will undertake necessary follow up action. Based on the recommendations of the CoE, the Principal is empowered to award penalties for offences classified as belonging to categories 1 to 7 of the offence table. The cases falling in categories from S.No. 8 onwards are to be put up to the Principal for consideration and award of suitable penalty.

ANNEXURE - III

Sl.No.	Nature of Malpractice	Maximum Punishment
1.	Appeal by the candidate in the answer script to show mercy by way of awarding more than deserving marks.	Fine of Rs. 1000/- per subject.
2.	The candidate writing his/her name in the answer script.	
3.	The candidate writing his / her registration number / college name in places other than specified in the answer script	
4.	Any special marking in the answer script by the candidate.	
5.	The candidate communicating with neighbouring candidate orally or non-verbally; the candidate causing suspicious movement of his/her body.	
6.	Irrelevant writing by the candidate in the answer script.	
7.	The candidate writing answer on his/her question paper or making use of his/her question paper for rough work.	
8.	The candidate possessing cell phones / programmable calculator(s)/any other electronic storage device(s) **gadgets**	Invalidating the examination of the particular subject written by the candidate
9.	The candidate possessing any incriminating material(s) (whether used or not). For example : Written or printed materials, bits of papers containing written information, writings on scale, calculator, handkerchief, dress, part of the body, Hall Ticket, etc.	Invalidating the examination of the particular subject written by the candidate.

10.	The candidate possessing cell phone(s)/ programmable calculator(s)/any other electronic storage device(s) gadgets and containing incriminating materials (whether used or not).	Invalidating the examination of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate.
11.	The Candidate possessing the question paper of another candidate with additional writing on it.	Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects.
12.	The candidate passing his/her question paper to another candidate with additional writing on it.	If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate.
13.	The candidate passing incriminating materials brought into the examination hall in any medium (hard/soft) to other candidate(s).	
14.	The candidate copying from neighbouring candidate.	
15.	The candidate taking out of the examination hall answer booklet(s), used or unused.	
16.	Appeal by the candidate in the answer script coupled with a promise of any form of consideration.	
17.	Candidate destroying evidence relating to an alleged irregularity.	Invalidating the examinations of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate. Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects. If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate. **Additional Punishment :** i. If the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects during the debarred period. ii. If the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears - subjects for two subsequent semesters.

18.	Vulgar / offensive writings by the candidate in the answer script.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears – subjects registered by the candidate.
19.	The candidate possessing the answer script of another candidate.	
20.	The candidate passing his /her answer script to another candidate.	
21.	Involved in any one or more of the malpractices of serial no. 8 to 21 for the second or subsequent times.	Invalidating the examinations of all the theory and practical courses of the current semester and all the arrears- courses registered by the candidate. **Additional Punishment :** i. If the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects during the debarred period. ii. If the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears - subjects for two subsequent semesters.
22.	The candidate substituting an answer sheets prepared outside the examination hall for the one already distributed to the candidate.	
23.	The candidate indulge in any disruptive conduct including, but not limited to, shouting, assault of invigilator, officials or students using abusive and / or threatening language, destruction of property.	Invalidating the examinations of all the theory and practical courses of the current semester and all the arrears- courses registered by the candidate. **Additional Punishment :** i. If the candidate has not completed the programme, he/she is debarred from continuing his/her studies for two years i.e., for four subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects during the debarred period. ii. If the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears - courses for four subsequent semesters.
24.	The candidate harass or engage others to harass on his/her behalf an invigilator, official, witnesses or any other person in relation to an irregularity by making telephone calls, visits, mails or by any other means.	
25.	Candidate possessing any firearm/weapon inside the examination hall.	

26.	Cases of Impersonation	i. Handing over the impersonator to the police with a complaint to take appropriate action against the person involved in the impersonation by the Chief Supt.
		If a student is found to impersonate a 'bonafide student', the impersonating student is debarred from continuing his / her studies and writing the examinations permanently. He/she is not eligible for any further admission to any programme.
		Debarring the 'bonafide student' for whom the impersonation was done from continuing his / her studies and writing the examinations permanently. He/she is not eligible for any further admission to any programme.

ANNEXURE - IV

Process to Consider the Application for Revocation of Detainment

The process to consider the application for revocation of detainment on account of lack of attendance in 3 or more courses, due to genuine reasons (viz. sports participation, NCC, Medical Grounds etc.) is as follows :

The student submits an application for consideration via a request letter to the CoE,not later than 3 days from the last working day, along with the HoD's recommendation, Class Advisor's report and Mentor's recommendation. A committee consisting of the Principal, CoE, HoD (Respective Department) and HoD's-2 from departments other than the student's own. The committee shall meet within 4 working days,to consider the case. Stakeholders may be called to be present in the meeting as may be required, and Decision arrived at.The decision approved by Principal shall be final.

ANNEXURE - V

Academic Evaluation Committee (AEC)

The committee includes the Principal, CoE, HoD concerned. The committee meets to carry out business related to academic matters which require central decision making and approval viz. retest approval of missed CIA, addressing the feedback collected from the various departments' class committee meetings

Department Evaluation Committee (DEC)

The committee includes HoD (need basis), and a few faculty members of the department from various levels. The committee meets to carry out business related to academic matters that can be addressed within the department viz. course equivalence of common courses for readmitted students; approval of new courses to be offered by the department; consider and approve the credit equivalence of courses offered by industry, review the course offerings; consider the merit of applications involving lack of attendance in PE/OE courses to take up another PE or OE; approve CIAM only courses every semester; approve scheme of assessment for each course; Approval for and Mapping credits of certification courses; approval of list of nationally or internationally recognized professional certification courses with prometric testing.

Curriculum

	Conceptual Frame work				
	(For Students admitted from the Academic Year 2023-24 onwards)				

Semester	Level of Course	Hrs. / Week	No of Courses	Range of Credits / Courses	Total Credits
PART – I					
A – Foundation Courses					
I, II & VII	Humanities and Social Sciences (HS)	1 - 4	6	0 - 4	10
I to IV	Basic Sciences (BS)	4 - 5	6	4	24
I to III	Engineering Sciences (ES)	4 - 5	5	2 - 4	14
B – Professional Core Courses					
II to VII	**Professional Core (PC)**	3 - 5	25	2 - 4	79
C-Elective Courses					
V to VIII	Professional Elective (PE)	3	6	3	18
V to VIII	Open Elective (OE)	3	3	3	9
D – Project Work					
VI, VII & VIII	Project Work (PW)	4 - 16	2	2 - 8	12
PART II – Career Enhancement Courses (CEC)					
V & VI	Mandatory Course (MC)	3	2	NC	0
II	Soft Skills	2	1	0	0
IV, V	Professional Certificate Courses	2	2	1	2
V	Summer Internship	-	1	1	1
Total Credit					169

Approved by BoS Chairman

	Curriculum and Scheme of Assessment (For Students admitted from the Academic Year 2023-24 and onwards)	

Semester - I

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23IPT101	Induction Programme	HS	-	-	-	-	0	-	-	-
Theory / Theory with Practical										
B23ENT101	Professional English	HS	3	3	0	0	2	40	60	100
B23MAT101	Matrices and Differential Calculus	BS	4	3	1	0	4	40	60	100
B23MET101	Engineering Graphics	ES	5	3	2	0	4	40	60	100
B23HST101	தமிழர்மரபு / Heritage of Tamils	HS	1	1	0	0	1	40	60	100
B23PHI101	Engineering Physics	BS	5	3	0	2	4	50	50	100
B23CSI101	C Programming	ES	5	3	0	2	4	50	50	100
Total credits to be earned							19			

Semester - II

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23MAT201	Integral Calculus and Complex Analysis	BS	4	3	1	0	4	40	60	100
B23HST201	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	HS	1	1	0	0	1	40	60	100
B23ECI201	Circuit Analysis	PC	5	3	0	2	4	50	50	100
B23ECI202	Electron Devices	PC	5	3	0	2	4	50	50	100
B23CET201	Soft Skills	CEC	2	2	0	0	NC	100	-	100
B23ENI102	Professional Communication	HS	4	2	0	2	4	50	50	100
B23CHI101	Engineering Chemistry	BS	5	3	0	2	4	50	50	100
Practical										
B23MEP101	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
Total credits to be earned							23			

Approved by BoS Chairman

			Semester - III							

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23MAT301	Transforms and Partial Differential Equations	BS	4	3	1	0	**4**	40	60	100
B23CSI303	Fundamentals of Data Structures using C	ES	5	3	0	2	**4**	50	50	100
B23ECT301	Analog Electronic circuits	PC	3	3	0	0	**3**	40	60	100
B23ECT302	Digital Electronics	PC	3	3	0	0	**3**	40	60	100
B23ECT303	Signals and Systems	PC	3	3	0	0	**3**	40	60	100
B23ECT304	Electromagnetic Fields	PC	4	3	1	0	**4**	40	60	100
Practical										
B23ECP301	Analog Circuits Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP302	Digital Electronics Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP303	Signals and Systems Laboratory	PC	2	0	0	2	**1**	60	40	100
Total credits to be earned							**26**			

			Semester - IV							

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23MAT402	Probability and Random Processes	BS	4	3	1	0	**4**	40	60	100
B23ECI401	Communication Systems	PC	5	3	0	2	**4**	50	50	100
B23ECT402	Control Systems	PC	3	3	0	0	**3**	40	60	100
B23ECT403	Linear Integrated Circuits	PC	3	3	0	0	**3**	40	60	100
B23ECT404	Digital Signal Processing	PC	3	3	0	0	**3**	40	60	100
B23ECT405	Communication Networks	PC	3	3	0	0	**3**	40	60	100
B23CEP401	Professional Certificate Course - I	CEC	2	0	0	0	**1**	100	-	100
Practical										
B23ECP401	Linear Integrated Circuits Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP402	Digital Signal Processing Laboratory	PC	4	0	0	4	**2**	60	40	100
Total credits to be earned							**25**			

Summer Internship - THREE WEEKS during IV Semester summer holidays (Review will be conducted in first week of V Semester and its credit will be included in V Semester mark statement)

Approved by BoS Chairman

Semester - V										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
Theory / Theory with Practical										
B23ECT501	VLSI Design	PC	3	3	0	0	**3**	40	60	100
B23ECT502	Digital Communication	PC	3	3	0	0	**3**	40	60	100
B23ECT503	Antenna Wave Propagation	PC	3	3	0	0	**3**	40	60	100
B23MCT501	Environmental Sciences	MC	3	3	0	0	**0**	100	-	100
	Professional Elective– I	PE	3	3	0	0	**3**	40	60	100
	Open Elective – I	OE	3	3	0	0	**3**	40	60	100
B23CEP501	Professional Certificate Course - II	CEC	2	0	0	2	**1**	100	-	100
B23CEP502	Summer Internship / NPTEL Online Certification course	CEC	0	-	-	-	**1**	100	-	100
Practical										
B23ECP501	VLSI Design Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP502	Digital Communication Laboratory	PC	4	0	0	4	**2**	60	40	100
Total credits to be earned							**21**			

Semester - VI										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
Theory / Theory with Practical										
B23ECT601	Microprocessors and Microcontrollers	PC	3	3	0	0	**3**	40	60	100
B23ECT602	RF and Microwave Engineering	PC	3	3	0	0	**3**	40	60	100
B23ECT603	Wireless Communication	PC	3	3	0	0	**3**	40	60	100
B23MCT601	Indian Constitution	MC	3	3	0	0	**0**	100	-	100
	Professional Elective– II	PE	3	3	0	0	**3**	40	60	100
	Professional Elective– III	PE	3	3	0	0	**3**	40	60	100
Practical										
B23ECP601	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP602	Advanced Communication Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP603	Mini Project	PW	4	0	0	4	**2**	40	60	100
Total credits to be earned							**21**			

Approved by BoS Chairman

Semester - VII										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
Theory / Theory with Practical										
B23ECT701	Foundations of Artificial Intelligence and Machine Learning	PC	3	3	0	0	**3**	40	60	100
B23ECI702	Embedded systems and IOT Design	PC	5	3	0	2	**4**	50	50	100
B23HST703	Universal Human Value	HS	2	2	0	0	**2**	40	60	100
	Professional Elective – IV	PE	3	3	0	0	**3**	40	60	100
	Professional Elective – V	PE	3	3	0	0	**3**	40	60	100
	Open Elective – II	OE	3	3	0	0	**3**	40	60	100
Practical										
B23ECP701	Project Work Phase - I	PW	4	0	0	4	**2**	40	60	100
Total credits to be earned							**20**			

Semester - VIII										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
Theory / Theory with Practical										
	Professional Elective – VI	PE	3	0	0	0	**3**	40	60	100
	Open Elective – III	OE	3	0	0	0	**3**	40	60	100
Practical										
B23ECP801	Project Work Phase – II	PW	16	0	0	16	**8**	40	60	100
Total credits to be earned							**14**			

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HUMANITIES AND SOCIALSCIENCES (HS)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
Theory / Theory with Practical										
B23IPP101	Induction Programme	HS	-	-	-	-	0	-	-	-
B23ENI102	Professional Communication	HS	4	2	0	0	4	50	50	100
B23ENT101	Professional English	HS	3	3	0	0	2	40	60	100
B23HST703	Universal Human Value	HS	2	1	0	0	2	40	60	100
B19HST201	தமிழ்மரபு / Heritage of Tamils	HS	1	1	0	0	3	40	60	100
B19HST301	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology	HS	1	1	0	0	3	40	60	100
Total credits to be earned							**10**			

BASIC SCIENCES (BS)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23MAT101	Matrices and Differential Calculus	BS	4	3	1	0	4	40	60	100
B23PHI101	Engineering Physics	BS	5	3	0	2	4	50	50	100
B23MAT201	Integral Calculus and Complex Analysis	BS	4	3	1	0	4	40	60	100
B23CHI101	Engineering Chemistry	BS	5	3	0	2	4	50	50	100
B23MAT302	Linear Algebra Transforms and Partial Differential Equations	BS	4	3	1	0	4	40	60	100
B23MAT404	Probability and Random Processes	BS	4	3	1	0	4	40	60	100
Total credits to be earned							**24**			

ENGINEERING SCIENCES (ES)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23CSI101	C Programming	ES	5	3	0	2	4	50	50	100
B23MET101	Engineering Graphics	ES	5	3	2	0	4	40	60	100
B23MEP101	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
B23CSI303	Fundamentals of Data Structures using C	ES	5	3	0	2	4	50	50	100
Total credits to be earned							**14**			

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			Instructional Hours					Assessment		
Course Code	**Course Name**	**CT**	**CP**	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
B23ECI201	Circuit Analysis	PC	5	3	0	2	**4**	50	50	100
B23ECI202	Electron Devices	PC	5	3	0	2	**4**	50	50	100
B23ECT301	Analog Electronic circuits	PC	3	3	0	0	**3**	40	60	100
B23ECT302	Digital Electronics	PC	3	3	0	0	**3**	40	60	100
B23ECT303	Signals and Systems	PC	4	3	1	0	**4**	40	60	100
B23ECT304	Electromagnetic Fields	PC	4	3	1	0	**4**	40	60	100
B23ECP301	Analog Circuits Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP302	Digital Electronics Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECI401	Communication Systems	PC	5	3	0	2	**4**	50	50	100
B23ECT402	Control Systems	PC	3	3	0	0	**3**	40	60	100
B23ECT403	Linear Integrated Circuits	PC	3	3	0	0	**3**	40	60	100
B23ECT404	Digital Signal Processing	PC	3	3	0	0	**3**	40	60	100
B23ECT405	Communication Networks	PC	3	3	0	0	**3**	40	60	100
B23ECP401	Linear Integrated Circuits Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP402	Digital Signal Processing Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECT501	VLSI Design	PC	3	3	0	0	**3**	40	60	100
B23ECT502	Digital Communication	PC	3	3	0	0	**3**	40	60	100
B23ECT503	Antenna Wave Propagation	PC	3	3	0	0	**3**	40	60	100
B23ECP501	VLSI Design Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP502	Digital Communication Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECT601	Microprocessors and Microcontrollers	PC	3	3	0	0	**3**	40	60	100
B23ECT602	RF and Microwave Engineering	PC	3	3	0	0	**3**	40	60	100
B23ECT603	Wireless Communication	PC	3	3	0	0	**3**	40	60	100
B23ECP601	Microprocessors and Microcontrollers Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECP602	Advanced Communication Laboratory	PC	4	0	0	4	**2**	60	40	100
B23ECT701	Foundations of Artificial Intelligence and Machine Learning	PC	3	3	0	0	**3**	40	60	100
B23ECI702	Embedded systems and IOT Design	PC	5	3	0	2	**4**	50	50	100
							79			

PROFESSIONAL CORE (PC)

Approved by BoS Chairman

PROFESSIONAL ELECTIVES (PE)

Professional Elective – I (Semester V)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE501	CMOS Digital VLSI Design	PE	3	3	0	0	3	40	60	100
B23ECE502	Image Processing	PE	3	3	0	0	3	40	60	100
B23ECE503	Wireless Systems and Standards	PE	3	3	0	0	3	40	60	100
B23ECE504	IoT Processors	PE	3	3	0	0	3	40	60	100
B23ECE505	Data Base Management System	PE	3	3	0	0	3	40	60	100

Professional Elective – II (Semester VI)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE601	VLSI Signal Processing	PE	3	3	0	0	3	40	60	100
B23ECE602	Speech and Audio Processing	PE	3	3	0	0	3	40	60	100
B23ECE603	Wireless Networking	PE	3	3	0	0	3	40	60	100
B23ECE604	IoT Based System Design	PE	3	3	0	0	3	40	60	100
B23ECE605	Computer and Machine Vision	PE	3	3	0	0	3	40	60	100

Professional Elective – III (Semester VI)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE608	Low Power VLSI Design	PE	3	3	0	0	3	40	60	100
B23ECE609	Multimedia Compression Techniques	PE	3	3	0	0	3	40	60	100
B23ECE610	Wireless Adhoc and Sensor Networks	PE	3	3	0	0	3	40	60	100
B23ECE611	Wireless Sensor Network Design	PE	3	3	0	0	3	40	60	100
B23ECE612	Deep Learning	PE	3	3	0	0	3	40	60	100

Professional Elective – IV (Semester VII)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE701	Device Modeling	PE	3	3	0	0	3	40	60	100
B23ECE702	Advanced Digital Signal Processing	PE	3	3	0	0	3	40	60	100
B23ECE703	Network Security	PE	3	3	0	0	3	40	60	100
B23ECE704	Industrial IoTandIndustry4.0	PE	3	3	0	0	3	40	60	100
B23ECE705	Machine Learning Techniques	PE	3	3	0	0	3	40	60	100

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Professional Elective – V (Semester VII)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE708	Nano Electronics	PE	3	3	0	0	3	40	60	100
B23ECE709	Pattern Recognition and Machine Learning	PE	3	3	0	0	3	40	60	100
B23ECE710	Long Term Evolution Technologies	PE	3	3	0	0	3	40	60	100
B23ECE711	MEMS Design	PE	3	3	0	0	3	40	60	100
B23ECE712	Software Testing	PE	3	3	0	0	3	40	60	100

Professional Elective – VI (Semester VIII)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECE801	System on Chip Design	PE	3	3	0	0	3	40	60	100
B23ECE802	Digital Signal Processing System Design	PE	3	3	0	0	3	40	60	100
B23ECE803	High Performance Networks	PE	3	3	0	0	3	40	60	100
B23ECE804	Fundamentals of Nano Electronics	PE	3	3	0	0	3	40	60	100
B23ECE805	Fundamentals of cloud	PE	3	3	0	0	3	40	60	100

OPEN ELECTIVES (OE)

Open Elective – I (Semester V)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23AEO501	Basics of Flight Mechanics	OE	3	3	0	0	3	40	60	100
B23AGO501	Environmental Agriculture	OE	3	3	0	0	3	40	60	100
B23BMO501	Introduction to Medical Physics	OE	3	3	0	0	3	40	60	100
B23BTO501	Food Processing and Preservation	OE	3	3	0	0	3	40	60	100
B23ECO501	Electronics Engineering	OE	3	3	0	0	3	40	60	100
B23CSO501	Fundamentals of Database Management System	OE	3	3	0	0	3	40	60	100
B23EEO501	Rotating Machines and Transformers	OE	3	3	0	0	3	40	60	100
B23MEO501	Robotics	OE	3	3	0	0	3	40	60	100

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Open Elective – II (Semester VII)										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
B23AEO701	Unmanned Aircraft Systems Operation & MRO	OE	3	3	0	0	3	40	60	100
B23AGO701	Production Technology for Agricultural Machinery	OE	3	3	0	0	3	40	60	100
B23BMO701	Telemedicine	OE	3	3	0	0	3	40	60	100
B23BTO701	Fundamentals of Nanotechnology	OE	3	3	0	0	3	40	60	100
B23ECO701	Embedded System Design Using ARDUINO	OE	3	3	0	0	3	40	60	100
B23CSO701	Fundamentals of Cloud Computing	OE	3	3	0	0	3	40	60	100
B23EEO701	Hybrid Electrical Vehicles	OE	3	3	0	0	3	40	60	100
B23MEO701	3D Printing and Tooling	OE	3	3	0	0	3	40	60	100

Open Elective – III (Semester VIII)										
Course Code	**Course Name**	**CT**	**Instructional Hours**					**Assessment**		
			CP	**L**	**T**	**P**	**C**	**CIA**	**ESE**	**Total**
B23AEO801	Vehicle Aerodynamics	OE	3	3	0	0	3	40	60	100
B23AGO801	Agriculture finance, Banking and Cooperatives	OE	3	3	0	0	3	40	60	100
B23BMO801	Hospital Management	OE	3	3	0	0	3	40	60	100
B23BTO801	Biological Waste Management	OE	3	3	0	0	3	40	60	100
B23ECO801	Wireless Technologies	OE	3	3	0	0	3	40	60	100
B23CSO801	Fundamentals of IoT	OE	3	3	0	0	3	40	60	100
B23EEO801	Energy Conservation and Management	OE	3	3	0	0	3	40	60	100
B23MEO801	Lean Six Sigma	OE	3	3	0	0	3	40	60	100

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PROJECT WORK (PW)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23ECP603	Mini Project	PW	4	0	0	4	2	100	-	100
B23ECP701	Project work Phase–I	PW	4	0	0	4	2	40	60	100
B23ECP801	Project Work Phase-II	PW	16	0	0	16	8	40	60	100
Total credits to be earned							12			

CAREER ENHANCEMENT COURSE (CEC)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23CEP201	Soft Skills	CEC	2	2	0	0	0	100	-	100
B23CEP401	Professional Certificate Course - I	CEC	2	0	0	0	1	100	-	100
B23CEP501	Professional Certificate Course - II	CEC	2	0	0	0	1	100	-	100
B23CEP502	Summer Internship	CEC	0	-	-	-	1	100	-	100
Total credits to be earned							3			

MANDATORY COURSE (MC)

Course Code	Course Name	CT	Instructional Hours					Assessment		
			CP	L	T	P	C	CIA	ESE	Total
B23MCT501	Environmental Sciences	MC	3	3	0	0	0	100	-	100
B23MCT601	Indian Constitution	MC	3	3	0	0	0	100	-	100
Total credits to be earned							0			

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Syllabus

Semester – I

B.E.	B23ENT101 – PROFESSIONAL ENGLISH	L	T	P	C
		2	0	0	2

Course Objectives	
1.	To develop the listening and reading skills of first year engineering and technology students.
2.	To help learners' develop vocabulary through reading skills.
3.	To enhance learners' grammatical knowledge.
4.	To enhance the learners' ability of writing different complex texts.
5.	To develop the competency of learners through LSRW skills.

UNIT – I	6
Listening	Listening to voicemail & messages; Listening and contextualizing.
Speaking	Replying to polite requests and offers, understanding basic instructions.
Reading	Short comprehension passages, practice in skimming & scanning.
Writing	Writing Instructions.
Language development	Parts of Speech, Wh - Questions, yes or no questions, Question tags.
Vocabulary development	Prefixes - suffixes.

UNIT – II	6
Listening	Listening commentaries and announcements.
Speaking	Role Play exercises based on workplace contexts.
Reading	Comprehension questions including dialogues and conversations.
Writing	Writing different types of Paragraph.
Language development	Regular & Irregular Verbs, Tenses.
Vocabulary development	Understanding contextual meaning, Synonyms.

Approved by BoS Chairman

UNIT – III	6
Listening	Listening to a product launch-sensitizing leaners to the nuances of persuasive communication.
Speaking	Debate - discussion on current issues.
Reading	Short texts and longer passages - note making.
Writing	Understanding text structure, use of reference words and discourse markers, jumbled sentences.
Language development	Idioms and Phrases, Degrees of comparison.
Vocabulary development	One word substitutes.

UNIT – IV	6
Listening	Listening to short academic videos.
Speaking	Making short presentation through short films.
Reading	Intensive and Extensive reading-reading different types of magazines.
Writing	Letter writing- formal and informal.
Language development	Direct / indirect questions.
Vocabulary development	Phrasal verbs

UNIT – V	6
Listening	Listening to talks/lectures by specialists on specific topics.
Speaking	Discussion on general and current topics.
Reading	Longer texts - cloze reading.
Writing	Writing short essays, developing outline, identifying main and subordinate ideas, Dialogue writing.
Language development	Spelling and Punctuations, Modal verbs.
Vocabulary development	Collocations

	Total Instructional hours : 30

Approved by BoS Chairman

Course Outcomes : Students will be able to	
CO1	Develop listening and reading skills for effective communication
CO2	Develop vocabulary skills
CO3	Build grammatical understanding
CO4	Explain opinions efficiently in writing formal and informal contexts
CO5	Develop knowledge through LSRW skills

Text Books	
1.	Board of Editors Using English, "A Course book for Undergraduate Engineers and Technologists", Orient Black Swan Limited, Hyderabad : 2015.
2.	Richards, C. Jack," Interchange Students Book - 2", New Delhi, CUP, 2015.

Reference Books	
1.	Bailey, Stephen, "A practical guide for students", New York Rutledge, 2011.
2.	Raman, Meenakshi and Sharma, Sangeetha "Technical Communication Principles and Practice" Oxford University Press: New Delhi, 2014.
3.	Dutt P. Kiranmai and Rajeevan Geeta, "Basic Communication Skills", Foundation Books, 2013.

Approved by BoS Chairman

KIT - Kalaignarkarunanidhi Institute of Technology

B.E.	B23MAT101 - MATRICES AND DIFFERENTIAL CALCULUS (Common to all Branches)	L	T	P	C
		3	1	0	4

Course Objectives	
1.	To develop the use of matrices that is needed by engineers for practical applications.
2.	To understand the concept of functions of several variables.
3.	To recognize and classify ordinary differential equations.
4.	To apply the concept of ordinary differential equations in engineering disciplines.
5.	To learn the applications of Laplace transforms in engineering.

UNIT - I	MATRICES	12

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley Hamilton theorem – Quadratic form: Nature, Reduction to canonical form by orthogonal transformation

UNIT - II	FUNCTIONS OF SEVERAL VARIABLES	12

Partial differentiation –Total derivative – Jacobians – Taylor's series expansion for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers

UNIT - III	ORDINARY DIFFERENTIAL EQUATIONS	12

Higher order linear ordinary differential equations with constant coefficients - Method of variation of parameters - Simultaneous differential equations

UNIT - IV	APPLICATIONS OF ORDINARY DIFFERENTIAL EQUATIONS	12

Solution of specified differential equations connected with electric circuits - Law of Natural growth and decay - Simple harmonic motion (Differential equations and associated conditions need to be given)

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UNIT - V	LAPLACE TRANSFORM	12

Existence conditions - Properties (excluding proofs) - Transform of standard functions -Transforms of derivatives and integrals - Inverse Laplace transform - Applications to solution of linear second order ordinary differential equations with constant coefficients

	Total Instructional hours : 60

Course Outcomes : Students will be able to	
CO1	Make use of Eigen values and Eigen vectors to reduce the quadratic form into canonical form and to find the powers of a square matrix.
CO2	Construct maxima and minima problems.
CO3	Solve differential equations which existing in different engineering disciplines.
CO4	Develop the applications of differential equations in various engineering field.
CO5	Apply Laplace transform and inverse transform to solve differential equations with constant coefficients.

Text Books	
1.	Grewal B.S.,"Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2015.
2.	Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media - An imprint of Lakshmi Publications Pvt., Ltd., New Delhi, 7th Edition, 2015.
3.	Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2015.
4.	George B. Thomas, Joel Hass, Christopher Heil, Maurice D. Weir, "Thomas' Calculus", Pearson, 14th Edition, 2018.

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	Reference Books
1.	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2019.
2.	Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
3.	Ramana B V., "Higher Engineering Mathematics", Tata Mc Graw Hill Publishing Company, New Delhi, 2017.
4.	Veerarajan T., "Engineering Mathematics for Semester I and II", Tata Mc Graw Hill Publishing Company, New Delhi, 2019.
5.	Gean Duffy., "Advanced Engineering Mathematics with MATLAB", A CRC Press Company, Boca Raton London, New York Washington, D.C, 2nd edition 2009. (Free e-book downloaded from www.EasyEngineering.net.pdf).

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B.E.	B23MET101 – ENGINEERING GRAPHICS (Common to All)	L	T	P	C
		2	2	0	4

Course Objectives	
1.	Understand the conventions and method of Engineering drawing.
2.	Construct and interpret the basic Engineering drawings.
3.	Improve their visualization skills so that they can apply these skills in new product development.
4.	Enhance their technical communication skill in the form of communicative drawings.
5.	Comprehend the theory of projection.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)	2

Importance of graphics in Engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning

UNIT - I	PLANE CURVES AND FREE HANDSKETCHING	14

Basic Geometrical constructions, Curves used in Engineering practices-Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT - II	PROJECTION OF POINTS, LINES AND PLANE SURFACE	14

Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method

UNIT - III	PROJECTION OF SOLIDS	14

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to both the principal planes by rotating object method and auxiliary plane method

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UNIT - IV	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES	14

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones

UNIT - V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	14

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-prisms, pyramids and cylinders by visual ray method

COMPUTER AIDED DRAFTING	3

Introduction to drafting packages and demonstration of their use
Basic Geometrical constructions using AUTOCAD

	Total Instructional hours : 75

Course Outcomes : Students will be able to	
CO1	Construct the basic Engineering curves and freehand sketching of basic geometrical constructions and multiple views of objects.
CO2	Draw problems related to projections of points, straight lines, planes and solids.
CO3	Build the projection of simple solids.
CO4	Apply the knowledge acquired on practical applications of sectioning and development of solids.
CO5	Construct simple solids and its sections in isometric view and projections and to draw its perspective views.

Text Books	
1.	K.V.Natarajan, "A text book of Engineering Graphics", 28th Edition, Dhana Lakshmi Publishers, Chennai, 2015.
2.	N.D. Bhatt and V.M. Panchal, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.

Approved by BoS Chairman

	Reference Books
1.	K. Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Publishers, 2017.
2.	K.R.Gopalakrishna., "Engineering Drawing" (Vol. I & II combined) Subhas Publications, Bangalore, 2018.
3.	N.S Parthasarathy and Vela Murali, "Engineering Drawing", Oxford University Press, 2015.

Approved by BoS Chairman

B.E.	B23HST101 - தமிழர் மரபு	L	T	P	C
		1	0	0	1

அலகு – I	மொழி மற்றும் இலக்கியம்	3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு – II	மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக்கலை	3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு – III	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்	3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு – IV	தமிழர்களின் திணைக் கோட்பாடுகள்	3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி

அலகு – V	இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டில் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப் படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

மொத்தம் – 15 காலங்கள்

Approved by BoS Chairman

	Text - Cum - Reference Books
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு - தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2.	கணினித் தமிழ் - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4.	பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5.	Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6.	Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by : International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by : International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by : International Institute of Tamil Studies).
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the Histroyb of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by : The Author)
11.	Porunai Civilization (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by : RMRL) - Reference Book.

Approved by BoS Chairman

B.E.	B23HST101 - HERITAGE OF TAMILS (Common to all Branches)	L	T	P	C
		1	0	0	1

UNIT - I	LANGUAGE AND LITERATURE	3

Language Families in India - Dravidian Languages – Tamil as aClassical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

UNIT - II	HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE	3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils

UNIT - III	FOLK AND MARTIAL ARTS	3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils

UNIT - IV	THINAI CONCEPT OF TAMILS	3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas

UNIT - V	CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books

Total Instructional hours : 15

Approved by BoS Chairman

	Text - Cum - Reference Books
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு - தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2.	கணினித் தமிழ் - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4.	பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5.	Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6.	Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by : International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by : International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by : International Institute of Tamil Studies).
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the Histroyb of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by : The Author)
11.	Porunai Civilization (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by : RMRL) - Reference Book.

Approved by BoS Chairman

B.E.	**B23PHI101 - ENGINEERING PHYSICS** **(Common to all Branches)**	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To gain knowledge on the basics of properties of matter, its applications and inculcate practical skills in the determination of elastic property of the materials.
2.	To acquire knowledge & experimental skills on the concepts of Photonics and their applications in fiber optics.
3.	To have adequate knowledge on the concepts of electrical, magnetic properties of materials and enhance the practical skills in determination of electrical properties of the materials.
4.	To get knowledge on advanced physics concepts of quantum theory and its applications in SEM, TEM and induce practical skills in microscope.
5.	To enhance the fundamental knowledge of students in Crystal Physics and its Applications relevant to various streams of Engineering and Technology.

UNIT - I	**PROPERTIES OF MATTER**	**14**

Elasticity - Modulus, types of modulii of elasticity, Stress - strain diagram and its uses - factors affecting elastic modulus and Twisting couple, torsion pendulum; theory and experiment

Bending of beams - Bending moment - uniform and non- uniform bending; theory and experiment - I - shaped girders and its applications

Determination of rigidity modulus - Torsion pendulum - Determination of Young's modulus by non-uniform bending method - Determination of Young's modulus by uniform bending method

UNIT - II	**PHOTONICS AND FIBER OPTICS**	**12**

Lasers ; properties of laser-spontaneous and stimulated emission-amplification of light by population inversion - Einstein's A and B coefficients - derivation – Types of laser; Nd. - YAG Laser, Semiconductor lasers; homojunction and heterojunction, Industrial and Medical Applications

Fiber Optics ; Principle, Numerical Aperture and Acceptance Angle - Types of optical fibres - Fiber optic communication System - Block diagram - Medical Applications - Endoscopy

Determination of wavelength of the Laser using grating- Determination of particle size using Laser - Determination of Numerical aperture and acceptance angle of an optical fiber

Approved by BoS Chairman

UNIT - III	PHOTONICS AND FIBER OPTICS	12

Classical free electron theory – Relaxation time and collision time - Expression for electrical conductivity – Thermal conductivity – Wiedemann - Franz law – Lorentz number - Drawbacks of classical theory - Quantum theory - Fermi - Dirac statistics – variation of Fermi level with temperature

Introduction to magnetic materials – Comparision of Dia, Para and Ferro magnetic materials – Domain theory of ferromagnetism - Hysteresis - Soft and Hard magnetic materials - Ferrites and its applications.

Determination of specific resistance of the wire using Carey Foster's Bridge

UNIT - IV	QUANTUM PHYSICS	12

Black body radiation; Planck's theory (derivation) - wave particle duality - debroglie's wavelength - concept of wave function and its physical significance

Wave equation; Schroedinger's time independent and time dependent equations, particle in a one-dimensional rigid box.

Applications - Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM)

Determination of thickness of a thin wire by using travelling microscope

UNIT - V	CRYSTAL PHYSICS	10

Crystal Structures - Single crystalline, polycrystalline and amorphous materials - unit cell - space lattice - crystal systems - Bravais lattices - Miller indices- inter - planar distances – coordination number and packing factor for SC, BCC, FCC and HCP structures

Crystal imperfections - Point and Line defects - Burger vector

Total Instructional Hours (Theory) : 45

Total Instructional Hours (Lab) : 15

Course Outcomes : Students will be able to	
CO1	Categorize the basics of properties of matter and its applications, classify the elastic properties of materials by using uniform, non-uniform bending method and torsional pendulum apparatus.
CO2	Explain the basics of Laser, Fiber Optics and their applications, determination of Particle size, Wavelength of laser and acceptance angle, numerical aperture of optical fiber.
CO3	Justify the concepts of electrical, magnetic properties of materials, determination of Specific resistance of the material.

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CO4	Interpret the basic knowledge of quantum theory that could be helpful in understanding the wave functions of the particle and determination of thickness of thin sheet by using travelling microscope.
CO5	Classify and compare the different types of Crystals, their structures and its defects.

Text Books	
1.	Bhattacharya, D.K. & Poonam, T, "Engineering Physics", Oxford University Press, 2015.
2.	Gaur, R.K. & Gupta, S.L. "Engineering Physics", Dhanpat Rai Publishers, 2012.
3.	Pandey, B.K. & Chaturvedi, S. "Engineering Physics", Cengage Learning India, 2012.
4.	Rajendran V, "Engineering Physics", Tata McGraw Hill, Publishing Company, New Delhi, 2011.
5.	Wahab, M.A. - Solid State Physics: Structure and Properties of Materials, Narosa Publishing House, 2009.

Reference Books	
1.	Halliday, D., Resnick, R. & Walker, J. "Principles of Physics"", Wiley, 2015.
2.	Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers", Cengage Learning, 2010.
3.	Tipler, P.A. & Mosca, G. "Physics for Scientists and Engineers with Modern Physics", W.H. Freeman, 2007.
4.	Avadhanulu M.N, "Engineering Physics - Volume 1", S.Chand & Company Ltd., New Delhi, 2010.
5.	Garcia, N. & Damask, A. - Physics for Computer Science Students. Springer - Verlag, 2012.
6.	Senthil Kumar, G. Physics Laboratory I & II, VRB publishers Pvt. Ltd., Chennai (2016).

Equipment Needed for 30 Students

1. Diode Laser (2 mS power) , He – Ne Laser source (2mW), Optical Fibre Kit   -   06
2. Travelling Microscope ,Knife edge, Slotted weights   -   19
3. Carey Foster Bridge   -   06
4. Air Wedge Apparatus with Travelling Microscope   -   06
5. Torsional Pendulum   -   06

Approved by BoS Chairman

B.E.	B23CSI101 - C PROGRAMMING	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To know the basics of problem-solving techniques.
2.	To provide exposure to problem-solving through programming.
3.	To develop C programming language with conditional statements and loops.
4.	To develop modular applications in C using functions pointers and structures
5.	To do input/output and file handling in C

UNIT - I	INTRODUCTION TO PROBLEM SOLVING & COMPUTER	8

Problem Solving : Problem Solving Techniques - Logical Thinking – Step for Solving the Problems – Compare Problem Solving and Logical Thinking – Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT - II	BASICS OF C PROGRAMMING	10

Introduction to programming paradigms - Structure of C program - Phases of developing a running computer program in C – Applications of C Language - C programming : Data Types – Storage Class - Constants – Enumeration Constants - Keywords – Operators : Operators – Types of Operators - Expressions - Precedence and Associativity – Input / Output statements – Decision making statements - Looping statements with example of Pattern – Preprocessor directives

UNIT - III	ARRAYS AND POINTERS	9

Introduction to Arrays : Declaration, Initialization – One dimensional array – Two dimensional arrays with example of Matrices Operations – Pointers: Pointer Declaration – Initialization -   Pointer operators – Pointer Arithmetic – Dynamic Memory Allocation – Selection sort, Insertion sort, Bubble sort - Searching

UNIT - IV	FUNCTION AND STRINGS	9

Function : definition of function, Declaration of function – Function Call - Prototype Declaration - Pass by value, pass by reference – Recursion - Linear recursion, Binary Search using recursive functions - C standard functions and libraries - String operations: length, compare, concatenate, copy - String Arrays

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UNIT - V	STRUCTURES AND FILE HANDLING	10

Introduction : need for structure data type, structure definition, Structure declaration, Structure within a structure – Array Structure - Union – File Handling: File Operations – File Types: Sequential and Random access – Case Study: AI Processing System using C.

	Total Instructional Hours : 45

Course Outcomes : Students will be able to	
CO1	Demonstrate knowledge on C programming constructs
CO2	Construct C programs using decision making and control statements.
CO3	Experiment with programs in C using an array.
CO4	Build programs in C using strings, pointers, functions.
CO5	Model the applications in C using Structures, Union and File Operations.

Text Books	
1.	Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2.	Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015.

Reference Books	
1.	Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education,2018.
2.	Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3.	Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
4.	Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
5.	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.

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Description of the Experiments	
Experiment with I/O statements, operators, expressions	
1.	Develop a C programs for Decision Making Construct. a) if-else b) switch-case c) goto, break - continue
2.	Develop a C programs for Loop Control statements. a) for b) Nested for c) while and do-while
3.	Develop a C programs for Array a) One Dimensional – Sorting and Searching b) Two Dimensional – Matrix Operations c) Traversal
4.	Develop a C program to perform the pointers.
5.	a) Linear Search b) Binary Search c) Pointer Operation
6.	Build a C programs for the recursive function
7.	Implement a C programs for string operations and String operations using build in methods
8.	Develop a C program to experiment with Pass by value and Pass by Reference
9.	Develop a c program for structure and union a) Payroll using structure and union. b) Student records using structure and union
10.	Develop a C program to perform file operations
	Total Instructional hours (Lab) : 30

Approved by BoS Chairman

Semester – II

B.E.	B23MAT201 - INTEGRAL CALCULUS AND COMPLEX ANALYSIS	L	T	P	C
		3	1	0	4

Course Objectives	
1.	To recognize various techniques of integration.
2.	To apply integration techniques in evaluating area and volume of solids.
3.	To develop the use of Vector calculus in two and three dimensional spaces.
4.	To demonstrate understanding of the basic concepts of complex differentiation.
5.	To understand Cauchy theorem and Cauchy integral formulae and apply these to evaluate complex contour integrals.

UNIT - I	INTEGRAL CALCULUS	12

Riemann sum – Definite and Indefinite integrals - Substitution rule (Exponential, logarithmic, Trigonometric functions) – Integration by parts – Integration of Rational functions by Partial fraction

UNIT - II	MULTIPLE INTEGRALS	12

Double integrals : Double integrals in Cartesian coordinates - Double integrals in Polar coordinates – Area enclosed by plane curves – Triple integrals: Evaluation of triple integrals - Volume as triple integral (Simple problems)

UNIT - III	VECTOR CALCULUS	12

Gradient and directional derivative - Divergence and curl - Solenoidal and Irrotational vector fields - Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Verification of theorem and applications (for cubes and rectangular parallellopipeds)

UNIT - IV	COMPLEX DIFFERENTIATION	12

Analytic functions - Cauchy - Riemann equations (excluding proof) – Properties of analytic function – Harmonic conjugate - Construction of analytic function by Milne Thomson method – Bilinear transformation

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UNIT - V	COMPLEX INTEGRATION	12

Cauchy's integral theorem – Cauchy's integral formula – residues - Cauchy's Residue theorem – Evaluation of real integrals – Stereographic projection – Use of circular contour and semicircular contour (excluding poles on real axis)

	Total Instructional hours : 60

Course Outcomes : Students will be able to	
CO1	Develop Fundamental Theorem of Calculus, techniques of Integration such as substitution, partial fractions and integration by parts.
CO2	Make use of integration to compute area and volume.
CO3	Apply the line, surface and volume integrals for verification of Green's, Gauss and Stokes theorems.
CO4	Develop an understanding of the standard techniques of complex variable theory in particular analytic function
CO5	Identify contour integrations with the help of residue theorem.

Text Books	
1.	Grewal B.S.,"Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2.	Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2015.
3.	George B. Thomas , Joel Hass , Christopher Heil , Maurice D. Weir, "Thomas' Calculus", Pearson, 14th Edition, 2018.

Reference Books	
1.	Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media - An imprint of Lakshmi Publications Pvt., Ltd., New Delhi, 7th Edition, 2015.
2.	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition 2019.

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3.	O'Neil, P.V.,"Advanced Engineering Mathematics", Cengage Learning India Pvt. Ltd, New Delhi, 7th Edition 2017.
4.	Sastry, S.S, "Engineering Mathematics", Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.
5.	Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics", (Tata McGraw Hill Education Pvt. Ltd), 6th Edition, New Delhi, 2012.
6.	Gean Duffy., "Advanced Engineering Mathematics with MATLAB", A CRC Press Company, Boca Raton London, New York Washington, D.C, 2nd edition 2009. (Free e-book downloaded from www.EasyEngineering.net.pdf)

Approved by BoS Chairman

B.E.	B23HST201- தமிழரும் தொழில்நுட்பமும்	L	T	P	C
		1	0	0	1

அலகு – I	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு – II	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்	3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக்கலை

அலகு – III	உற்பத்தித் தொழில் நுட்பம்	3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருவாக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்

அலகு – IV	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்	3

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன் வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்

அலகு – V	அறிவியல் தமிழ் மற்றும் கணித்தமிழ்	3

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

மொத்தம் – 15 காலங்கள்

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	Text - Cum - Reference Books
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு - தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2.	கணினித் தமிழ் - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4.	பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5.	Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL
6.	Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by : International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by : International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by : International Institute of Tamil Studies).
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the Histroy of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by : The Author)
11.	Porunai Civilization (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by : RMRL) - Reference Book.

Approved by BoS Chairman

B.E.	B23HST201- TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

UNIT - I	WEAVING AND CERAMIC TECHNOLOGY	3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries

UNIT - II	DESIGN AND CONSTRUCTION TECHNOLOGY	3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period

UNIT - III	MANUFACTURING TECHNOLOGY	3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel - Copper and goldCoins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram

UNIT - IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society

UNIT - V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project

Total Instructional hours : 15

Approved by BoS Chairman

Course Outcomes : Students will be able to	
CO1	Summaries the weaving and ceramic technologies during the sangam age.
CO2	Illustrate the design and construction technology in building material, temples and chettinadu houses during sangam age and British period.
CO3	Explain the technology in ship building, steel industry, minting of coins and making beads during sangam age and show the archaeological evidence.
CO4	Extend irrigation technology in construction of dam and ponds, animal husbandry, agriculture activity, maritime knowledge, fishery and pearl hunting of sangam age.
CO5	Summarize the development of scientific Tamil, digitalization of Tamil literature and online Tamil dictionaries.

Text - Cum - Reference Books	
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு - தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2.	கணினித் தமிழ் - முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்)
3.	கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4.	பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5.	Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6.	Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by : International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu) (Published by : International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by : International Institute of Tamil Studies).
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the Histroyb of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by : The Author)
11.	Porunai Civilization (Jointly Published by : Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12.	Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by : RMRL) - Reference Book.

Approved by BoS Chairman

B.E.	B23ECI201 - CIRCUIT ANALYSIS	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To introduce the basic concepts of DC and AC circuits behavior.
2.	To study the application of network theorems.
3.	To study the resonance concepts, Q factor and tuned circuits.
4.	To study the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
5.	To introduce different h parameters and different networks.

UNIT - I	DC CIRCUITS ANALYSIS	9

Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.

UNIT - II	NETWORK THEOREMS AND DUALITY	9

Network theorems - Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Millman's theorem, and Maximum power transfer theorem, application of Network theorems - Duals, Dual circuits, Star delta conversion.

UNIT - III	RESONANCE AND COUPLED CIRCUITS	9

Resonance - Series resonance - Parallel resonance - Bandwidth - Q factor - Selectivity. Self-inductance - Mutual inductance - Dot rule - Coefficient of coupling - Analysis of multiwinding coupled circuits - Series, Parallel connection of coupled inductors - Single tuned and double tuned coupled circuits.

UNIT - IV	TRANSIENT ANALYSIS	9

Natural response - Forced response - Transient response of RC, RL and RLC circuits to excitation by Step Signal, Impulse Signal and exponential sources, Complete response of RC, RL and RLC Circuits to sinusoidal excitation.

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UNIT - V	TWO PORT NETWORKS	9

Two port networks, Z parameters, Y parameters, Transmission (ABCD) parameters, Hybrid (H) Parameters, Interconnection of two port networks, Symmetrical properties of T and π networks.

	Total Instructional hours : 45

Course Outcomes : Students will be able to	
CO1	Identify the laws of basic electrical circuits and network topology
CO2	Apply the circuit theorems in network reduction.
CO3	Explain the concept of resonance and coupled circuits.
CO4	Analyze the transient response of different circuits
CO5	Inspect the different parameters of two port networks.

Text Books	
1.	William H. Hayt, Jr. Jack E. Kemmerly and Steven M.Durbin, " Engineering Circuit Analysis", McGraw Hill Science Engineering, Ninth Edition, 2020.
2.	Joseph Edminister and MahmoodNahvi, "Electric Circuits", Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Seventh Edition 2017.

Reference Books	
1.	Charles K. Alexander, Mathew N.O.Sadiku, "Fundamentals of Electric Circuitsll", Seventh Edition, McGraw Hill, 9th Reprint 2022.
2.	James W. Nilson, Susan A.Reidel, " Electric Circuits", Pearson publication,11th Edition, 2020
3.	https://archieve.nptel.ac.in/courses/108/106/108106172
4.	Lab Manual

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List of Experiments
Experiment with I/O statements, operators, expressions

1.	Verifications of KVL & KCL
2.	Verifications of Thevenin & Norton theorem
3.	Verifications of Super Position Theorem
4.	Verifications of maximum power transfer & reciprocity theorems
5.	Determination of Resonance Frequency of Series & Parallel RLC Circuits
6.	Transient analysis of RL and RC circuits
	Practical hours : 30 **Total hours: 75**

List of Equipment's for a batch of 30 students		
S. No.	**Description of Equipment**	**Quantity required**
1.	CRO(30MHz)	5
2.	Function Generators(3MHz)	5
3.	Dual Regulated power Supplies(0-30V)	10
4.	Ammeters	10
5.	Voltmeters	10
6.	Resistors, Capacitors, Inductors	100
7.	Bread Boards	12

Approved by BoS Chairman

B.E/B.Tech	B23ECI202 – ELECTRON DEVICES	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To understand the construction, theory and operation of the basic electronic devices such as PN junction diode.
2.	To impart the construction, theory and operation of the basic electronic devices such as Bipolar Junction Transistors.
3.	To acquaint the construction, theory and operation of the basic electronic devices such as Field effect Transistors
4.	To analyze the construction, theory and operation of the basic electronic devices such as special semiconductor Devices.
5.	To acquaint the construction, theory and operation of the basic electronic devices such as Power control devices, LED, LCD and other Opto-electronic devices

UNIT-I	SEMICONDUCTOR DIODE	9

PN junction diode, forward and reverse bias characteristics , Breakdown in PN Junction Diodes, PN diode Current equations, Energy Band diagram, Transition and Diffusion Capacitances, Switching Characteristic.

UNIT-II	BIPOLAR JUNCTION TRANSISTORS	9

NPN and PNP Operations, Input and Output characteristics of CE, CB, CC configurations, Early effect and early voltage of BJT, BJT device model-small signal model-Large signal model, Multi Emitter Transistor.

UNIT-III	FIELD EFFECT TRANSISTORS	9

Drain and Transfer characteristics, Current equations, Pinch off voltage and significance of JFET, Drain and Transfer Characteristics, Threshold voltage, Channel length modulation of MOSFET, Comparison of MOSFET with JFET, CMOS Inverter Basics, Static and dynamic characteristics.

UNIT-IV	SPECIAL SEMICONDUCTOR DEVICES	9

MESFET, FINFET, PINFET, CNTFET, Schottky barrier diode, Zener diode, Varactor diode, Tunnel diode, LASER diode and LDR.

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UNIT-V	POWER DEVICES AND DISPLAY DEVICES	9
	Unijunction Transistor, Silicon Controlled Rectifier, Diac, Triac, Power BJT, LED, LCD, Phototransistor, Opto Coupler, Solar cell.	
		LectureHours:45

LIST OF EXPERIMENTS
1. Design and obtain the Characteristics of PN Junction Diode
2. Design and obtain the Zener diode Characteristics & Regulator using Zener diode
3. Design and obtain the Common Emitter input-output Characteristics
4. Design and obtain the Common Base input-output Characteristics
5. Design and obtain the FET Characteristics
6. Design and obtain the SCR Characteristics
7. Design and obtain the Clipper and Clamper
8. Design and obtain the Full Wave Rectifier
Practical Hours: 30

Total hours: 75

Text Books	
1.	Donald A Neaman, "Semiconductor Physics and Devices", Tata McGraw Hill Inc., Fourth Edition, 2012.
2.	Electronic Devices and Circuits- Jacob Millman, C. Halkias, Satyabratajit, McGraw Hill Education 2nd edition,2015
3.	Salivahanan. S, Suresh Kumar. N and Vallavaraj. A, "Electronic Devices and circuits", Tata McGraw Hill Publishing Company, New Delhi, Third Edition, 2008.
4.	Godse, "Electronic Devices and Circuits ", Technical Publication, 2017.

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Reference Books	
1.	Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory", Pearson Prentice Hall, Tenth edition, 2008.
2.	Thomas L. Floyd , "Electronic Devices", Published by Pearson, 9th edition,2019.
3.	R.S.Sedha, "A Text Book of Applied Electronics", S.Chand Publications, 2006.
4.	Bell, C.Gordon Newell, "Electronics circuits and devices",Pearson/Prentice Hall, 5th edition 2012.
5.	https://archive.nptel.ac.in/courses/108/108/108108122/
6.	Lab manual

Course Outcomes: Students will be able to	
CO1	Explain the V-I characteristic of PN diode
CO2	Interpret the models and equivalence circuits of Bipolar Junction Transistors
CO3	Illustrate the characteristic of Field Effect Transistors
CO4	Explain the Special Semiconductor Devices such as MESFET, FINFET, LASER diode and LDR
CO5	Interpret the basic electronic devices such as power Bipolar Transistors, Power control devices, LED, LCD and other Optoelectronic devices

List of Equipment's for a batch of 30 students		
S.NO.	**Description of the Equipment**	**Quantity required(R)**
1.	BC107, BC148, 2N2646, BFW10	25
2.	IN4007, Zener diodes	25
3.	CRO(30MHz)	10
4.	Function Generators(3MHz)	10
5.	Dual Regulated power Supplies(0-30V)	10
6.	Resistors, Capacitors, Inductors	100
7.	Bread Boards	12

Approved by BoS Chairman

B.E.	B23CEP201 – SOFT SKILLS (Common to all Branches)	L	T	P	C
		2	0	0	0

Course Objectives	
1.	To identify personality using evaluation method.
2.	To encourage creative thinking by practice.
3.	To enrich interpersonal skills through integrated activities.
4.	To develop social and professional etiquette.
5.	To identify and apply employability skills for professional success.

UNIT - I	SELF EVALUATION	6

Introduction to soft skills, Familiarize oneself, Self-understanding, SWOT analysis, Goal Setting

UNIT - II	INNOVATIVE THINKING	6

Divergent thinking, Encourage curiosity, Writing a story, Poster making

UNIT - III	INTERPERSONAL SKILLS	6

Interpersonal skills - Need & Components – Understanding Intercultural Competence - Team Work - Problem Solving Skills - Conflict Management & Resolutions in Workplace, Leadership skills, Managerial skills

UNIT - IV	BUSINESS ETIQUETTE	6

Define Etiquette -Types and Importance of Workplace Etiquette - Basic Corporate Etiquette - Telephone Etiquette - Meeting & E-mail Etiquette - Customer Service Etiquette

UNIT - V	CORPORATE SKILLS	6

Work Ethics - Adaptability - Analytical Reasoning - Lateral Thinking - Stress & Time Management

Total Instructional hours : 30

Approved by BoS Chairman

Course Outcomes : Students will be able to	
CO1	Identify different personalities.
CO2	Show creative skill in different aspects.
CO3	Utilize leadership skills with ability to work in a team.
CO4	Analyze work place etiquette.
CO5	Develop adequate soft skills required for the workplace.

Text Books	
1.	Butterfield, Jeff "Soft Skills for Everyone" Cengage Learning, New Delhi, 2015.
2.	S.Hariharanetal "Soft Skills" MJP Publishers : Chennai, 2010.
3.	Peter, Francis "Soft Skills and Professional Communication" New Delhi : Tata McGraw Hill, 2012. Print.
4.	Meenakshi Raman, Shalini Upadhyay, 'Soft Skills', Cengage Learning India Pvt. Ltd, Delhi, 2018.
5.	M.S. Rao, 'Soft Skills Enhancing Employability', I. K. International Publishing House Pvt. Ltd, New Delhi, 2010
6.	Sabina Pillai, Agna Fernandez, 'Soft Skills and Employability Skills', Cambridge University Press, 2018.
7.	John Peter.A, 'Self – Development and Professional Excellence', Cengage Learning India Pvt. Ltd, Delhi, 2019.

Approved by BoS Chairman

B.E.	B23ENI101 – PROFESSIONAL COMMUNICATION	L	T	P	C
		3	0	2	4

Course Objectives

1.	To enhance listening and reading ability of learners to comprehend various forms of speech or conversations.
2.	To develop learners' verbal ability through complex texts and speak effectively in real life and workplace context.
3.	To make use of grammatical knowledge to enhance fluency.
4.	To foster learners' ability to write convincing job applications and effective reports.
5.	To develop learners language proficiency through LSRW skills.

UNIT – I	9
Listening	Listening for general information - specific details - conversation - Audio / video (formal & informal); Telephone conversation
Speaking	Self-Introduction; Introducing a friend; - politeness strategies - making polite requests & polite offers
Reading	Introduction to technical texts, scientific texts
Writing	Extended definitions, Writing checklists, Recommendation
Language development	Gerunds, Infinitives
Vocabulary development	Technical vocabulary, abbreviations, British & American spelling

UNIT – II	9
Listening	Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities
Speaking	Narrating personal experiences / Talking about events and situations
Reading	Reading longer technical texts, Summarizing

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Writing	Interpreting graphical representations, Writing dialogues about formal and informal contexts
Language development	Use of conjunctions and prepositions
Vocabulary development	Numerical adjectives, Transitional device

UNIT – III	9
Listening	Listen to a classroom lecture; listening to advertisements about products
Speaking	Picture description - describing locations in workplace, Presenting product, describing shape, size and weight - talking about quantities - talking about precautions, discussing advantages and disadvantages - making comparisons
Reading	Cause & effect texts, practice in speed reading
Writing	Process writing, Use of sequence words, Analytical and issue based essays
Language development	Subject verb agreement, Pronoun concord / pronoun antecedent
Vocabulary development	Sequence words, Misspelled words, Content v/s Function words

UNIT – IV	9
Listening	Listening to TED Talks, Educational videos and completing exercises based on them
Speaking	Short speech (Just A Minute) - Extempore and persuasive speech, discussing and making plans-talking about tasks-talking about progress
Reading	Reading for details in personal and professional emails
Writing	Drafting personal and professional emails, job application - cover letter, résumé preparation, Internship letter
Language development	Clauses, if conditionals
Vocabulary development	Finding suitable synonyms, Paraphrasing

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UNIT – V	9
Listening	Listening to debates/ discussions and panel discussions, listening to interviews
Speaking	Making predictions - talking about a given topic, giving opinions & facts, describing a process, discussing safety issues (making recommendations)
Reading	Reading and understanding technical articles
Writing	Writing reports, Minutes of meeting, Writing feasibility, survey and industrial reports
Language development	Reported speech, Active and Passive voice, Impersonal passive, Idioms
Vocabulary development	Verbal analogies, Purpose statements

Total Theory Instructional hours : 45
Total Lab Instructional hours : 30

Course Outcomes : Students will be able to	
CO1	Develop listening skills to respond appropriately in general and academic purposes.
CO2	Develop strategies and skills to enhance their ability to read and comprehend.
CO3	Apply vocabulary skills to improve their language skills.
CO4	Build the writing skills with specific reference to technical writing.
CO5	Demonstrate language proficiency through LSRW skills.

Text Books	
1.	Board of Editors. Fluency in English A Course book for Engineering and Technology. Orient Blackswan, Hyderabad : 2016
2.	Sudharshana.N.P and Saveetha. C. English for Technical Communication. Cambridge University Press: New Delhi, 2016.

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	Reference Books
1.	Raman, Meenakshi and Sharma, Sangeetha "Technical Communication Principles and Practice" Oxford University Press: New Delhi, 2014.
2.	Kumar, Suresh. E. "Engineering English" Orient Blackswan: Hyderabad, 2015.
3.	Booth-L. Diana, Project Work, Oxford University Press, Oxford: 2014.
4.	Davis, Jason and Rhonda LIss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006.
5.	Communicative English for Engineers and Professionals- Nitin Bhatnagar & Mamta Bhatnagar.
6.	Skills for Success. Listening and Speaking. Level 4- Margret Brooks.
7.	Grammar F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press : Oxford, 2011.

Exercises for Batch of 30 Students

1. Listening Comprehension
2. Self- introduction
3. Short presentation
4. Group Discussion
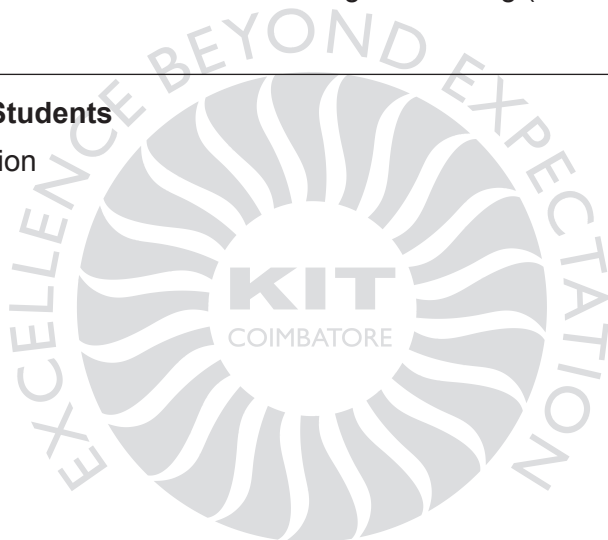
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B.E.	B23CHI101 - ENGINEERING CHEMISTRY (Common to all Branches)	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To make the students conversant with boiler feed water requirements, related problems, water treatment and inculcate practical skills in the water quality analysis.
2.	To make the students conversant with basics of polymer chemistry.
3.	To make the students conversant with basic of electrochemical reactions, corrosion and induce experimental skills in the electro-analytical techniques.
4.	To make the student acquire sound knowledge of energy devices.
5.	To develop an understanding of the basic concepts of nano materials.

UNIT - I	WATER TECHNOLOGY	17

Hardness of water : Types, expression of hardness and their units, hardness problems, boiler troubles - scale and sludge, caustic embrittlement, boiler corrosion, priming and foaming

Treatment of Boiler feed water : Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning)

External treatment : Ion exchange process, Zeolite process

Desalination of brackish water : Reverse osmosis - municipal water treatment, break point chlorination

Determination of alkalinity in water sample, Determination of total, temporary & permanent hardness of water by EDTA method. Estimation of iron content of the water sample using spectrophotometer

UNIT - II	POLYMERS	9

Polymers : Definition, polymerization, types - addition and condensation polymerization, free radical mechanism - tacticity – biodegradable polymer (PHBV) and conducting polymer (poly-aniline)

Plastics : Classification, preparation, properties and uses of PVC, teflon, nylon-6, 6 and epoxy resin

Rubber : Vulcanization of rubber, synthetic rubbers -n-butyl rubber and SBR

Moulding : Ingredients - compression and Injection

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UNIT - III	ELECTROCHEMISTRY AND CORROSION	16

Electrochemistry : Redox reaction, electrode potential - oxidation potential, reduction potential, Nernst equation (derivation) - measurement and applications - electrochemical series and its significance

Corrosion : causes - types-chemical and electrochemical corrosion (galvanic and differential aeration), corrosion control - electrochemical protection (sacrificial anodic method and impressed current cathodic method)

Estimation of iron content of the given solution using potentiometer, Conductometric titration of strong acid vs strong base, Estimation of copper in brass

UNIT - IV	ENERGY DEVICES	9

Batteries : Types of batteries – primary (alkaline battery) and secondary battery (lead acid battery, lithium-ion-battery), Fuel Cells (H_2 - O_2 fuel cell)

Super Capacitors : Principle, construction, working and applications

Photo voltaic cell : Solar cells - principle, construction, working and applications

UNIT - V	NANOCHEMISTRY	9

Basics : Distinction between molecules, nanoparticles and bulk materials- surface area to volume ratio

Synthesis : Top-down process (ball milling) - Bottom-up process (chemical vapour deposition and sol-gel method)

Properties of nano materials - Optical, electrical, thermal and mechanical

Applications of nano materials - Medicine, Industries, electronics and biomaterials

Total Instructional Hours (Theory) : 45

Total Instructional Hours (Lab) : 15

Course Outcomes : Students will be able to	
CO1	Determine the characterization of water and quantitative analysis of alkalinity, hardness and Iron.
CO2	Develop the basics of polymer chemistry.
CO3	Interpret the principles of electrochemical reactions, corrosion and estimation of copper in Alloy.
CO4	Apply the concepts of energy devices and its engineering applications.
CO5	Organize the basics of Nano chemistry and its applications.

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Text Books	
1.	Dara, S S and Umare, S S, "A Textbook of Engineering Chemistry", Chand S & Company Ltd., New Delhi, 2015.
2.	Jain, P C and Monika Jain, "Engineering Chemistry" Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 2015
3.	Vogel's Textbook of Quantitative Chemical Analysis, 8th edition, 2014.

Reference Books	
1.	Friedrich Emich, "Engineering Chemistry", Scientific International Pvt. Ltd., New Delhi, 2014.
2.	Prasanta Rath, "Engineering Chemistry", Cengage Learning India Pvt. Ltd., Delhi, 2015.
3.	Shikha Agarwal, "Engineering Chemistry - Fundamentals and Applications", Cambridge University Press, Delhi, 2015.
4.	Charles P. Poole and Frank J. Owens, "Introduction to nanotechnology", John Wiley Sons, New Jersey, 2003.

Equipment Needed for 30 Students

1. Conductivity Meter   - 10
2. Potentiometer   - 10
3. Spectrophotometer   - 02
4. Electronic Balance   - 01

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B.E. / B.Tech	B23MEP101 – BASIC WORKSHOP PRACTICES LABORATORY (GROUP - A & B) (Common to all Branches)	L	T	P	C
		0	0	4	2

Course Objectives	
1.	Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work, sawing, planning, making joints in wood materials used in common household wood work.
2.	Welding various joints in steel plates using arc welding work; machining various simple processes like turning, drilling, tapping in parts; assembling simple mechanical assembly of common household equipments, making a tray out of metal sheet using sheet metal work.
3.	To provide exposure to the students with hands on experience on various basic Engineering practices in Electrical Engineering.
4.	To provide exposure to the students with hands on experience on various basic Engineering practices in Electronics Engineering.

GROUP – A (CIVIL & MECHANICAL)	
I Civil Engineering Practices	12

Plumbing Works

Making basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings

Carpentry

Preparation of wooden joints by sawing, planning and cutting

1.	Planning & Polishing operation
2.	Half lap joint
3.	Cross lap joint

II Mechanical Engineering Practices	18

Welding Workshop

Study of welding tools and equipment's - Study of various welding methods - Instruction of BI standards and reading of welding drawings.

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Exercise in arc welding for making	
1.	Lap joint
2.	Butt joint
3.	Demonstration of gas welding and cutting.
Machine Shop	
1.	Drilling and Tapping
2.	Lathe Exercise – Facing operation
3.	Lathe Exercise – Straight turning and Chamfering
Sheet metal	
Making of small parts using sheet metal	
1.	Making of Square Tray

GROUP – B (ELECTRICAL & ELECTRONICS)	**30**

Expt. No.	Description of the Experiments
1.	Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2.	Fluorescent lamp and Stair case wiring.
3.	Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
4.	Measurement of energy using single phase energy meter.
5.	Measurement of resistance to earth of an electrical equipment.
6.	Study of Electronic components and equipment's – Resistor color coding
7.	Measurement of AC signal parameter (peak-peak, rms period, frequency) using CRO.
8.	Study of logic gates AND, OR, EX-OR and NOT.
9.	Soldering & desoldering practices.
10.	Study of Fan, Iron Box, Emergency Lamp, Telephone and FM Radio.

Total Instructional hours : 60

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Course Outcomes : Students will be able to	
CO1	Explain the pipe connections and identify the various components used in plumbing.
CO2	Develop simple wooden joints using wood working tools and simple components using lathe and drilling machine.
CO3	Construct simple lap, butt and tee joints using arc welding equipment and simple parts using sheet metal.
CO4	Construct Residential house wiring, Fluorescent lamp wiring and Stair case wiring.
CO5	Measure electrical quantities such as voltage, current, power & power factor in RLC Circuit, resistance to earth, AC signal parameter (peak-peak, RMS period, frequency) and ripple factor.
CO6	Examine logic gates (AND, OR, EX-OR and NOT), Electronic components and equipment's.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
GROUP – A (CIVIL & MECHANICAL)		
Sl. No.	**Description of Equipment**	**Quantity required**
1.	Assorted components for plumbing, Consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.	15
2.	Carpentry vice (fitted to work bench)	15
3.	Standard woodworking tools	15
4.	Models of industrial trusses, door joints, furniture joints	5
5.	Power Tools:	
	(a) Rotary Hammer	2
	(b) Demolition Hammer	2
	(c) Circular Saw	2
	(d) Planer	2
	(e) Hand Drilling Machine	2
	(f) Jigsaw	2

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6.	Arc welding transformer with cables and holders	5
7.	Welding booth with exhaust facility	5
8.	Welding accessories like welding shield, chipping hammer, wire brush, etc.	5
9.	Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2
10.	Centre lathe	2
11.	Hearth furnace, anvil and smithy tools	2
12.	Moulding table, foundry tools	2
13.	Power Tool: Angle Grinder	2
14.	Study-purpose items: Centrifugal pump, Airconditioner	1

GROUP – B (ELECTRICAL & ELECTRONICS)		
Sl. No.	**Description of Equipment**	**Quantity required**
1.	Assorted Electrical Components for House Wiring	15 sets
2.	Electrical Measuring Instruments	10 sets
3.	Iron Box	1
4.	Fan and Regulator	1
5.	Emergency Lamp	1
6.	Megger	1
7.	Digital Live Wire Detector	2
8.	Soldering Guns	10
9.	Assorted Electronic Components for Making Circuits	50
10.	Multipurpose PCBs	10

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11.	Multi Meters	10
12.	Telephone	2
13.	FM radio	2
14.	Regulated Power Supply	2
15.	CRO (30MHz)	2
16.	Bread board	10
17.	Digital IC types (IC 7432, IC 7408, IC 7400, IC 7404, IC 7402, IC 7486)	Each 10

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Semester-III

B.E / B.TECH	B23MAT301 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
	(Common to AERO, AGRI, ECE, EEE & MECH)	3	1	0	4

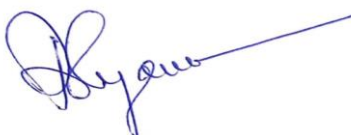| Course Objectives	
1.	To introduce the basic concepts of PDE for solving standard partial differential equations
2.	To understand Fourier series analysis in representation of Periodic signals.
3.	To develop Fourier series techniques in solving wave and heat flow problems.
4.	To acquaint the student with Fourier transform techniques used in wide variety of situations.
5.	To develop the concept of Z transforms techniques for discrete time systems.

UNIT – I PARTIAL DIFFERENTIAL EQUATIONS	12
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Solution of first order partial differential equations of the forms $f(p,q) = 0$, $z = px + qy + f(p,q)$ - Lagrange's linear equation - Linear homogeneous partial differential equations of second and higher order with constant coefficients.	

UNIT – II FOURIER SERIES	12
Dirichlet's conditions - General Fourier series - Odd and even functions - Half range sine series - Half range cosine series - Parseval's identity – Harmonic analysis.	

UNIT – III BOUNDARY VALUE PROBLEM	12
Classification of second order linear PDE - Solutions of one dimensional wave equation - One dimensional equation of heat conduction - Steady state solution of two dimensional equation of heat conduction in Cartesian coordinates.	

UNIT – IV FOURIER TRANSFORMS	12
Fourier transform pair - Fourier sine and cosine transforms - Properties (without proof) - Transforms of simple functions - Convolution theorem (without proof) - Parseval's identity.	

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NIT – V Z-TRANSFORMS AND DIFFERENCE EQUATIONS	12

Z-transforms - Elementary properties - Inverse Z-transform (using partial fraction and residues) - Initial and final value theorems - Convolution theorem (without proof) - Formation of difference equations - Solution of difference equations using Z - transforms.

	Total Instructional hours : 60

Course Outcomes : Students will be able to	
CO1	Apply the techniques to find solutions of standard Partial Differential Equations .
CO2	Solve differential equations using Fourier series analysis.
CO3	Apply Fourier series to solve boundary value problems.
CO4	Develop Fourier transforms techniques in engineering problems.
CO5	Make use of Z - transforms to solve difference equations.

Text Books	
1.	Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2020.
2.	Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics" Volume III, S. Chand & Company Ltd., 2016

Reference Books	
1.	Ramana B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
2.	Erwin Kreyszig., "Advanced Engineering Mathematics", John Wiley & Sons, 10th Edition, New Delhi, 2018.
3.	Wylie C. Ray and Barrett Louis C.,"Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.
4.	Peter V.O Neil., "Advanced Engineering Mathematics", Cengage, New Delhi, 2016.
5.	Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics",Narosa Publications, 5th Edition, New Delhi, 2017.

Approved by BoS Chairman

B. E.	B23CSI303-FUNDAMENTALS OF DATA STRUCTURES USING C (COMMON TO BME,ECE & EEE)	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To acquire the concepts of data structures.
2.	To understand the usage linked lists.
3.	To understand the concepts of stacks and queues.
4.	To know the concepts of trees and graphs .
5.	To familiarize the concepts of sorting, searching and hashing techniques.

UNIT - I	INTRODUCTION	9

Abstract Data Types (ADTs), List ADT, array-based implementation – linked list implementation –– singly linked lists- circularly linked lists - doubly-linked lists – applications of lists –Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).

UNIT - II	LINEAR DATA STRUCTURES-QUEUE	9

Queue ADT - Types of Queue: Simple Queue, Circular Queue, Priority Queue, deQueue - Operations on each types of Queues (Insertion, Deletion, and Traversal) – applications of queues.

UNIT - III	LINEAR DATA STRUCTURES-STACK	9

Stack ADT- definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation.

UNIT - IV	NON-LINEAR DATA STRUCTURES- TREES & GRAPHS	9

Tree ADT - Tree traversals - Binary Tree ADT - expression trees - Applications of Trees - Binary Search Tree – Balanced Binary Tree- B -Trees – Heaps - Graph – Graph traversal Algorithms – Shortest Path Algorithms – Minimum Spanning Tree Algorithms

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UNIT - V	SEARCHING, SORTING & HASHING	9

Searching- Linear Search - Binary Search. Sorting - Quick sort - Bubble sort - Merge sort - Selection sort - Hashing- Hash Function – Types of Hash Functions – Collision – Collision Resolution Technique – Perfect Hashing.

Expt. No.	Description of the Experiments
1.	Implementation of Singly, Doubly and Circular Linked list using C
2.	Array implementation of Stack and Queue ADTs.
3.	Linked list implementation of Stack and Queue ADTs.
4.	Implementation of Tree traversal algorithms.
5.	Implementation of Binary Search Trees.
6	Implementation of AVL Trees.
7	Implementation of Shortest path and MST algorithms
8	Implementation of searching algorithms.
9	Implementation of sorting algorithms.
10	Hashing – collision resolution techniques.
	Total Instructional hours : (45+15) = 60

Course Outcomes : Students will be able to	
CO1	Identify suitable data structures for simple problems
CO2	Apply the linear data structures such as stacks and queues to solve problems.
CO3	Make use of tree data structures to provide solutions.
CO4	Apply the concept of graphs in real world scenarios.
CO5	Analyse various searching ,sorting and hashing techniques.

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Text Books	
1.	"C Programming Absolute Beginner's Guide" by Greg Perry and Dean Miller is the third edition, June 23, 2013
2	Pradip Dey and Manas Ghosh, —Programming in C, Second Edition, Oxford University Press, 2011.
3.	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, Second Edition, University Press, 2008

Reference Books	
1.	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
2.	"Data Structures Using C" by Aaron M. Tenenbaum, Yedidyah Langsam, and Moshe J. Augenstein ,2022
3.	"Data Structures and Algorithm Analysis in C" by Mark Allen Weiss,2022
4.	Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2016.
5.	Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

CO-PO Mapping Table:

Cos	K-Level	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PSO1	PSO2
		K3	K3	K5	K4	K3	K3, A3	K2, A3	K3, A3	A3	A3	K3, A3	A3	K3, A3	K3, A3
CO1	K3	2	2	1	1	1	1	1	-	1	2	1	3	2	1
CO2	K3	2	2	1	1	1	-	-	-	1	1	1	2	2	2
CO3	K3	2	2	1	1	1	-	-	-	1	1	1	2	2	1
CO4	K3	2	2	1	1	1	-	-	-	2	1	1	2	2	3
CO5	K3	2	2	1	1	1	2	1	-	1	2	1	3	3	2
Weighted Average		2	2	1	1	1	1	1	-	1	1	1	2	2	2

3 – Substantial **2- Moderate** **1- Low** **'-' – No Correlation**

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B.E	B23ECT301 – ANALOG ELECTRONIC CIRCUITS	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To understand the methods of transistor biasing.
2.	To design and analyze single stage and multistage amplifier circuits and the h parameter models for amplifiers.
3.	To give a comprehensive exposure to all types of feedback amplifiers and oscillator and Multivibrator principles.
4.	To study about turned amplifiers and Power Amplifiers.
5.	To design, analyze the DC regulated power supplies, converters.

UNIT- I	BIASING OF BJT AND FET	9

DC Load line, AC load line, Operating point, various biasing methods for BJT- Stability factors -Bias compensation, Thermal stability- JFET and MOSFET biasing methods.

UNIT- II	BJT AND FET AMPLIFIERS	9

BJT and FET amplifier design - Hybrid equivalent circuits - Calculation of current and voltage gain, input and output impedance of various configurations, cascaded BJT amplifiers. Differential amplifier-Differential and common mode gain – CMRR – Darlington amplifiers, Bootstrap technique.

UNIT- III	FEEDBACK AMPLIFIERS , OSCILLATORS AND MULTIVIBRATORS	9

Basic concepts of feedback - effect of negative feedback on input and output resistances, gain, gain stability, distortion and bandwidth -voltage and current feedback circuits. Barkhausen criteria for oscillation – Analysis of RC oscillators – Phase shift and Wein bridge oscillators – LC oscillator – Colpitts - crystal oscillator -Classification of Multivibrators.

UNIT- IV	TUNED AMPLIFIERS AND POWER AMPLIFIERS	9

Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers – Analysis of capacitor coupled single tuned amplifier - double tuned amplifier. Power amplifiers- class A - Class B - Class AB - Class C - conversion efficiency Power MOSFET - Temperature Effect - Class AB Power amplifier using MOSFET.

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UNIT- V	POWER SUPPLIES AND DC CONVERTERS	9

Half wave and Full wave Rectifiers - Ripple factor. Filters - L, C and Pi type filters - Voltage Regulators - Series and Shunt Voltage Regulators – DC/DC convertors – Buck, Boost, Buck Boost analysis and design.

	Total Instructional hours: 45

Text Books	
1.	Donald. A. Neamen, "Electronic Circuits Analysis and Design", 3rd Edition, Mc Graw Hill Education (India) Private Ltd., 2010. (Unit I-IV)
2.	Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 11th Edition, Pearson Education, 2013. (Unit V)

Reference Books	
1.	Millman J, Halkias.C.and Sathyabrada Jit, "Electronic Devices and Circuits", 4th Edition, Mc Graw Hill Education (India) Private Ltd., 2015.
2.	Salivahanan and N. Suresh Kumar, "Electronic Devices and Circuits", 4th Edition, , Mc Graw Hill Education (India) Private Ltd., 2017
3.	Floyd, "Electronic Devices", Ninth Edition, Pearson Education, 2012
4.	David A. Bell, "Electronic Devices & Circuits", 5th Edition, Oxford University Press, 2008
5.	Anwar A. Khan and Kanchan K. Dey, " A First Course on Electronics", PHI, 2006
6.	Rashid M, "Microelectronics Circuits", Thomson Learning, 2007
7.	http://nptel.ac.in/video.php?subjectId=117103063

Course Outcomes: Students will be able to	
CO1	Explain the biasing methods of Transistors.
CO2	Develop small signal models of BJT and FET amplifiers.
CO3	Analyze the stability of feedback amplifiers, Oscillator and Multivibrator circuits.
CO4	Classify the various types of tuned amplifiers and Power amplifiers.
CO5	Model power supplies and converters.

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B.E	B23ECT302 - DIGITAL ELECTRONICS	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To present the Digital fundamentals, Boolean algebra and its applications in digital systems.
2.	To familiarize with the design of various combinational digital circuits using logic gates.
3.	To introduce the analysis and design procedures for synchronous sequential circuits.
4.	To introduce the analysis and design procedures for asynchronous sequential circuits and PLD'S.
5.	To introduce the digital design of digital circuits using Verilog HDL.

UNIT- I	DIGITAL FUNDAMENTALS	9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1s and 2s complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT- II	COMBINATIONAL CIRCUIT DESIGN	9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Binary Multipliers, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Parity generator.

UNIT- III	SYNCHRONOUS SEQUENTIAL CIRCUITS	9

Flip flops – SR, JK, T, D, Master/Slave FF, operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits, Design Moore/Mealy models, state minimization, state assignment, circuit implementation, Design of Counters, Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT- IV	ASYNCHRONOUS SEQUENTIAL CIRCUIT & PROGRAMMABLE LOGIC DEVICES	9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, ASM Charts, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits. Programmable Logic Devices- Programmable Read only Memory (PROM), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Field Programmable Gate Arrays (FPGA)

UNIT- V	DIGITAL DESIGN WITH VERILOG HDL	9

Introduction of Verilog HDL and VHDL – Types of Modelling: Behavioural, Dataflow and Gate level, Design of Combinational circuit using Verilog, Design of Sequential circuit using Verilog.

Total Instructional hours: 45

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Text Books
1.	M. Morris Mano and Michael D. Ciletti, "Digital Design", 6th Edition, Pearson, 2018.

Reference Books
1.	Charles H.Roth., "Fundamentals of Logic Design", 6 th Edition, Thomson Learning, 2013.
2.	Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
3.	S.Salivahanan and S.Arivazhagan, "Digital Electronics", I st Edition, Vikas Publishing House pvt Ltd, 2012.
4.	Anil K.Maini, "Digital Electronics", Wiley, 2014.
5.	A.Anand Kumar, "Fundamentals of Digital Circuits", 4 th Edition, PHI Learning Private Limited, 2016.
6.	Soumitra Kumar Mandal, "Digital Electronics", McGraw Hill Education Private Limited, 2016.
7.	Samir Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis", 2 nd Edition, Pearson education Inc, 2003.

Course Outcomes: Students will be able to	
CO1	Make use of basic postulates of Boolean algebra and Classify the various logic gates and its families
CO2	Design various combinational digital circuits using logic gates
CO3	Analyze the procedure for synchronous sequential circuits
CO4	Analyze the procedure for asynchronous sequential circuits and PLD'S
CO5	Design of digital circuits using Verilog HDL

Approved By BoS Chairman

B.E	B23ECT303 - SIGNALS AND SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To understand the basic properties and characterization of signal & systems using MATLAB.
2.	To analyse continuous time signals in the Fourier and Laplace domain.
3.	To apply LTI continuous time system in the Fourier and Laplace domain.
4.	To analyse discrete time signals in the Fourier and Z transform domain.
5.	To apply LTI discrete time system in the Fourier and Z transform domain.

UNIT- I	CLASSIFICATION OF SIGNALS AND SYSTEMS	10

Standard signals - Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids – Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals Classification of systems - CT systems and DT systems – Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.

UNIT- II	ANALYSIS OF CONTINUOUS TIME SIGNALS	10

Fourier series for periodic signals Fourier Transform – properties - Laplace Transforms and properties.

UNIT- III	LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS	9

Impulse response - convolution integrals - Differential Equation - Fourier and Laplace transforms in Analysis of CT systems Systems connected in series / parallel.

UNIT- IV	ANALYSIS OF DISCRETE TIME SIGNALS	8

Baseband signal Sampling – Fourier Transform of discrete time signals (DTFT) - Properties of DTFT -Z Transform & Properties.

UNIT- V	LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS	8

Impulse response – Difference Equations - Convolution sum Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems DT systems connected in series and parallel.

Total Instructional hours: 45

Approved By BoS Chairman

Text Books
1. Allan V. Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson, 2015. (Unit I - V)

Reference Books
1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.

	Course Outcomes: Students will be able to
CO1	Classify the various types of continuous and discrete time signals and systems using MATLAB
CO2	Analyze Continuous time signals in the Fourier and Laplace domain
CO3	Apply LTI Continuous time systems in the Fourier and Laplace domain
CO4	Analyze discrete time signals in the Fourier and Z transform domain
CO5	Apply LTI discrete time systems in the Fourier and Z transform domain

Approved By BoS Chairman

Approved By BoS Chairman

B.E	B23ECT304 - ELECTROMAGNETIC FIELDS	L	T	P	C
		3	1	0	4

	Course Objectives
1.	To understand the basic units, constants and Theorems of Electromagnetic Fields.
2.	To gain conceptual and basic mathematical understanding of electric field in free space and in materials.
3.	To gain conceptual and basic mathematical understanding of magnetic field in free space and in materials.
4.	To understand the coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations.
5.	To understand Electromagnetic wave propagation in different media.

UNIT- I	INTRODUCTION	12

Electromagnetic model, Units and constants, Review of vector algebra, Rectangular, cylindrical and spherical coordinate systems (with MATLAB), Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem (with MATLAB), Curl of a vector field, Stoke's theorem, Null identities, Helmholtz's theorem.

UNIT- II	STATIC ELECTRIC FIELD	12

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Capacitance, Parallel, cylindrical and spherical capacitors, Electrostatic energy, Poisson's and Laplace's equations, Uniqueness of electrostatic solutions.

UNIT- III	STATIC MAGNETIC FIELD	12

Lorentz force equation, Law of no magnetic monopoles, Ampere's law, Vector magnetic potential, Biot-Savart law and applications, Magnetic field intensity and idea of relative permeability, Magnetic circuits, Behaviour of magnetic materials, Boundary conditions, Inductance and inductors, Magnetic energy, Magnetic forces and torque.

UNIT- IV	TIME-VARYING FIELDS AND MAXWELL's EQUATIONS	12

Faraday's law, Displacement current and Maxwell-Ampere law, Maxwell's equations, Potential functions, Electromagnetic boundary conditions, Wave equations and solutions, Time-harmonic fields.

Approved By BoS Chairman

UNIT- V	ELECTROMAGNETIC WAVES	12

Uniform plane waves- Wave equation - Wave propagation in different media – Poynting Vector and Theorem – wave Polarization - Reflection of a plane wave at Normal and Oblique incidence - EMI / EMC Interference.

		Total Instructional hours: 60

	Text Books
1.	D.K. Cheng, "Field and wave Electromagnetics", 2nd Edition, Pearson (India), 1989. (UNIT I, II, III, IV, V)
2.	W.H. Hayt and J.A. Buck, "Engineering Electromagnetics", 7th Edition, McGraw-Hill (India), 2006. (UNIT I - V)

	Reference Books
1.	D.J. Griffiths, "Introduction to Electrodynamics", 4th Edition, Pearson (India), 2013.
2.	B.M. Notaros, "Electromagnetics", Pearson: New Jersey, 2011.
3.	M.N.O. Sadiku and S.V. Kulkarni, "Principles of Electromagnetics", 6th Edition, Oxford (Asian Edition), 2015.

	Course Outcomes: Students will be able to
CO1	Explain basic laws and theorems applied in Electromagnetic waves and propagation analysis.
CO2	Analyze static and dynamic electric and magnetic field and associated laws.
CO3	Show the EM wave propagation in a medium and through boundaries.
CO4	Solve electromagnetic problems with Maxwell's equations.
CO5	Analyze about Electromagnetic waves propagation in different media.

Approved By BoS Chairman

B.E	B23ECP301 - ANALOG CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives	
1.	To study the Frequency response of CE and CS Amplifier.
2.	To learn the Transfer characteristics of differential amplifier.
3.	To gain hands on experience in designing electronic circuits.
4.	To study feedback amplifiers and oscillators.
5.	To study the operation of various multivibrators.

List of Experiments	
Expt. No.	**Description of the Experiments**
1.	Construct and simulate CE (BJT) and CS (FET) amplifiers to find Frequency Response.
2.	Differential Amplifiers - Transfer characteristics, CMRR Measurement
3.	Simulation Analysis of BJT amplifiers with Fixed bias and Voltage divider bias
4.	Simulation Analysis of FET amplifiers with fixed bias and voltage divider bias
5.	Frequency response of Series and Shunt feedback amplifiers
Design, Simulation and Analysis of Following Circuits	
7.	Tuned Amplifier
8.	Power Amplifier
9.	Colpitts Oscillator
10.	RC Phase shift Oscillator
11.	Wien Bridge Oscillator
12.	Astable and Monostable Multivibrators
	Total Instructional hours: 60
Course Outcomes: Students will be able to	
CO1	Analyze amplifier circuits with Fixed bias and Voltage divider bias using Simulation
CO2	Design, simulate and analyze feedback amplifier, tuned amplifier, power amplifier, various oscillators , Multivibrators and Regulated Power supplies
CO3	Demonstrate and Outline the technical details of all the experiments conduction with result obtained.

Approved By BoS Chairman

List of Equipment Required: Requirements for a Batch of 30 Students

Sl.No.	Description of the Equipment	Quantity required (Nos.)
1.	CRO (30MHz)	12
2.	Signal Generator /Function Generators (3 MHz)	12
3.	Dual Regulated Power Supplies (0 - 30V)	12
4.	Standalone desktop PCs with SPICE software	15
5.	Transistor/FET(BJT-NPN-PNP and NMOS/PMOS)	50
6.	Resistors, Capacitors, Inductors	50
7.	Diodes, Zener diode	10
8.	Digital Multimeter	15
9.	Circuit Simulation Software (any public domain or commercial software)	15

Approved By BoS Chairman

	B23ECP302 - DIGITAL ELECTRONICS LABORATORY	L	T	P	C
B.E		0	0	4	2

Course Objectives	
1.	To understand the various basic logic gates
2.	To design and implement the various combinational circuits
3.	To design and implement combinational circuits using MSI devices.
4.	To design and implement sequential circuits
5.	To understand and code with HDL programming

List of Experiments	
Expt. No.	**Description of the Experiments**
Experiments Based on Digital Trainer Kits	
1.	Verification of Boolean Theorems using basic gates.
2.	Design and implementation of combinational circuits using basic gates for arbitrary Functions , code converters.
3.	Design and implement Half/Full Adder and Subtractor.
4.	Design and implement combinational circuits using MSI devices: • 4 – bit binary adder / subtractor • Parity generator / checker • Magnitude Comparator
5.	Design and implementation of i)Multiplexer and De-multiplexer ii) Encoder and Decoder
6.	Design and implement synchronous counters.
7.	Design and implement asynchronous counters.
8.	Design and implement shift-registers.
Experiments Based on EDA Tools	
9.	Simulation of Half / Full Adder and Subtractor using Verilog HDL.
10.	Simulation of Encoder and Decoder using Verilog HDL.
11.	Simulation of Magnitude Comparator using Verilog HDL.
12.	Simulation of shift-registers using Verilog HDL.
13.	Simulation of synchronous and asynchronous sequential counters using Verilog HDL.
14.	Simulation of 8-bit memory using Verilog HDL.

Approved By BoS Chairman

		Total Instructional hours: 60

Course Outcomes:

CO1	Test for the combinational and sequential circuits using discrete components
CO2	Analyze the combinational and sequential circuits using HDL
CO3	Demonstrate and Outline the technical details of all the experiments conduction with result obtained.

List of Equipment Required: Requirements for a Batch of 30 Students

Sl.No.	Description of the Equipment	Quantity required (Nos.)
1.	Digital trainer kits	15
2.	Digital ICs required for the experiments in sufficient numbers ICs 7400/ 7402 / 7404 / 7486 / 7408 /7432 / 7483 / 74150 / 74151 / 74147 /7445 / 7476/7491/ 555 / 7494 / 7447 /74180 / 7485 / 7473 / 74138 / 7411 /7474	50
3.	Computer with HDL software	15

Approved By BoS Chairman

B.E	B23ECP303 - SIGNALS AND SYSTEMS LABORATORY	L	T	P	C
		0	0	2	1

Course Objectives

1.	To study the various operations of signals and response of systems using appropriate tools

List of Experiments	
Expt. No.	**Description of the Experiments**
1	Generate discrete signal and calculate energy/ Power of a signal.
2	Understand the properties and the different representations of LTI systems
3	Understand the concept of convolution
4	Analyze the effects of sampling in the time and frequency domains
5.	Learn about uniform quantization
6	Discrete Fourier Analysis and Synthesis of Signals
7.	The given a real electrocardiogram (EGC) signal contains 500 data samples and sampled at a rate of 200 Hz. Detect the heart rate of the patient from which this ECG was taken.
	Total Instructional hours: 30

Course Outcomes: Students will be able to	
CO1	Examine the mathematical concepts on CT and DT signals using appropriate tools
CO2	Apply the mathematical concepts on CT and DT systems using appropriate tools
CO3	Analyze the concept of sampling and Quantization
CO4	Infer the properties of Discrete Time LTI systems
CO5	Experiment the concept of signals and systems in biomedical application.

List of Equipment Required: Requirements for a Batch of 30 Students

Sl. No.	Description of the Equipment	Quantity required (Nos.)
1.	Computer	30
2.	Software – Python/ Appropriate tools	-

Approved By BoS Chairman

Semester-IV

B.E.	B23MAT402 – PROBABILITY AND RANDOM PROCESSES (Common to ECE & VLSI)	L	T	P	C
		3	1	0	4

Course Objectives	
1.	To introduce the basic concepts of probability and random variables.
2.	To understand the basic concepts of two dimensional random variables.
3.	To apply the concept of random process in engineering disciplines.
4.	To introduce the concept of correlation and spectral densities.
5.	To analyze the response of random inputs to linear time invariant systems.

UNIT – I ONE DIMENSIONAL RANDOM VARIABLES	12

Discrete and continuous random variables - Moments - Moment generating functions - Binomial, Poisson,Geometric, Uniform, Exponential and Normal distributions.

UNIT – II TWO DIMENSIONAL RANDOM VARIABLES	12

Definition - Joint distributions - Marginal and conditional distributions - Covariance - Correlation and linear regression.

UNIT – III RANDOM PROCESSES	12

Classification - Stationary process - Markov process - Poisson process - Discrete parameter Markov chain - Chapman Kolmogorov equations - Limiting distributions.

UNIT- IV CORRELATION AND SPECTRAL DENSITIES	12

Auto-correlation functions - Cross-correlation functions - Properties - Power spectral density - Cross spectral density - Properties.

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UNIT – V LINEAR SYSTEMS WITH RANDOM INPUTS	12
Linear time invariant system - System transfer function - Linear systems with random inputs - Auto correlation and cross correlation functions of input and output - White noise.	

	Total Instructional hours : 60

Course Outcomes : Students will be able to	
CO1	Interpret the fundamental knowledge of the concepts of probability and standard distributions.
CO2	Develop the basic concepts of one and two dimensional random variables and apply in engineering fields.
CO3	Identify the concept of random processes in engineering disciplines.
CO4	Apply the concept of correlation and spectral densities.
CO5	Show the response of random inputs to linear time invariant systems.

Text Books	
1.	Ibe. O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 2nd edition 2014.
2.	Peebles.P.Z., "Probability, Random Variables and Random Signal Principles", Tata McGraw Hill, 4th Edition, New Delhi, 2017.

Reference Books	
1.	Miller S.L. and Childers. D.G., "Probability and Random Processes with Applications to Signal Processing and Communications", Academic Press, 2018.
2.	Devore J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 9th Edition, 2015.
3.	Cooper G.R., McGillem. C.D., "Probabilistic Methods of Signal and System Analysis", 3rd Indian Edition, Oxford University Press, New Delhi, 2015.
4.	Ravichandran J., "Probability and Random Processes for Engineers", I.K. International Publishing House Pvt. Limited, 2014.

Approved by BoS Chairman

B.E	B23ECI401 - COMMUNICATION SYSTEMS	L	T	P	C
		3	0	2	4

Course Objectives	
1.	To introduce the concepts of amplitude modulation and angle modulation process.
2.	To understand the properties of random process.
3.	To know effect of noise on communication systems and principles of sampling and Quantization.
4.	To analyse modulation and demodulation of AM, FM and PCM
5.	To analyse the operation of sampling and reconstruction, PPM, PWM and TDM

UNIT- I	AMPLITUDE MODULATION	9

Elements of a Communication System, Amplitude Modulation-DSBSC, DSBFC, SSB, VSB Modulation index, Spectra, Power relations and Bandwidth – AM Generation –Square law and Switching modulator, DSBSC Generation Balanced and Ring Modulator, SSB Generation – Filter, Phase Shift and Third Methods, VSB Generation – Filter Method, Comparison of different AM techniques.

UNIT- II	ANGLE MODULATION	9

Angle modulation – PM and FM – Narrow band, Wideband FM Spectral analysis of modulated signal – FM Modulators ,FM Demodulators – FM detectors – slope detectors – Phase discriminators – Ratio detectors, PLL.

UNIT- III	RANDOM PROCESS	9

Random variables, Central limit Theorem, Random Process, Stationary Processes, Mean, and Correlation & Covariance functions, Auto correlation functions – Cross correlation functions – Properties – Power spectral density, Ergodic Processes, Gaussian Process, and Transmission of a random signal Through a LTI filter.

UNIT- IV	RECEIVERS AND NOISE IN COMMUNICATION SYSTEMS	9

Tuned Radio Frequency (TRF), Super-heterodyne receiver, Noise: Noise and its types. Noise voltage - Signal-to-noise ratio - Noise figure - Noise temperature - Noise figure, Figure of Merit in DSBSC, SSB, AM and FM receivers

Approved By BoS Chairman

UNIT- V	SAMPLING & QUANTIZATION	9

Low pass sampling – Aliasing - Signal Reconstruction - Quantization -Uniform & non-uniform quantization - quantization noise Logarithmic Companding – PAM, PPM, PWM, PCM , Multiplexing Techniques – FDM,TDM.

	Total Instructional hours: 45

List of Experiments:

Expt. No.	Description of the Experiments
1.	AM Modulator and Demodulator
2.	FM Modulator and Demodulator
3.	Signal Sampling and reconstruction
4.	Pulse Width Modulation
5.	Pulse Position Modulation
6.	Pulse Code Modulation and Demodulation
7.	Time Division Multiplexing
	Practical Hours: 30
	Total Hours : 75

Text Books	
1.	J.G. Proakis, M. Salehi, "Fundamentals of Communication Systems", Pearson Education, 2014. (UNIT I - IV)
2.	Simon Haykin, "Communication Systems", 4th Edition, Wiley, 2014. (UNIT I - V).

Reference Books	
1.	B. P. Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University Press, 2007.
2.	D. Roody, J. Coolen, "Electronic Communications", 4th Edition, PHI, 2006.
3.	A. Papoulis, "Probability, Random variables and Stochastic Processes", McGraw Hill, 3rd Edition, 1991.
4.	B. Sklar, "Digital Communications Fundamentals and Applications", 2nd Edition, Pearson Education, 2007.
5.	Communication Systems - Lab Manual prepared by Department of ECE

Approved By BoS Chairman

Course Outcomes: Students will be able to	
CO1	Develop Amplitude Modulation and Angle modulated systems.
CO2	Apply the concepts of Random Process to Communication systems.
CO3	Analyze the noise performance of AM and FM systems , sampling and Quantization.
CO4	Demonstrate modulation and demodulation of AM, FM and PCM
CO5	To interpret operation of sampling and reconstruction, PPM, PWM and TDM

Approved By BoS Chairman

B.E	B23ECT402 - CONTROL SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To understand the components and their representation of control systems.
2.	To learn the various methods for time response.
3.	To learn the various methods for frequency response.
4.	To introduce stability analysis and design of compensators.
5.	To understand the stability of systems.

UNIT- I	SYSTEMS COMPONENTS AND THEIR REPRESENTATION	9

Basic Elements of Control System – Open loop and Closed loop systems - Mathematical Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph-Mason's Gain formula.

UNIT- II	TIME RESPONSE ANALYSIS	9

Standard test signals - Transient response - steady state response - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors - Analytical design for PD, PI and PID control systems.

UNIT- III	FREQUENCY RESPONSE ANALYSIS	9

Closed loop frequency response - Performance specification in frequency domain. Frequency response of standard second order system - Bode Plot - Polar Plot – Nyquist Stability Criterion.

UNIT- IV	STABILITY ANALYSIS AND COMPENSATOR DESIGN	9

Concept of stability Routh Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Application of Root Locus Diagram - Nyquist Stability Criterion Relative Stability. Effect of Cascade lead compensation - Cascade lag compensation - Cascade lag – lead compensation.

UNIT- V	STATE VARIABLE ANALYSIS	9

State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Concepts of Controllability and Observability.

Total Instructional hours: 45

Approved By BoS Chairman

Text Books	
1.	Nagrath I J, "Control Systems Engineering ", New Age International Pvt Ltd, Seventh Edition, 25 September, 2021.
2.	M. Gopal, "Control Systems, Principles and Design", 6th Edition, Tata McGraw Hill, New Delhi, 2018.
3.	Nise's , "Control Systems Engineering", Wiley India Ed – 1 January 2018.
4.	Arun K. Ghosh / Rumi Ghosh , "Introduction to Control Systems", PHI Learning Private Limited, Third Edition, 14 October 2023
5.	Katsuhiko Ogata, "Modern Control Engineering", Prentice Hall of India Private Ltd., 5th Edition, New Delhi, 2015.

Reference Books	
1.	Control Systems 5ed (PB 2020) by KANI A N	1 January 2020.
2.	Katsuhiko Ogata, "Modern Control Engineering", Prentice Hall of India Private Ltd., 5th Edition, New Delhi, 2015.
3.	Nagrath and M.Gopal, "Control Systems Engineering", New Age International Publishers, 6th Edition, New Delhi, 2011.

Course Outcomes: Students will be able to	
CO1	Identify the basic components of a control system and Compute the transfer function of the physical systems using appropriate techniques.
CO2	Analyze the response of the system using time domain and frequency domain techniques.
CO3	Identify the stability of the systems using an appropriate method.
CO4	Design compensators for the given system, satisfying the specifications.
CO5	Develop the state space model for a given system and find the controllability.

B.E	B23ECT403 - LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To introduce the basic building blocks of linear integrated circuits.
2.	To learn the linear and non-linear applications of operational amplifiers.
3.	To introduce the theory and applications of analog multipliers and PLL.
4.	To learn the theory of ADC and DAC.
5.	To introduce the concepts of waveform generation and introduce some special function ICs.

UNIT- I	BASICS OF OPERATIONAL AMPLIFIERS	9

Introduction to op-amps, stages, Current mirror and current sources, Widlar current source, Wilson current source DC and AC performance characteristics, slew rate, Open and closed loop configurations, Inverting and non-inverting amplifier, Introduction to FET based op-amps.

UNIT- II	APPLICATIONS OF OPERATIONAL AMPLIFIERS	9

Sign Changer, Scale Changer, Phase Shift Circuits, Adder, Subtractor, Differential amplifier, Instrumentation amplifier, Differentiator, Integrator, Comparator and its applications, Precision rectifiers, peak detector, clipper and clamper, Design of active filters.

UNIT- III	ANALOG MULTIPLIER AND PLL	9

Logarithmic amplifier, analog multiplier ICs and its applications, Variable trans-conductance multiplier - Four quadrant multiplier, Gilbert Multiplier cell, Operation of the basic PLL, Voltage controlled oscillator, Application of PLL.

UNIT- IV	ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS	9

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R - 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type.

UNIT- V	WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS	9

Sine-wave generators, Multivibrators and Triangular wave generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator, Opto-couplers and fibre optic IC.

	Total Instructional hours: 45

Approved By BoS Chairman

Text Books	
1.	D. RoyChoudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2018, Fifth Edition. (Unit I – V)
2.	Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 4th Edition, Tata McGraw-Hill, 2016. (Unit I – V)

Reference Books	
1.	Ramakant A. Gayakwad, "OP-AMP and Linear ICs", 4th Edition, Prentice Hall / Pearson Education, 2015.
2.	Robert F.Coughlin, Frederick F.Drisco, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.
3.	Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley International, 5th Edition, 2009.
4.	S.Salivahanan& V.S. KanchanaBhaskaran, "Linear Integrated Circuits", TMH, 2nd Edition, 4th Reprint, 2016.

Course Outcomes: Students will be able to	
CO1	Explain the basics of operational amplifier
CO2	Analyze the linear and nonlinear applications of operational amplifiers
CO3	Identify and explain the applications of analog multiplier and PLL ICs
CO4	Examine the analog to digital and digital to analog converters using Op-Amps
CO5	Analyze different types of Operational Amplifier based waveform generators and special function ICs

Approved By BoS Chairman

B.E	B23ECT404 - DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	0	0	3

Course Objectives	
1.	To make students learn discrete Fourier transforms, properties of DFT and its application to linear filtering.
2.	To understand the characteristics of digital IIR filters.
3.	To understand the characteristics of digital FIR filters.
4.	To understand the effects of finite precision representation on digital filters.
5.	To understand the internal blocks of DSP processors and Programming with DSP processors.

UNIT- I	**DISCRETE FOURIER TRANSFORM**	9

Review of discrete-time signals & system - DFT and its properties, FFT algorithms & its applications, Overlap-add & overlap-save methods.

UNIT- II	**DESIGN OF INFINITE IMPULSE RESPONSE FILTERS**	9

Analog filters – Butterworth filters, Chebyshev Type I filters (upto 3rd order), Analog Transformation of prototype LPF to BPF /BSF/ HPF. Transformation of analog filters into equivalent digital filters using Impulse invariant method and Bilinear Z transform method-Realization structures for IIR filters – direct, cascade, parallel forms.

UNIT- III	**DESIGN OF FINITE IMPULSE RESPONSE FILTERS**	9

Design of linear phase FIR filters windowing and Frequency sampling methods Realization structures for FIR filters –Transversal and Linear phase structures-Comparison of FIR & IIR.

UNIT- IV	**FINITE WORD LENGTH EFFECTS**	9

Fixed point and floating point number representation - ADC – quantization truncation and rounding - quantization noise - input / output quantization - coefficient quantization error product quantization error - overflow error - limit cycle oscillations due to product quantization and summation - scaling to prevent overflow.

UNIT- V	**PROGRAMMABLE DIGITAL SIGNAL PROCESSORS**	9

Introduction to Digital Signal Processors - Architecture of TMS320C6713 - Fixed and Floating point architecture principles – Device characteristics - Peripherals – Programming.

Total Instructional hours: 45

Approved By BoS Chairman

Text Books	
1.	A.V. Oppenheim, R.W. Schafer and J.R. Buck, "Discrete Time Signal Processing", Pearson, 8th Indian Reprint, 2004.
2.	John G Proakis and Manolakis, "Digital Signal Processing Principles Algorithms and Applications", Pearson, 4th Edition, 2007.

Reference Books	
1.	I.C. Ifeachor and B.W. Jervis, "Digital Signal Processing A Practical Approach", Pearson, 2002.
2.	M.H.Hayes, "Digital Signal Processing", Schaum's outlines, Tata McGraw Hill, 2007.
3.	S.K. Mitra, "Digital Signal Processing", A Computer Based approach, Tata McGraw- Hill, 1998.
4.	D.J. De Fatta, J.G.Lucas and W.S. Hodgkiss, "Digital Signal Processing A system Design Approach", John Wiley & sons, Singapore, 1988.
5.	Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

Course Outcomes: Students will be able to	
CO1	Apply DFT for the analysis of digital signals and systems
CO2	Design IIR filters
CO3	Design FIR filters
CO4	Identify the effects of finite precision representation on digital filters
CO5	Summarize about the DSP processor

Approved By BoS Chairman

B.E	B23ECT405 - COMMUNICATION NETWORKS	L	T	P	C
		3	0	0	3

Course Objectives
1.	To develop an understanding of computer networking basics.
2.	To make the students to understand the different layers of ISO /OSI model and TCP/IP
3.	Network IEEE standards. To understand IP addressing methods and QOS parameters.
4.	To know the functions and congestion control mechanism of TCP.
5.	To know about application layer and network security.

UNIT- I	DATA COMMUNICATIONS	9

Introduction to networks –Topologies – Protocols and Standards–ISO/OSI model-TCP/IP- Transmission Media and Connectors, Switching Techniques, Connecting devices – Switches, Routers, Gateways.

UNIT- II	DATA LINK LAYER	9

LAN: Ethernet IEEE 802.3, IEEE802.5, IEEE802.11, FDDI, Bridges. Error detection and correction–Forward Error Correction –Flow Control and Error control techniques - Stop and wait – Go back N ARQ – Selective repeat ARQ - sliding window techniques – HDLC.

UNIT- III	NETWORK LAYER	9

Internetworks – Packet Switching and Datagram approach – IPv4 - addressing methods – Subnetting & Supernetting – IPv6. Routing – Distance Vector Routing, Link State Routing, Path Vector Routing. Quality of services (QOS) – methods to improve QOS parameters-Trunking, VPN.

UNIT- IV	TRANSPORT LAYER	9

Functions of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) –Transmission Control Protocol (TCP)– Congestion Control –-Integrated Services.

UNIT- V	APPLICATION LAYER AND SECURITY	9

Domain Name Space (DNS) – SMTP, FTP, HTTP, WWW – network security-cryptography, Symmetric and Public key encryption. Case study: Bluetooth architecture.

Total Instructional hours: 45

Approved By BoS Chairman

Text Books	
1.	Behrouz.A.Foruzan, "Data communication and Networking", Fifth Edition, Tata McGraw-Hill, 2013.
2.	Andrew S. Tannenbaum, "Computer Networks", Fourth Edition, PHI, 2003

Reference Books	
1.	James.F.Kurouse &W.Rouse, "Computer Networking: A Top down Approach Featuring", Addison Wesley,2009.
2.	Larry.L.Peterson &Peter.S.Davie, "Computer Networks", third edition, Harcourt AsiaPvt.Ltd,2007
3.	Leon, Garica, Widjaja,"Communication Networks" ,TMH
4.	Walrand, "Communication Networks",TMH.
5.	Comer ,"Internetworking with TCP/IP, vol. 1, 2, 3 (4th Ed.)" , Pearson Education/PHI

Course Outcomes: Students will be able to	
CO1	Explain about the network topologies, protocols and models.
CO2	Compare data link layer protocols and LAN standards.
CO3	Analyze routing algorithms and methods to improve QoS.
CO4	Summarize transport layer protocols and congestion controls methods.
CO5	Identify cryptographic and security techniques

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		L	T	P	C
B.E	**B23CEP401 - PROFESSIONAL CERTIFICATE COURSE-I**	**0**	**0**	**2**	**1**

Course Contents:

THEORY

- ❖ Basics of Mobile Electronics
- ❖ Smart Phone Trouble shooting Block Diagram
- ❖ Mobile Accessories
- ❖ Innovative applications of Mobile App.

PRACTICAL WORKS

- ❖ Finding mobile model
- ❖ Use of various Tools& Instruments used in mobile phone repairing
- ❖ Assembling & Disassembling
- ❖ Testing of various parts with Multimeter
- ❖ Testing ofMic,Speaker,Ringer,Vibrator,LCD,Antenna using Multimeter
- ❖ Finding faults and replacing the faulty parts
- ❖ Soldering& De-soldering
- ❖ Jumpering
- ❖ Touch /Display Replacement
- ❖ Two types of mobile testing
  - ➢ Continuity test
  - ➢ Voltage test
- ❖ Mic, Speaker, Ringer trouble shooting Solutions
- ❖ Insert SIM /No signal solution
- ❖ Charging Solution
- ❖ IC Replacement
- ❖ Keypad Problem
- ❖ Touch Screen Problem
- ❖ Network Problem
- ❖ Dead Mobile trouble shooting
- ❖ All Hardware Problem
- ❖ SIM tray/Memory tray Replacement
- ❖ Charging Connecter pin Replacement
- ❖ Battery Connecter and Head Set pin ReplacementHow to Solder and De-
solder a component using Blower
(CCpin,BCPpin,SIM tray, Memory tray, Head set pin, All mobile IC'setc……

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SOFTWARE:

- ❖ Flashing Tools
- ❖ Flashing Method
- ❖ Pattern Lock
- ❖ Password Lock
- ❖ Hanging
- ❖ Logo Hanging
- ❖ Auto ON/OFF
- ❖ Restart
- ❖ SIM lock
- ❖ Unfortunately, Google Chrome/Settings/WhatsApp has Stopped
- ❖ Formatting of Virus affected handsets
- ❖ Flashing of various brands of handsets
- ❖ Unlocking of handset through codes and software.
- ❖ Use of Secret Codes.

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B.E	B23ECP401- LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives	
1.	To understand the basics of linear integrated circuits and available ICs.
2.	To understand the characteristics of the operational amplifier.
3.	To apply operational amplifiers in linear and nonlinear applications.
4.	To acquire the basic knowledge of special function IC.
5.	To use simulation software for circuit design.

List of Experiments	
Expt. No.	**Description of the Experiments**
Design, Simulate and Analyse of Following Circuits	
1.	Inverting, non - inverting and differential amplifier
2.	Integrator and Differentiator
3.	Rectifier using precision diodes
4.	Active low-pass filter, high-pass filter
5.	Band-pass filters
6.	Schmitt Trigger using op-amp
7.	RC Phase shift oscillator and Wien bridge oscillator
8.	Voltage Regulators with ICs.
9.	Astable and Monostable multivibrators using NE555
10.	R-2R Ladder Type D- A Converter (3 – bit input) and any A-D Converter
	Total Instructional hours: 60

Course Outcomes:

CO1	Design, simulate and analyze Op-amp like Inverting, Non – inverting & Differential Amplifiers, Differentiator, Integrator, Filters, Schmitt Trigger, Oscillators, ADC and DAC for 3 bit inputs.
CO2	Design, simulate and analyze Monostable and Astable multivibrators with 555 timer.
CO3	Demonstrate and Outline the technical details of all the experiments conduction with result obtained.

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List of Equipment Required: Requirements for a Batch of 30 Students

Sl.No.	Description of the Equipment	Quantity required (Nos.)
1.	CRO /DSO (Min 30MHz)	15
2.	Signal Generator /Function Generators (2 MHz)	15
3.	Dual Regulated Power Supplies (0 - 30V)	15
4.	Digital Multimeter	15
5.	IC tester	2
6.	Standalone desktops PC	15
7.	Transistors, Resistors, Capacitors, diodes, Zener diodes, Bread Boards, Transformers, wires, Power transistors, Potentiometer, A/D and D/A convertors, LEDs	50

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B.E	B23ECP402- DIGITAL SIGNAL PROCESSING LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives	
1.	To implement generation of sequences.
2.	To realize Linear and Circular Convolution.
3.	To design and realize FIR and IIR filters.
4.	To implement signal processing algorithms using digital signal processor.

List of Experiments	
Expt. No.	**Description of the Experiments**
MATLAB / Equivalent Software package	
1.	Generation of elementary Discrete-Time sequences
2.	Linear and Circular convolutions
3.	Auto correlation and Cross Correlation
4.	Frequency Analysis using DFT
5.	Design of FIR filters (LPF/HPF/BPF/BSF) and demonstrates the filtering operation
6.	Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations
7.	Multirate Filters
DSP Processor (TMS320C6713) Implementation	
1.	Study of architecture of Digital Signal Processor
2.	Perform MAC operation using various addressing modes
3.	Generation of Waveforms
4.	Finding Linear and Circular Convolution
5.	Implementation of FFT
6.	Implement an Up-sampling and Down-sampling operation in DSP Processor
7.	Implementation of Finite word length effects
	Total Instructional hours: 60

Course Outcomes:

CO1	Inspect the difference equations, convolutions and waveform generation using digital signal processor.
CO2	Examine the different sequences and frequency domain analysis in MATLAB platform by using DFT.
CO3	Demonstrate and Outline the technical details of all the experiments conduction with result obtained.

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List of Equipment Required: Requirements for a Batch of 30 Students

Sl.No.	Description of the Equipment	Quantity required (Nos.)
1.	PCs with Fixed / Floating point DSP Processors (Kit / Add-on Cards)	15
2.	MATLAB with Simulink and Signal Processing Tool Box or Equivalent Software in desktop systems	15
3.	Signal Generators (1MHz)	15
4.	CRO (20MHz)	15

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