ACADEMIC REGULATIONS, COURSE STRUCTURE & SYLLABUS

MI21 REGULATIONS

CHOICE BASED CREDIT SYSTEM (CBCS)

B. Tech, 1st Year (2021-22)

For ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

Applicable for the batches admitted in First year from 2021-22 onwards

MALLA REDDY INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC Autonomous Institution with NAAC 'A' Grade

(Approved by AICTE & Govt. of Telangana & Affiliated to JNT University Hyderabad)

Maisammaguda, Dhulapally (Post Via Hakimpet),

Secunderabad-500 100

MALLA REDDY INSTITUTE OF ENGINEERING & TECHNOLOGY

VISION

To emerge as a Centre for Excellence offering Technical Education and Research opportunities to develop total Personality of the Students, instill high level of Confidence and making them technically superior and ethically strong, who in turn shall contribute to the Advancement of the Society.

MISSION

Malla Reddy Institute of Engineering & Technology (MRIET) dedicates to achieve and cultivate Academic Excellence in Technical Education.

MRIET pursues continuous Development of Infrastructure and enhances state of the art equipment to provide students intellectually inspiring environment of learning, Research and inculcating Ethical and moral values.

MRIET constantly strives to impart world class education by anticipating and exceeding the expectations of all its Stakeholders.

DEPARTMENT OF HUMANITIES & SCIENCES

VISION

To be a promising school of scientific temper; to shape engineers adaptable to challenging workspace and potential to meet social requirements.

MISSION

To create a research atmosphere by expanding the accessibility of resources beyond national standards.

To contribute a human resource that is deep and diverse in knowledge.

To shape next generation engineers capable of addressing the emerging technological advancement; competent in communication and committed to the welfare of human beings.

MALLA REDDY INSTITUTE OF ENGINEERING AND TECHNOLOGY

Maisammaguda, Secunderabad.

ACADEMIC REGULATIONS-2021 (MI 21 Regulation)
B. Tech. PROGRAMMES

(Effective for the student's admitted into 1st year from the Academic Year 2021-2022 onwards)

1.0 Under-Graduate Degree Programme in Engineering & Technology (UGP in E&T)

Malla Reddy Institute of Engineering & Technology (MRIET) offers a 4-year (8semesters) **Bachelor of Technology** (B. Tech.) degree programme under Choice Based Credit System (CBCS) with effect from the Academic Year2021-22 onwards, in the following Branches of Engineering:

Table 1

Sl. No.	Branch
I.	Computer Science and Engineering
II.	Computer Science and Engineering (Artificial Intelligence& Machine Learning)
III.	Computer Science and Engineering (Data Science)
IV.	Electronics and Communication Engineering
V.	Information Technology

2.0 Eligibility for admission

2.1 Category - A (70 % of the sanctioned seats)

Admission to UGP under Category – A is made by the convener TS EAMCET on the basis of the merit rank obtained by the qualifying candidate at the Entrance test TS EAMCET conducted by Telangana State Government.

2.2 Category – B (30 % of the sanctioned seats)

Admissions to the UGP under Category – B are made by the Management of the College and ratified by Telangana State Council of Higher Education (TSCHE) based on the merit rank of TS EAMCET / Marks in the Qualifying examination (Intermediate / Class XII) as prescribed in relevant G.O.s from time to time.

2.3 The medium of instruction for the entire undergraduate programme in Engineering &Technology will be **English** only.

3.0 B. Tech. Programme structure

3.1 The B. Tech. Programme of MRIET is of Semester Pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instruction Days per Semester.

3.2 A student after securing admission shall complete the B. Tech. programme in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year - first semester, failing which student shall forfeit seat in B. Tech course. Each student shall secure 160 credits (with CGPA $\geq$ 5) required for the completion of the undergraduate programme and award of the B. Tech degree.

3.3 **UGC/AICTE/JNTUH** specified definitions/descriptions are adopted appropriately for various terms and abbreviations used in these academic regulations/ norms, which are listed below:

3.3.1 Semester scheme

Each under graduate programme is of 4 academic years (8 semesters) with the academic year divided into two semesters of 22weeks ($\geq$90 instruction days) each, each semester having-'Continuous Internal Evaluation (CIE) 'and'Semester End Examination (SEE)' under Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) indicated by UGC, and curriculum/course structure as suggested by AICTE are followed.

3.3.2 Credit courses

All subjects / courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.

- One credit for one hour/week/semester for theory/lecture (L) courses or Tutorials.
- One credit for two hours/week/semester for laboratory/practical (P) courses.

Other student activities like NSS, Study Tour, Guest Lecture etc., and identified Mandatory Courses will not carry Credits.

3.3.3 Subject Course Classification

All subjects/courses offered for the UGP in E&T (B. Tech. degree programmes) are broadly classified as follows.

Table 2

SL. No.	Broad Course Classification	Course Group/Category	Course Description
1	Foundation Courses(FnC)	BS–Basic Sciences	Includes mathematics, physics and chemistry Subjects
2		ES-Engineering Sciences	Includes fundamental engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC–Professional Core	Includes core subjects related to the parent Discipline/department/branch of Engineering.
5	Elective Courses (EℓC)	PE–Professional Electives	Includes elective subjects related to the parent Discipline/department/branch of Engineering.
6		OE –Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline/department/branch of Engineering.
7	Core Courses	Project Work	B. Tech. major project or UG major Project Stage I& II
8		Industrial training/ Mini-project	Industrial training/Summer Internship/ Industrial Oriented Mini-project/Mini-project
9		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/department/branch Of Engineering.
10	Mandatory Courses(MC)	-	Mandatory courses(non-credit)

Curriculum Distribution

Course Work and Subject Area		% of Courses
HS	Humanities and Social Sciences including Management courses	7
BS	Basic Science courses	14
ES	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	12
PC	Professional core courses	42
PE	Professional Elective courses relevant to chosen specialization/branch	11
OE	Open subjects – Electives from other technical and /or emerging subjects	5
PW	Project work, seminar and internship in industry or elsewhere	9

4.0 Course work

4.1 As suggested by AICTE, 'Mandatory Induction Programme' shall be offered for all the Branches of Engineering at the start of the I Year UG Degree Course, to enable the newly admitted students get acquainted with the new professional environment, to develop awareness and understanding of the engineering education requirements, and to get them prepared for the academic schedules ahead. The features, activities and pattern of the Induction Programme shall be as per the guidelines suggested in the AICTE Model Curriculum.

4.2 Each student shall register for and secure the specified number of Credits required for the completion of the UGP and Award of the B. Tech. Degree in the respective Branch of Engineering.

4.3 Each semester is structured to provide about 20 Credits, totaling to 160 Credits for the entire B. Tech Programme.

5.0 Course registration

5.1 A 'faculty advisor or counselor' shall be assigned to a group of 20 students, who will advise the students about the undergraduate programme, its course structure and curriculum, choice/option for subjects/ courses, based on their competence, progress, pre-requisites and interest.

5.2 The academic section of the college invites 'Registration forms' from students before the beginning of the semester through 'on-line registration',

ensuring‘date and time stamping’. The on-line registration requests for any ‘current semester’ shall be completed **before the commencement of SEEs (Semester End Examinations) of the ‘preceding semester’**.

5.3 A student can apply for **on-line** registration, **only after** obtaining the **‘written approval**’ from the faculty advisor/counselor, which should be submitted to the college academic section through the Head of the Department. (A copy of the same shall be retained with Head of the Department, faculty advisor/counselor and the student.)

5.4 A student may be permitted to register for all the subjects/ courses in a semester as specified in the course structure with maximum additional subject(s)/course(s) limited to 4credits, based on **progress** and SGPA/CGPA, and completion of the‘ **pre-requisites’** as indicated for various subjects/ courses, in the Department course structure and Syllabus contents.

5.5 Choice for **‘additional subjects/ courses** ‘must be clearly indicated, which needs the specific approval and signature of the faculty advisor/counselor.

5.6 If the student submits ambiguous choices or multiple options or erroneous entries during **on-line** registration for the subject(s) / course(s) under a given/ specified course group/ category as listed in the course structure, only the first mentioned subject/ course in that category will be taken into consideration.

5.7 Subject/ course options exercised through **on-line** registration are final and **cannot** be changed or inter-changed; further, alternate choices also will not be considered. However, if the subject/ course that has already been listed for registration by the Head of the Department in a semester could not be offered due to any unforeseen or unexpected reasons, then the student shall be allowed to have alternate choice either for a new subject (subject to offering of such a subject), or for another existing subject (subject to availability of seats). Such alternate arrangements will be made by the Head of the Department, with due notification and time-framed schedule, within the **First week** after the commencement of class-work for that semester.

5.8 Dropping of subjects/ courses may be permitted, **only after** obtaining prior approval from the faculty advisor/ counselor / Head of the Department (subject to retaining minimum credits), ‘within a period of 15 days’ from the beginning of the current semester.

5.9 For courses like NSS etc., a’ Satisfactory Performance Certificate’ from the concerned authorities for the relevant Semester is essential. No Marks or Grades or Credits shall be awarded for these activities.

5.10 Mandatory Course applicable for first year will be conducted under bridge course for lateral entry students in II yr I sem.

5.11 **Open electives**: The students have to choose three open electives (OE-I, II &III) from the list of open electives given. However, the student cannot opt for an open elective subject offered by his own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

5.12 **Professional electives**: The students have to choose six professional electives (PE-I to VI) from the list of professional electives given.

6.0 Subjects/courses to be offered

6.1 A typical section (or class) strength for each semester shall be 60.

6.2 A subject/ course may be offered to the students, **only if** a minimum of 20 students (1/3 of the section strength) opt for it. The maximum strength of a section is limited to 80(60+ 1/3 of the section strength).

6.3 More than **one faculty member** may offer the **same subject** (lab/ practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection of choice for students will be based on - '**First Come First Serve** basis and CGPA criterion' (i.e. the first focus shall be on early **on-line entry** from the student for registration in that semester, and the second focus, if needed, will be on CGPA of the student).

6.4 If more entries for registration of a subject come into picture, then the Head of the Department concerned shall decide, whether or not to offer such a subject/ course for **two (or multiple) sections**.

6.5 In case of options coming from students of other departments/ branches/ disciplines (not considering **open electives**), first **priority** shall be given to the student of the '**parent department**'.

7.0 Attendance requirements:

7.1 A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (including attendance in mandatory or non-credit courses) for that semester.

7.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

7.3 A stipulated fee shall be payable for condoning of shortage of attendance.

7.4 Shortage of attendance below 65%in aggregate shall in **NO** case be condoned.

7.5 **Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They**

get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester. They may seek re-registration for all those subjects registered in that semester, in which the student is detained, by seeking re-admission into that semester as and when offered; if there are any professional electives and/ or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category.

7.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class.

8.0 Academic requirements

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.**7.**

8.1 A student is evaluated in each course for 100 marks (30 internal and 70 external; details in item no.9). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if he secures not less than 35% (25 marks out of 70 marks) in the Semester End Examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together (40 marks out of 100 marks); in terms of letter grades, this implies securing **"P"** grade or above in that subject/course.

8.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Industrial Oriented Mini Project/Summer Internship and seminar, if the student secures not less than 40% of the total marks (i.e. 40 out of 100 allotted marks) in each of them. The student is deemed to have failed, if he (i) does not submit a report on Industrial Oriented Mini Project/Summer Internship, or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) does not present the seminar as required in the IV year I Semester, or (iii) secures less than 40% marks in Industrial Oriented Mini Project/Summer Internship and seminar evaluations.

A student may reappear once for each of the above evaluations, when they are scheduled again; if he fails in such **one re-appearance** evaluation also, the student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

8.3 Promotion Rules

Sl. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

8.4 A student (i) shall register for all courses/subjects covering 160 credits as specified and listed in the course structure, (ii) fulfills all the attendance and academic requirements for 160 credits, (iii) earn all 160 credits by securing SGPA ≥5.0 (in each semester), and CGPA (at the end of each successive semester) ≥ 5.0, (iv) **passes all the mandatory courses,** to successfully complete the under graduate programme. The performance of the student in these 160 credits shall be taken into account for the calculation of 'the final CGPA **(at the end of under graduate programme),** and shall be indicated in the grade card of IV year II semester.

8.5 If a student registers for 'extra **subjects'** (in the parent department or other departments/branches of Engineering) other than those listed subjects totaling to 160 credits as specified in the course structure of his department, the performances in those 'extra **subjects**' (although evaluated and graded using the same procedure as that of the required 160 credits) will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects'** registered, percentage of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in items 7 and 8.1–8.4 above.

8.6 A student eligible to appear in the semester end examination for any subject/ course, but absent from it or failed (thereby failing to secure **'P'** grade or above) may reappear for that subject/course in the supplementary examination as and when conducted. In such cases, internal marks (CIE) assessed earlier for that subject/course will be carried over, and added to the marks to be obtained in the SEE supplementary examination for evaluating performance in that subject.

8.7 A student **detained in a semester due to shortage of attendance may be re-admitted in the same semester in the next academic year for fulfillment of academic requirements**. The academic regulations under which a student has been re-admitted shall be applicable. However, no grade allotments or SGPA/CGPA calculations will be done for the entire semester in which the student has been detained.

8.8 A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.** The academic regulations under which the student has been readmitted shall be applicable to him.

9.0 Evaluation-Distribution and Weightage of marks

9.1 The performance of a student in every subject/course (including practicals and Project Stage – I & II) will be evaluated for 100 marks each, with 30 marks allotted for CIE (Continuous Internal Evaluation) and 70 marksforSEE (Semester End-Examination), and a Letter Grade

corresponding to the % of marks obtained shall be awarded.

9.2 For all Subjects/Courses as mentioned above, the distribution shall be 30 marks for CIE and 70 marks for the SEE.

9.3 Distribution and Weightage of Credits

Type of Subject	Semester	
	Period/Week	Credits
Theory	03	03
Practicals	02/03	1.0/1.5
Drawing Subjects: Engineering Drawing/ Graphics	05 (1T + 4P)	3
Industry Oriented Mini Project	--	02
Technical Seminar	02	01
Project Work	20	10

9.3.1 Theory Subjects

Theory subjects are allotted 3 or 4 credits. The distribution shall be 30 marks for internal evaluation and 70 marks for the end examination.

There shall be two mid-term internal examinations. The syllabus for the mid examination will be the first 2.5 units for the first mid examination and the remaining 2.5 units for the second mid examination. Each mid-term examination consists of one objective paper, one descriptive paper and one assignment. The objective paper shall be of 10 marks and the descriptive paper shall be for 15 marks with a total duration of 1 hour 50 minutes (20 minutes for objective and 90 minutes for descriptive paper).The objective paper is set with 20 multiple choice ,fill-in the blanks and matching type of questions for a total of 10 marks. The descriptive paper shall contain 5 full questions out of which, the student has to answer 3 questions, each carrying 5 marks. 5 marks are allotted for the assignment. There shall be one assignment to be submitted and evaluated before each mid exam. Total internal evaluation marks is therefore 30.

The first mid-term examination marks and first assignment marks shall make one set of CIE marks and the second Mid-term examination marks and second assignment marks shall make second set of CIE marks. Average of these two sets of CIE marks will be taken as the final marks secured by each candidate in that best of the assignments to be considered.

The duration of mid examination is 1 hour 50 minutes for theory subjects.

The duration of end examination is 3 hours for theory subjects.

9.3.2 Substitution Test

- If any candidate is absent for any theory subject in a mid examination or both mid examinations, a substitution test covering the entire syllabus of the subject will be conducted on payment of prescribed fees before the commencement of the end semester examinations. Prior permission is to be taken from the concerned Head of the Department for writing substitution tests.
- If a candidate has missed both the mid examinations, then the marks scored in the substitution test will be halved and accordingly recorded.

9.4 Practical Subjects

For practical subjects the distribution shall be 30 marks for internal evaluation and 70 marks for the end semester examination. Out of the 30 marks allotted for internal evaluation, day-to-day work in the laboratory shall be evaluated for 20 marks and internal practical / internal drawing examination for 10 marks. Internal examinations shall be conducted by the concerned teacher with the help of any other faculty member of the department.

The end examination for practical subjects shall be conducted with an external examiner and laboratory teacher specified by the Head of the Department concerned.

The duration of end examination for practical subjects is 3 hours.

External examiner shall be appointed by the **Dean-Academics** on the recommendation of the Chairman, Board of Studies of the concerned department. External examiner can be a teacher from outside the college or a teacher of the college who was not associated with the day-to-day class work of that laboratory.

The end examination in the subject of Drawing will be conducted along with the examinations of theory subjects.

9.5 Drawing Subjects

Drawing subjects are allotted marks as in theory subjects: 30 marks for internal evaluation and 70 marks for the end examination. Out of the 30 marks allotted for internal evaluation, day-to-day practice shall be evaluated for 20 marks and internal drawing examination for 10 marks.

9.6 Electives

Departmental Electives include subjects related to the parent discipline, department or the branch of engineering.

Interdisciplinary Electives include subjects offered by a department or branch of engineering to other departments or branches of engineering.

Open Electives are subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline or branch of engineering, that do not require a prerequisite course.

However, students **cannot opt** for an open elective subject offered by their own department, if it is already listed under core / elective subjects offered by that department, in any semester.

9.7 Skill Development Courses

Skill Development Courses are allotted 1 credit. The distribution of marks shall be 30 marks for internal evaluation and 70 marks for the end examination.

The end examination shall be conducted by examiners specified by the Head of the Department.

The duration of end examination for Skill Development Courses is 3 hours.

9.8 Industry-Oriented Mini-Project

An Industry-oriented Mini-project in collaboration with an industry related to specialization of the department is to be taken up during the vacation following III year II semester examinations. The mini project work shall be submitted in report form to the Head of the Department concerned within the first two weeks of commencement of classes of IV year I semester. The marks allotted for Industry oriented Mini Project is 100 marks (30 internal + 70 external). The Mini Project is to be presented in a seminar which will be evaluated by a committee for 30 marks. The committee consists of the Head of the Department, supervisor of the mini project and a senior faculty member of the department.

The external examination (viva-voce) for Mini Project shall be conducted by a committee consisting of an external examiner and an internal examiner nominated by the Head of the Department, for 70 marks. This examination is to be scheduled along with the laboratory exams of IV year I semester.

External examiner shall be appointed by the **Dean-Academics** on the recommendations of the Chairman, Board of Studies of the Department. External examiner must be teacher from outside the college.

9.9 Technical Seminar

A student shall present a technical seminar in IV year II semester. For the seminar, the student shall collect information on a specialized topic and

present the same. The student will also have to submit a technical report to the department showing his / her understanding of the topic. The seminar presentation and the report shall be evaluated for 100 marks by a departmental committee consisting of the Head of the Department, seminar supervisor and a senior faculty member. There shall be **no external examiner** for technical seminar.

9.10 Project Work

UG project work shall be carried out in two stages: Project Stage – I during IV Year I Semester, Project Stage – II during IV Year II Semester. Each stage will be evaluated for 100 marks. Student has to submit project work report at the end of each semester. First report includes project work carried out in IV Year I semester and second report includes project work carried out in IV Year I & II Semesters. SEE for both project stages shall be completed before the commencement of SEE Theory examinations.

For Project Stage – I, the departmental committee consisting of Head of the Department, project supervisor and a senior faculty member shall evaluate the project work for 70 marks and project supervisor shall evaluate for 30 marks. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - I or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together. A student who has failed may reappear once for the above evaluation, when it is scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

For Project Stage – II, the external examiner shall evaluate the project work for 70 marks and the project supervisor shall evaluate it for 30 marks. The topics for industrial oriented mini project, seminar and Project Stage – I shall be different from one another. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together. For conducting viva-voce of project stage – II, University selects an external examiner from the list of experts in the relevant branch submitted by the Principal of the College. A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

External examiner shall be appointed by the **Dean-Academics** on the recommendations of the Chairman, Board of Studied of the concerned department. External examiner must be a teacher from outside the college.

9.11 Laboratory examination marks / sessional marks awarded by the examiners are subject to scrutiny and scaling by the Results Committee wherever necessary. The Committee will arrive at a scaling factor and the marks will be scaled as

per the scaling factor. The recommendations of the committee are final and binding

9.12.1 The semester end examinations (SEE) will be conducted for 70 marks consisting of two parts viz. i) **Part- A** for 20 marks, ii) **Part – B** for 50 marks.

9.12.2 Part-A is a compulsory question consisting of ten sub-questions.

These 10 sub-questions composed of 2 questions from each unit will carry 2 marks each.

9.12.3 Part-B consists of five questions (numbered from 2 to 11) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

9.12.4 For subjects like **Engineering Graphics / Engineering Drawing,** the SEE shall consist of five questions of 14 marks each. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions. There shall be no Part –A, and Part–B system.

9.13 For mandatory courses of Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization lab, a student has to secure 40 marks out of100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course. **These marks should also be uploaded along with the internal marks of other subjects.**

9.14 No marks or letter grades shall be allotted for mandatory/non-credit courses. Only Pass/Fail shall be indicated in Grade Card.

10 Grading procedure

10.1 Grades /Marks will be awarded to indicate the performance of students in each Theory subject, Laboratory/Practicals, Seminar, Industry Oriented Mini Project and Project based on the percentage of marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in item 9 above, and a corresponding Letter Grade shall be given.

10.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following letter grades (as per UGC guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured in a Subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
Greater than or equal to 90%	**(Outstanding)**	**10**
80 and less than 90%	**A^+(Excellent)**	**9**
70 and less than 80%	**A (Very Good)**	**8**
60 and less than 70%	**B^+(Good)**	**7**
50 and less than 60%	**B (Average)**	**6**
40 and less than 50%	**P(Pass)**	**5**
Below 40 %	**F(FAIL)**	**0**
Absent	**Ab**	**0**

10.3 A student who has obtained an '**F'** grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the Semester End Examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

10.4 To a student who has not appeared for an examination in any subject, '**Ab'** grade will be allocated in that subject, and he is deemed to have '**failed'**. A student will be required to reappear as a 'supplementary student' in the Semester End Examination, as and when offered next. In this case also, the internal marks in those subjects will remain the same as those obtained earlier.

10.5 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

10.6 A student shall not be permitted to repeat any Subject / Course(s) only for the sake of 'Grade Improvement' or 'SGPA / CGPA Improvement'. However, he has to repeat all the Subjects / Courses pertaining to that Semester, when he is detained (as listed in items 8.7 – 8.8)

10.7 A student earns Grade point (GP) in each Subject/ Course, on the basis of the Letter Grade secured in that Subject/ Course (excluding Mandatory non-credit courses). The corresponding 'Credit Points' (CP) is then computed by multiplying the Grade Point with Credits for that particular Subject/ course

Credit points (CP) = Grade Point (GP) x Credits for a Course

10.8 The student passes the Subject / Course only when he gets GP ≥ 5 ('C' Grade or above).

10.9 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit points (≥CP) secured from ALL Subjects/ Courses registered in a Semester, by the Total number of credits registered during that semester. SGPA is rounded off to **two** decimal places. SGPA is thus computed as

$$\textbf{SGPA} = \{\sum_{i=1}^{N} C_i G_i\} / \{\sum_{i=1}^{N} C_i\} \ldots \textbf{.For each Semester,}$$

where 'i' is the subject indicator index (takes into account all subjects in a semester), 'N' is the no. of subjects '**registered'** for the semester (as specifically required and listed under the course structure of the parent department), C_i is the no. of credits allotted to the i^{th} subject, and G_i represents the grade points (GP) corresponding to the Letter Grade awarded forth at i^{th} Subject

10.10 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student in all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in **all** registered courses in **all** semesters, and the total number of credits registered in **all** the semesters. CGPA is rounded off to **two** decimal places. CGPA is thus computed from the 1st year 2nd semester onwards at the end of each semester as per the formula.

$$\textbf{CGPA} = \{\sum_{j=1}^{M} C_j G_j\} / \{\sum_{j=1}^{M} C_j\} \textbf{...for all S Semesters registered}$$

(i.e., up to and inclusive of S semesters, S≥2),

where '**M'** is the **total** no. of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered'**, from the1st semester onwards up to and inclusive of the 8th semester, 'j' is the subject indicator index (takes into account all subjects from 1 to 8 semesters), C_j is the no. of credits allotted to the j^{th} subject, and G_j represents the grade points (GP) corresponding to the Letter Grade awarded for that j^{th} subject. After registration and completion of I year 1st semester however, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8=32
Course 2	4	O	10	4 x 10 =40
Course 3	4	C	5	4 x 5=20
Course 4	3	B	6	3 x 6=18
Course 5	3	A+	9	3 x 9=27
Course 6	3	C	5	3 x 5=15
	21			**152**

SGPA= 152/21 = 7.24

Illustration of calculation of CGPA up to 3rd semester:

Semester	Course/Subject Title	Credits Allotted	Letter Grade Secured	Corresponding Grade Point (GP)	Credit Points (CP)
I	Course 1	3	A	8	24
I	Course 2	3	O	10	30
I	Course 3	3	B	6	18
I	Course 4	4	A	8	32
I	Course 5	3	A+	9	27
I	Course 6	4	C	5	20
II	Course 7	4	B	6	24
II	Course 8	4	A	8	32
II	Course 9	3	C	5	15
II	Course 10	3	O	10	30
II	Course 11	3	B+	7	21
II	Course 12	4	B	6	24
II	Course 13	4	A	8	32
II	Course 14	3	O	10	30
III	Course 15	2	A	8	16
III	Course 16	1	C	5	5
III	Course 17	4	O	10	40
III	Course 18	3	B+	7	21
III	Course 19	4	B	6	24
III	Course 20	4	A	8	32
III	Course 21	3	B+	7	21
	Total Credits	**69**		**Total Credit Points**	**518**

CGPA=518/69 =7.51

The above illustrated calculation process of CGPA will be followed for each subsequent semester until 8th semester. The CGPA obtained at the end of 8th semester will become the final CGPA secured for entire B.Tech. Programme.

10.11 For Merit Ranking or Comparison purposes or any other listing, **only** the '**rounded off'** Values of the CGPAs will be used.

10.12 For calculations listed in items 10.7 – 10.11, performance in failed Subjects / Courses (securing F Grade) will not be taken into account. Mandatory Courses with no credits will not be taken into consideration for calculation of SGPA / CGPA.

SGPA and CGPA of a semester will be mentioned in the semester Memorandum of Grades if all subjects of that semester are passed in first attempt. Otherwise the SGPA and CGPA shall be mentioned only on the Memorandum of Grades in which sitting he passed his last exam in that semester.

10.13 Passing Standards

10.13.1 A student shall be declared successful or 'passed' in a semester, if he secures a GP ≥ 5('P' grade or above) in every subject/course in that semester (i.e., when the student gets an SGPA ≥ 5.00 at the end of that particular semester); and he shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the Degree, as required.

10.14 After the completion of each semester, a grade card or grade sheet shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered **(course code, title, no. of credits, grade earned, etc.), credits earned, SGPA and CGPA.**

11.0 Declaration of results

11.1 Computation of SGPA and CGPA are done using the procedure listed in 10.7 to 10.10.

11.2 For final percentage of marks equivalent to the computed final CGPA, the following formula may be used.

% of Marks= (final CGPA–0.5) x10

12.0 Award of Degree

12.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 160 credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified'** for the award of B. Tech. degree in the chosen branch of Engineering selected at the time of admission.

12.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

12.3 A student with final CGPA (at the end of the under graduate programme) ≥ 8.00, and fulfilling the following conditions will be eligible for award of '**Gold Medal**'.

12.4

(i) Should have passed all the subjects/courses in '**first appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

(ii) Should have secured a CGPA 8.00, at the end of each of the 8 sequential semesters, starting from1st year1st semester onwards.

(iii) Should not have been detained or prevented from writing the semester end examinations in any semester due to shortage of attendance or any other reason.

12.5 Award of class

After a student has satisfied the requirements prescribed for the completion of the programme and are eligible for the award of B. Tech. degree he / she shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured
First Class with distinction	≥ 7.75
First Class	6.75 ≤ CGPA < 7.75
Second Class	5.75 ≤ CGPA < 6.75
Pass Class	5.0 ≤ CGPA < 5.75

13.0 With holding of results

13.1 If the student has not paid the fees to the University at any stage, or has dues pending due to any reason what so ever, or if any case of indiscipline is pending, the result of the student may be withheld, and the student will not be allowed to go into the next higher semester. The award or issue of the degree may also be with held in such cases.

14.0 Transitory Regulations

14.1 Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the Degree Programme, may be considered eligible for readmission to the same Subjects / Courses (or equivalent subjects / courses, as the case may be) and same Professional Electives / Open electives (or from set / category of Electives or equivalents

suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the Date of Commencement of his/ her I-year I-semester). Further, the student will come under the current regulations on his re-admission but not the previous regulations under which he/ she was first admitted.

14.2

a) A student seeking transfer to MRIET from other universities/ Institutions, after obtaining necessary permission from the State Government/ University has to pass all the subjects at the previous institution.

b) In case the student has failed in any subject, he has to take equivalent subject offered by this college and get a Pass grade. He should also obtain a Pass Grade in those subjects of this college which the student has not studied at the previous institution, up to that semester when transfer was effective.

c) For such of those transferred students with backlogs, the college will provide one chance to write the internal examinations in the failed subject and/or subject not studied in the curriculum of this college.

d) Equivalent subjects will be notified by the college, based on case to case basis as received from the university. However, in case of Professional Electives and Open Electives, student has to opt for a subject among the subjects listed under each of the electives, as the case may be.

e) For the completed semesters which the student studied previously at another institution/ under a different scheme, Grade Points will be awarded as per the College rules and CGOA calculated after clearing backlogs, if any.

15.0 Student Transfers

15.1 There shall be no branch transfers after the completion of admission process.

16.0 Scope

16.1 The Academic Regulations should be read as a whole, for the purpose of any interpretation.

16.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor / Principal is final.

16.3 The College may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made

shall be applicable to all students with effect from the dates notified by the College Authorities

16.4 Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

16.5 Where the words "Subject" or "Subjects", occur in these regulations, they also imply "Course" or "Courses".

MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

Sl. No.	Nature of Malpractices/ Improper conduct	Punishment
	If the student:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which student is appearing but has not made use of(material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students involved. In case of an outsider, he will be handed over to the police and a case will be registered against him / her.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the Subject of the examination (theory or practical) in which the student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and Project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The hall ticket of the student is to be cancelled

		and sent to the University.
3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks	Cancellation of the performance in that subject.

6.	Refuses to obey the orders of the chief superintendent/assistant – superintendent/any officer on duty or Misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of anyinjurytohispersonortoanyofhisrelatio nswhetherbywords,eitherspokenorwritte norbysignsorbyvisiblerepresentation,ass aultstheofficer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that Subject and all other subjects the student(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears off the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.

8.	Possesses any lethal weapon or fire arm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat.
9.	If student of the college, who is not a student for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6to 8.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeits the seat. Person(s) who do not belong to the college will be handed over to the police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared for including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the student has appeared for including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11shall is reported to the Principal/Dean-Academics for further action to award a suitable punishment.	As decided by the Principal/Dean-Academics

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SCHEME OF INSTRUCTIONS & EXAMINATIONS

B.Tech. I – Semester (CSE, IT)

S.NO	Course Code	Course Title	Scheme of Instructions				Scheme of Examination		
			L	T	P/D	Contact Hrs/ Week	CIE	SEE	Credits
Theory Course									
1	21MA101BS	Linear Algebra And Calculus	3	1	-	4	30	70	4
2	21CH102BS	Engineering Chemistry	3	1	-	4	30	70	4
3	21EE103ES	Basic Electrical Engineering	3	-	-	3	30	70	3
4	21EN104HS	English	3	-	-	3	30	70	3
5	21ES105MC	Environmental Science	3	-	-	3	-	100	0
Practical/Laboratory Course									
6	21CH106BS	Engineering Chemistry Lab			3	3	30	70	1.5
7	21EN107HS	English Language and Communication Skills Lab	-	-	3	3	30	70	1.5
8	21EE108ES	Basic Electrical Engineering Lab	-	-	3	3	30	70	1.5
		Total Credits	**15**	**2**	**9**	**26**			**18.5**

BTech. II – Semester (CSE, IT)

S.NO	Course Code	Course Title	Scheme of Instructions				Scheme of Examination		
			L	T	P/D	Contact Hrs/Week	CIE	SEE	Credits
Theory Course									
1	21MA201BS	Advanced Calculus	3	1	-	4	30	70	4
2	21AP202BS	Applied Physics	3	1	-	4	30	70	4
3	21CS203ES	Programming for Problem Solving	3	1	-	4	30	70	4
4	21ME204ES	Engineering Graphics	1	-	4	5	30	70	3
Practical/Laboratory Course									
6	21AP205BS	Applied Physics Lab	-	-	3	3	30	70	1.5
7	21CS206ES	C Programming Lab	-	-	3	3	30	70	1.5
8	21ME207ES	Engineering Workshop	-	-	3	3	30	70	1.5
		Total Credits	**10**	**3**	**13**	**26**			**19.5**

SCHEME OF INSTRUCTIONS & EXAMINATIONS

B.Tech. I-Semester ECE, CSE(AI&ML) & CSE(DS)

S.NO	Course Code	Course Title	Scheme of Instructions				Scheme of Examination		
			L	T	P/D	Contact Hrs/ Week	CIE	SEE	Credits
Theory Course									
1	21MA101BS	Linear Algebra and Calculus	3	1	-	4	30	70	4
2	21AP102BS	Applied Physics	3	1	-	4	30	70	4
3	21CS103ES	Programming for Problem Solving	3	1	-	4	30	70	4
4	21ME104ES	Engineering Graphics	1	-	4	5	30	70	3
Practical/Laboratory Course									
6	21AP105BS	Applied Physics Lab	-	-	3	3	30	70	1.5
7	21CS106ES	C Programming Lab	-	-	3	3	30	70	1.5
8	21ME107ES	Engineering Workshop	-	-	3	3	30	70	1.5
		Total Credits	**10**	**3**	**13**	**26**			**19.5**

B.Tech. II – Semester ECE, CSE(AI&ML) & CSE(DS)

S.NO	Course Code	Course Title	Scheme of Instructions				Scheme of Examination		
			L	T	P/D	Contact Hrs/ Week	CIE	SEE	Credits
Theory Course									
1	21MA201BS	Advanced Calculus	3	1	-	4	30	70	4
2	21CH202BS	EngineeringChemistry	3	1	-	4	30	70	4
3	21EE203ES	Basic Electrical Engineering	3	-	-	3	30	70	3
4	21EN204HS	English	3	-	-	3	30	70	3
5	21ES205MC	Environmental Science	3	-	-	3	-	100	0
Practical/Laboratory Course									
6	21CH206BS	Engineering Chemistry Lab			3	3	30	70	1.5
7	21EN207HS	English Language and Communication Skills Lab	-	-	3	3	30	70	1.5
8	21EE208ES	Basic Electrical Engineering Lab	-	-	3	3	30	70	1.5
		Total Credits	**15**	**2**	**9**	**26**			**18.5**

LINEAR ALGEBRA AND CALCULUS

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21MA101BS

L	T	P	C
3	1	0	4

Course Objectives: To learn

1. The types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form
4. Concept of Sequence.
5. Concept of nature of the series.
6. Geometrical approach to the mean value theorems and their application to the mathematical problems
7. Evaluation of surface areas and volumes of revolutions of curves.
8. Evaluation of improper integrals using Beta and Gamma functions.
9. Partial differentiation, concept of total derivative.
10. Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to

CO 1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations.
CO 2: Find the Eigen values and Eigen vectors.
CO 3: Reduce the quadratic form to canonical form using orthogonal transformations.
CO 4: Analyze the nature of sequence and series.
CO 5: Solve the applications on the mean value theorems.
CO 6: Evaluate the improper integrals using Beta and Gamma functions.
CO 7: Find the extreme values of functions of two variables with / without constraints.

UNIT-I: Matrices

Types of Matrices: Symmetric, Hermitian, Skew-Symmetric, Skew-Hermitian, Orthogonal and Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss- Jordan method; System of Linear Equations: Homogeneous and Non-Homogeneous equations. Gauss Elimination method, Gauss Seidel Iteration method.

UNIT-II: Eigen values and Eigen vectors

Introduction to Vector space, linear independence of vectors, and orthogonality of vectors. Linear and Orthogonal Transformation. Eigen values & Eigen vectors and their properties, Diagonalization of a matrix. Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Sequences & Series

Sequence: Definition of Sequence, limit, Convergent, Divergent and Oscillatory sequences.
Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D- Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent Series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean Value Theorems**:** Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series (without proof); Improper Integrals**:** Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus(Partial Differentiation and applications)

Definitions of Limit and continuity. Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minimaof functions of two variables and three variables using method of Lagranges multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3 G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications, Reprint,2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. Engineering Mathematics-I, by Dr. T.K.V Iyengar and others, S Chand and Co.

APPLIED PHYSICS

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21AP102BS/21AP202BS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES: Develop an ability to Understand

1.The interaction of light through Interference, Diffraction & Polarization.
2.Basic concepts in quantum physics required to deal with behavior particle.
3.Various types of semiconductor devices and their principle of operations.
4.The basic principles of lasers to various systems and optical fibers.
5.The concepts of magnetic and dielectric materials.

COURSE OUTCOMES: After completion of course, the student would be able to

CO 1: Realize the importance of light phenomenon in thin films due to interference, and to demonstrate the physical properties of light.
CO 2: Explain the fundamental concepts on Quantum behaviour of matter in its microstate.
CO 3: Analyze the formation of p-n junction diode and importance of semiconductor devices.
CO 4: Explain the principles and production of LASER beams & transfer of information by optical fibers.
CO 5: Differentiate magnetic materials and dielectric materials.

UNIT-I: WAVE OPTICS

INTERFERENCE

Coherence, Interference in thin films (Transmitted and Reflected cases), Wedge shaped film, Newton's rings experiment, Antireflection coatings.

DIFFRACTION

Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, double slits, and N-slits (quantitative), Diffraction grating experiment.

POLARIZATION

Polarized and unpolarized lights, Malus law, double refraction, Construction and working of Nicol Prism, Brewster's law.

UNIT-II: PRINCIPLES OF QUANTUM MECHANICS

Black body radiation, Wien's law, Rayleigh-Jeans law, Planck's law, Photoelectric effect, Compton effect, Wave-particle duality, de-Broglie's hypothesis, Matter waves, Davisson and Germer's experiment, Heisenberg's uncertainty principle, Physical significance of wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-III: SEMICONDUCTOR DEVICES

Intrinsic and Extrinsic semiconductors, Hall effect, PN diode: Formation of p-n junction, Energy diagram, V-I Characteristics, Construction of bipolar Junction Transistor (BJT): Principle of operation and Characteristics, LED: Device structure, Materials, Characteristics and Applications, Photodetectors: PIN and Avalanche diodes and their structure, Working principle and Characteristics, Solar cell: Device structure, Materials, Characteristics and Applications.

UNIT-IV: LASERS AND FIBER OPTICS

LASERS:

Characteristics of lasers, Interaction of radiation with matter, Principle and working of Laser, Metastable state, Population inversion, Pumping, Types of Lasers: Ruby laser, Carbon dioxide(CO_2) laser, He-Ne laser, Semiconductor laser, Applications of lasers.

FIBER OPTICS:

Total internal reflection, Construction of Fiber, Acceptance angle, Acceptance cone and Numerical aperture, Classification of Optical Fibers: Step and Graded index fibers, Modes of transmission, Losses associated with optical fibers, Optical fiber communication system.

UNIT-V: MAGNETIC & DIELECTRIC PROPERTIES OF MATERIALS

MAGNETIC PROPERTIES OF MATERIALS:

Origin of magnetic moment, Magnetic dipole, Magnetic moment, Permeability, Magnetic field induction, Magnetic field intensity, Intensity of magnetisation, Susceptibility, Relative permeability, Classification of magnetic materials: Día, para, ferro, anti-ferro and ferrimagnetic materials, Domain theory of ferromagnetism, Hysteresis, Applications of magnetic materials.

DIELECTRIC PROPERTIES OF MATERIALS:

Electric dipole, Dipole moment, Permittivity, Dielectric constant, Polarizability, Electric susceptibility, Displacement vector, Dielectric break down, Types of Polarizations: Electronic, Ionic and Orientational polarizations, Calculation of their polarizabilities, Internal field, Clausius-Mossotti equation, Ferroelectricity, piezoelectricity and, pyroelectricity, Structure and Properties of Multiferroics.

TEXTBOOKS:

1.Modern Engineering Physics, K. Vijaya Kumar, S.Chandralingam, S. Chand & Co. Pvt LtdVolume I & II
2.Engineering Physics, B.K.Pandey, S.Chaturvedi-CengageLearning.
3.Halliday and Resnick, Physics -Wiley.
4.A textbook of Engineering Physics. M. N. Avadhanulu, Dr.P.G.K. Shirsagar- S.Chand
5.Engineering Physics, S.O. Pillai, New Age International

REFERENCES:

1.Richard Robinett, Quantum Mechanics
2."Optics" by Ajay Ghatak, 6th edition McGraw Hill Education, 2017
3.Engineering Physics by R.K. Gaur, and S.L. Gupta, -Dhanpat Rai publishers, 2012
4.J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995)
5.Monika Katiyar & Deepak Gupta, "Optoelectronics Materials & Devices", NPTEL Onlinecourse

PROGRAMMING FOR PROBLEM SOLVING

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21CS103ES/21CS203ES

L	T	P	C
3	1	0	4

Pre-requisites: Nil

Course Objectives:

1.To learn the fundamentals of computers.

2.To understand the various steps in program development.

3.To learn the syntax and semantics of C programming language.

4.To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student able

CO 1: To write algorithms and to draw flowcharts for solving problems.

CO 2: To test a given logic and arrays in C programming language.

CO 3: To decompose a problem into functions and to develop modular reusable code.

CO 4: To use strings and structures to write C programs.

CO 5: To Develop programs for files and Preprocessor

UNIT – I

Introduction to Computers – Computer Systems, Functional units of Computer, Computer Languages, operating system, compilers, Software - types of software, SDLC, Applications of programming languages, Creating, compiling and running programs, Program Development, Algorithm, flow chart/Pseudo code with example, Number Systems

Introduction to the C Language – Background, Structure of C Program, Tokens – Identifiers, data types, Variables, Strings, Constants, Keywords, Operators (Arithmetic, relational, logical, bitwise etc.), Expression Evaluation - Precedence and Associativity, Type conversions,

UNIT – II

Control Statements - Decision making statements, Selection statements, Iteration statements(loops) - while, for, do-while statements, Loop examples, other statements related to looping –break, continue, goto, Simple C Program examples.

I/O - Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Arrays – Declaration and definition, applications, types of arrays, creating, accessing and manipulating elements of arrays, C program examples.

UNIT – III

Functions- concept, built-in functions and libraries, user defined functions, inter function communication, Storage classes, type qualifiers, passing parameters to functions, call by value, passing arrays to functions, passing pointers to functions, idea of call by reference. Command – line arguments.

Recursion- recursive functions, Limitations of recursion, example C programs.

Pointers – Introduction (Basic Concepts), types of pointer, pointers to pointers, compatibility, Pointer Arithmetic, array of pointers, pointers to functions.

UNIT – IV

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, C program examples.

Structures - Declaration, initialization, accessing structures, operations on structures, Complex structures, passing structure to function, array of structure, passing structures through pointers, self-referential structures, **Union**, Enumeration data type, bit fields, C programming examples.

Memory allocation - Static and dynamic memory allocation

UNIT – V

Preprocessor - Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef, macro definition

Files - Concept of a file, Text and Binary files – Standard library functions for files – Opening and closing binary files – File status functions: feof, ferror, clearer – Positioning Functions: rewind, ftell, fseek – System file operations: remove, rename, tmpfile – File program examples

TEXTBOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Oxford University Press.

REFERENCES:

1.The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2.C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3.Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition,Pearson education.
4.Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
5.Programming with C, R.S.Bickar, Universities Press.
6.Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
7.Programming in C – Stephen G. Kochan, III Edition, Pearson Eucation.

ENGINEERING GRAPHICS

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21ME104ES/21ME204ES **L T P C**
1 0 4 3

Pre-requisites: Nil

Course objectives:

1. To provide basic concepts in Engineering graphics and instruments used.
2. To impart knowledge about standard principles of the orthographic projection of objects.
3. To learn the principles of projections of points, lines, planes, and solids.
4. To teach the concept of sections of solids, sectional views, and pictorial views of solids.
5. To gain the capability of designing 3D objects with isometric principles by using computer-aidedsketches

Course outcomes: At the end of the course, the student will be able to:

CO 1: Understand the principles, significance of the engineering graphics and gets knowledge on usage ofvarious drawing instruments and be able to draw various curves like conic curves.

CO 2: Apply the concepts of scales. Draw orthographic projections of the first angle and third angleprojections

CO 3: Understand the concept of projections of points, lines, planes, and solids and acquirevisualization skills.

CO 4: Understand the sections and section views of regular solids, and development of surfaces of rightregular solids.

CO 5: Understand the Isometric parameters of regular objects and familiarize with the Auto CAD tool for drawing various objects.

UNIT– I

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Dimensioning, Lettering, Conic sections–Ellipse - Eccentricity & Oblong method, parabola- Eccentricity & Tangent method, and Hyperbola - Eccentricity method.

UNIT- II

Scales–Reduced and Enlarged scales, Representative fraction - Plain, Diagonal scales.
Orthographic Projections:–Conventions–First and Third Angle projections.

Projections of Points–placed in different quadrants, Projection of straight lines parallel to one plane,perpendicular to one plane, inclined to one plane, and lines inclined to both planes.

UNIT– III

Projections of planes: Projections of Plane regular geometric figures, Planes inclined to both reference planes. Projections of Regular Solids-Prism, Cylinder.

UNIT– IV

Sections and Sectional Views: Sections and Sectional Views of Right Regular Solids – Prism, Cylinder, – Sections of Sphere. Development of Surfaces of Right Regular Solids–Prism, Cylinder.

UNIT– V

Isometric Projections: Principles of Isometric Projections – Isometric Scale – Isometric Views – Conventions, Conversion of Isometric to Orthographic Views and Vice-versa.

Introduction to AutoCAD: User Interface – Menu System-Status bar, drawing aids, drawing basic entities, modify commands, Layers, Text and Dimensioning, Blocks Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, Create, edit and use customized layers; –coordinate systems, axis, polylines, rectangle, polygons, splines, circles, ellipse. Commands for 3D UCS, Extrude, revolve, loft, 3D move, 3D rotate, sphere, cone, cylinder, and viewports.

TEXTBOOKS:

1. N.D.Bhatt, Engineering Drawing, Charotar Publishing House Pvt Ltd, Fifty-Third Edition, 2014
2. CMAgrawal, Basant Agrawal, Engineering Graphics, McGraw Hill Education 2017
3. Dr.MH Annaiah, Dr.CN Chandrappa, and Dr.B.Sudheer Premkumar, Computer-AidedEngineering Drawing, NewAge International Publishers, Sixth edition, 2019.

REFERENCES:

1. N.S.Parthasarathy,Vela Murali, Engineering Drawing, Oxford University Press, 2015
2. K.Venugopal, Engineering Drawing and Graphics + Autocad, New Age International, 2007
3. D.M.Kulkarni, A.P.Rastogi, A.K.Sarkar, Engineering Graphics with AutoCAD, PHI Learning,2009

ONLINE REFERENCE:

1.https://nptel.ac.in/courses/112/103/112103019/

2.https://ocw.mit.edu/courses/mechanical-engineering/2-007-design-and-manufacturing-i-spring-2009/related- resources/drawing_and_sketching/

APPLIED PHYSICS LAB

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21AP105BS/21AP205BS **L T P C**

0 0 3 1.5

COURSE OBJECTIVES:

The course consists of experiments related to the principles of physics required for engineering students. It helps the students to correlate theory with experimental data. The student will be able tounderstand:

1.The behaviour of light due to interference and diffraction experimentally.
2.The work function of Photosensitive material.
3.The principle of operation and V-I characteristics of various Semiconductor devices.
4.To understand the behaviour of Laser light and its propagation in optical fibers experimentally.
5.To apply the principles of magnetism to a current carrying conductor.

COURSE OUTCOMES:

After completion of the course the student would be able to:

CO 1: Demonstrate physical properties of light.
CO 2: Examine the stopping potential and to determine work function of photosensitive material.
CO 3: Demonstrate working principles of various Semiconductor devices.
CO 4: Make use of optical fibers and lasers for engineering applications.
CO 5: Determine the magnetic induction of a circular coil carrying current by applying the principles of magnetism.

EXPERIMENT – 1:
Newton's Rings:
Determination of Radius of Curvature of Plano Convex Lens.

EXPERIMENT – 2:
Diffraction Grating:
To determine the wavelength of given monochromatic light source.

EXPERIMENT – 3:
Photoelectric effect:
To determine work function of a given material.

EXPERIMENT – 4:
Hall effect:
To determine Hall co-efficient of a given Semiconductor

EXPERIMENT – 5:
Energy gap of P-N junction diode:
To determine the energy gap of a Semiconductor diode.

EXPERIMENT – 6:
Light emitting diode:
Plot V-I Characteristics of light emitting diode

EXPERIMENT – 7:
Solar Cell:
To study the V-I Characteristics of Solar cell.

EXPERIMENT –8:
LASER:
To study the V-I and P-I characteristics of LASER source.

EXPERIMENT – 9:
Optical fiber:
To determine the bending losses of Optical fibers.
To determine the numerical aperture of Optical fibers.

EXPERIMENT – 10:
Stewart – Gee's experiment:
Determination of magnetic field along the axis of a current carrying coil.

References:

1.Practical Physics by Dr. Patil Sriram
2.Physics for science and engineering by Pramod V Naik
3.Practical physics by Dr. Aparna & Dr. KV Rao, VGS Publications
4.C. L. Arora "Practical Physics", S. Chand & Co., New Delhi, 3rd Edition 2012

C PROGRAMMING LABORATORY

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21CS106ES/21CS206ES **L T P C**
0 0 3 1.5

Pre-requisites: Nil

Course Objectives: The students will learn the following:

1. To work with an IDE to create, edit, compile, run and debug programs
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C likeoperators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions,arrays etc.
5. To Write programs using the structure and Union concept.
6. To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to

CO 1: Formulate and translate the algorithms for simple problems

CO 2: Identify and correct syntax and logical errors
CO 3: Represent and manipulate data with arrays, strings and structures
CO 4: Use Functions and pointers of different types
CO 5**:** Create, read and write to and from simple text and binary files

LIST OF EXPERIMENTS	
Ex. No. 1	**C Programming using Simple statements and expressions**
1. Write a C program to check whether a number is even or odd using ternary operator. 2. Write a C program to perform the addition of two numbers without using + operator. 3. Write a C program to evaluate the arithmetic expression ((a + b / c * d - e) * (f - g)). Read the values a, b, c, d, e,f, g from the standard input device. 4. Write a C program to find the sum of individual digits of a 3-digitnumber. 5. Write a C program to read the values of x and y and print the results of the following expressions in one line: i. (x+ y) /(x-y) ii. (x+ y) (x-y)	
Ex. No. 2	**Problem-solving using decision making.**

1. Write a C program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n termsof the sequence.
3. Write a C program to generate all the prime numbers between1andn, where n is a value supplied by the user.
4. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCII values
A– Z	65–90
a– z	97 –122
0 –9	48–57
Special symbols	0–47,58 – 64,91 – 96,123– 127

5. If cost price and selling price of an item is input through the keyboard, write a program to determine whether theseller has made profit or incurred loss. Write a C program to determine how much profit or loss in curred in percentage.

Ex. No. 3	Scientific problem-solving using looping.

1. Write a C program, which takes two integer operands and one operator from the user, performs the operation andthen prints the result. (Consider the operators+,-, *, /, % and use switch statement).
2. Write a C program to calculate the followingsum: sum= $1– x^2 /2!+x^4/4!– x^6 /6!+x^8 /8!$
3. Write a C program to find the roots of a quadratic equation.
4. Write a C program to check whether a given 3-digitnumber is Armstrong number or not.
5. Write a C program to print the numbers in triangular form

```
1
12
123
12 34
```

Ex. No. 4	Simple programming for one dimensional and two-dimensional arrays.

1. Write a C program to find the second largest integer in a list of integers.
2. Write a C program to perform the following:
   i. Addition of two matrices
   ii. Multiplication of two matrices
3. Write a C program to count and display positive, negative, odd and even numbers in an array.
4. Write a C program to merge two sorted arrays into another array in a sorted order.
5. Write a C program to find the frequency of a particular number in a list of integers.

Ex. No. 5	Solving problems using String functions

1. Write a C program that uses functions to perform the following operations:
   i. To insert a sub string into a given main string from a given position.
   ii. To delete n characters from a given position in a given string.
2. Write a C program to determine if the given string is a palindrome or not.
3. Write a C program to find a string within a sentence and replace it with another string.
4. Write a C program that reads a line of text and counts all occurrence of a particular word.
5. Write a C program that displays the position or index in the string S where the string T begins, or 1 if S doesn'tcontain T.

Ex. No. 6	Programs with user defined functions – Includes Parameter Passing

1. Write C programs that use both recursive and non-recursive functions
   i. To find the factorial of a given integer.
   ii. To find the greatest common divisor of two given integers.
2. Write C programs that use both recursive and non-recursive functions
   i. To print Fibonacci series.
   ii. To solve towers of Hanoi problem.
3. Write a C program to print the transpose of a given matrix using function.
4. Write a C program that uses a function to reverse a given string.

Ex. No. 7	Programs using Pointers

1. Write a C program to concatenate two strings using pointers.
2. Write a C program to find the length of string using pointers.
3. Write a C program to compare two strings using pointers.
4. Write a C program to copy a string from source to destination using pointers.
5. Write a C program to reverse a string using pointers.

Ex. No. 8	Program using Structures and Union

1. Write a C program that uses functions to perform the following operations:
   i. Reading a complex number
   ii. Writing a complex number
   iii. Addition and subtraction of two complex numbers
   iv. Multiplication of two complex numbers. Note: represent complex number using a structure.
2. Write a C program to compute the monthly pay of 100 employees using each employee's name, basic pay. The DA iscomputed as 52% of the basic pay. Gross-salary (basic pay + DA). Print the employees name and gross salary.
3. Create a Book structure containing book_ id, title, author name and price.Write a C program to pass a structure as afunction argument and print the book details.
4. Create a union containing 6 strings: name, home_ address, hostel_ address, city, state and zip. Write a C program todisplay you present address.
5. Write a C program to define a structure named DOB, which contains name, day, month and year. Using the conceptof nested structures display your name and date of birth.

Ex. No. 9	**Program using Preprocessor Directives**

1. Define a macro with one parameter to compute the volume of a sphere. Write a C program using this macro tocompute the volume for spheres of radius 5, 10 and 15 meters.
2. Define a macro that receives an array and the number of elements in the array as arguments.Write a C program forusing this macro to print the elements of the array.
3. Write symbolic constants for the binary arithmetic operators +,-,*, and/. Write a C program to illustrate the use ofthese symbolic constants.

Ex. No. 10	**Program using Files**

1. Write a C program to display the contents of a file.
2. Write a C program to copy the contents of one file to another.
3. Write a C program to reverse the first n characters in a file, where n is given by the user.
4. Two files DATA 1 and DATA 2 contain sorted lists of integers. Write a C program to merge the contents of two filesin to a third file DATA i.e., the contents of the first file followed by those of the second are put in the third file.
5. Write a C program to count the no. of characters present in the file.

Ex. No. 11	**Program using Command line Arguments**

1. Write a C program to read arguments at the command line and display it.
2. Write a C program to read two numbers at the command line and perform arithmetic operations on it.
3. Write a C program to read a file name at the command line and display its contents.

Ex. No. 12	**ADDITIONAL PROGRAMS**

1. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots+x^n$. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.Printx, n, the
   sum. Perform error checking. For example, the formula does not make sense for negative exponents–if n is less than
   0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of withoutcomputing the sum. Are any values of x also illegal? If so, test for them too.
2. Write a C program to find the 2's complement of a binary number.
3. Write a C program to convert a Roman numeral to its decimal equivalent. E.g .Roman number CD is equivalent to 400.

REFERENCES:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

ENGINEERING WORKSHOP

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21ME107ES/21ME207ES **L T P C**

0 0 3 1.5

Pre-requisites: Practical skill

Course Objectives:

1.To Study different hand-operated power tools, uses and their demonstration.
2.To gain a good basic working knowledge required for the production of various engineering products.
3.To provide hands-on experience about the use of different engineering materials, tools, equipment, and processes that are common in the engineering field.
4.To develop the right attitude, teamwork, precision, and safety at the workplace.
5.It explains the construction, function, use, and application of different working tools, equipment, and machines.
6.To study commonly used carpentry joints.
7.To have practical exposure to various welding and joining processes.
8.Identify and use marking out tools, hand tools, measuring equipment, and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

CO 1: Study and practice on machine tools and their operations

CO 2: Practice on manufacturing of components using workshop trades including plumbing, carpentry, foundry, house wiring, and welding.

CO 3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.

CO 4: Apply basic electrical engineering knowledge for house wiring practice.

1.TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry–(T-Lap Joint, Dove tail Joint, Mortise & Tenon Joint, Corner lap joint)
II. Tin-Smithy–(Square Tin, Rectangular Tray & ConicalFunnel, Open scoop)
III. Foundry–(Preparation of Green Sand Mould using Single-Piece and Split Pattern)
IV. Welding Practice–(Arc Welding & Gas Welding, Tig welding)
V. House-wiring–(Parallel & Series, One-way switch, Two-way Switch, and TubeLight)

2.TRADES FOR DEMONSTRATION & EXPOSURE:

I. Plumbing

II. Machine Shop

III. Metal Cutting (Air Plasma)

IV. Power tools in construction and Wood Working

V. Fitting–(V-Fit, Dove tail fit & Semi-circular fit)

VI. Black Smithy–(Round to Square, Fan Hook, and S-Hook)

TEXTBOOKS:

1.B.L.Juneja, Workshop Practice,1st Edition, Cengage, 2019
2. K.Venugopal, Workshop Manual,Anuradha,2012th edition.

REFERENCES:

1.P.Kannaiah, K.L.Narayana, Workshop Manual,SciTech, August 2015.
2.VenkatReddy, Workshop Manual,BSP, 6th Edition.

ADVANCED CALCULUS

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21MA201BS

L	T	P	C
3	1	0	4

Course Objectives: To learn

1. Methods of solving the differential equations of First order and its applications
2. Methods of solving the differential equations of Higher order and its applications
3. Evaluation of multiple integrals and their applications
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to line, surfaceand volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

CO 1: Identify whether the given differential equation of first order is exact or not

CO 2: Solve higher differential equation and apply the concept of differential equation to real world problems

CO 3: Evaluate the multiple integrals and apply the concept to find areas, volumes.

CO 4: Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order Ordinary Differential Equations

Exact, and Reducible to Exact linear and Bernoulli's Equations; Applications: OrthogonalTrajectories, Newton's law of cooling, Law of natural growth, decay and L-R Circuits.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients. Non-Homogeneous termsof the type e^{ax}, sinax, cosax, polynomials in x, $e^{ax}V(x)$ and $xV(x)$; Method of variation of parameters; Equations reducible to linear ODE with constant coefficients; Legendre's equation,Cauchy-Euler equation, Applications to L-C-R Circuits.

UNIT-III: Multivariable Integral Calculus

Evaluation of Double Integrals: Cartesian and polar coordinates, change of order of integration in Cartesian form, Evaluation of Triple Integrals: Change of variables from Cartesian to Cylindrical and Spherical Coordinates.
Applications: Areas and volumes by double and triple integrals.

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directionalderivatives, Tangent plane and normal line.Vector Identities (Without Proof). Scalar potential functions. Solenoidal and irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
3. Engineering Mathematics-I, by Dr. T.K.V Iyengar and others, S Chand and Co.
4. Integral Calculus by Shanthi Narayan

ENGINEERING CHEMISTRY

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21CH102BS/21CH202BS.

L	T	P	C
3	1	0	4

Course Objectives:

1. To bring adaptability to the concepts of electrochemistry and to create awareness on corrosion and its control.
2. To impart knowledge on various aspects of water and its treatment.
3. To acquire the knowledge of engineering materials like polymers, plastics, fibers and rubbers.
4. To impart the knowledge of applications of green chemistry and green fuels.
5. To acquire the knowledge on various spectroscopic techniques and to apply them for medical and other fields.

Course Outcomes: After completion of the course, student would be able to

CO 1: Explain the principles and concepts of electrochemistry. Analyse the problem of corrosion in industry.
CO 2: Explain the hardness of water and its treatment methods.
CO 3: Analyse the knowledge of fundamental principles to make predictions about the general properties of polymeric materials.
CO 4: Explain the concept, applications of green chemistry and green fuels.
CO 5: Apply required skills of various spectroscopic techniques in medical and other fields.

Unit - I: Electrochemistry and corrosion:(10 hours)

Electrochemistry: Electrode-Electrode potential, standard electrode potential electrochemical cells. Nernst Equation- derivation and its applications. Electrochemical series and its applications. Construction and Working of Calomel, Quinhydrone and glass electrode. Determination of pH of a solution by using Quinhydrone electrode. Numerical problems.

Corrosion: Causes and effects of corrosion: Theories of corrosion: Chemical and Electrochemical corrosion- mechanism of electrochemical corrosion. Factors affecting rate of corrosion. Corrosion control methods-Cathodic Protection-Sacrificial anodic and impressed current cathodic protection. Surface coatings: Metallic Coatings-Methods of applying metallic coatings- Hot dipping-Galvanization- Tinning – Cementation-Metal cladding- Electroplating (Copper) and Electroless plating (Nickel).

Unit - II: Water and its treatment:(10 hours)

Hardness of water – Causes of hardness - Types of hardness: Temporary and Permanent – Expression of hardness in terms of equivalents of $CaCO_3$ and units of hardness. Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in the treatment of Potable water – Disinfection of water by Chlorination and Ozonization. Boiler feed water- internal treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

Unit - III: Polymeric materials: (10 hours)

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

Plastics: Definition and characteristics- Thermoplastic and Thermosetting resins, compounding and moulding of plastics -compression and injection moulding. Preparation, properties and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron.

Fiber reinforced plastics (FRP) – Applications.

Rubbers: Natural rubber and its vulcanization - compounding of rubber.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Biodegradable polymers: Concept and advantages of biodegradable polymers– preparation, properties and applications of Poly vinyl alcohol.

Unit - IV: Green Chemistry and Green Fuels: (10 hours)

Green Chemistry- Introduction, Principles of green chemistry- Prevention, Atom economy, Less hazardous chemical synthesis, Designing safer chemicals, Use of safer solvents and auxiliaries, Design for energy efficiency, Use of renewable feedstock, Reduce derivatives, Use of catalyst, Design for degradation, Analysis in real time to prevent pollution and Inherently safer chemicals for accident prevention-Applications.

Green Fuels: Biodiesel – Concept, Transesterification and Advantages; Hydrogen- sources, preparation, storage, applications, advantages and limitations- Composition, properties and applications, of LPG and CNG- Alcohol blended fuel concept and advantages

Unit - V: Spectroscopic techniques and applications:(10hours)

Introduction to Spectroscopic techniques-Electronic spectroscopy- Beer lambert's law, Principle of UV- Visible spectroscopy, selection rules, types of electronic transitions and applications of UV visible spectroscopy; Vibrational and rotational spectroscopy-IR (Infra-red) spectroscopy Principle, mode of vibrations, selection rules and applications of IR spectroscopy-Nuclear magnetic resonance Spectroscopy- principle, chemical shift and applications of NMR spectroscopy- Introduction to Magnetic resonance imaging (MRI) and its medical applications.

TEXTBOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company,New Delhi, 17th Edition 2015.
2. Engineering Chemistry by Rama Devi, Prasanta Rath and Ch. VenkataRamanaReddy and Cengage publications, (2018)
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell, 4th Edition.

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi(2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi(2011)
3. Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).
4. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

BASIC ELECTRICAL ENGINEERING

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21EE103ES/21EE203ES **L T P C**

3 0 0 3

Course Objectives:

1.To introduce the concepts of electrical circuits and its components
2.To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3.To study and understand the different types of DC/AC machines and Transformers.
4.To import the knowledge of various electrical installations.

Course Outcomes:

CO 1: To analyze and solve electrical circuits using network laws and theorems.

CO 2: To understand and analyze basic Electric and Magnetic circuits

CO 3: To study the working principles of Electrical Machines
CO 4: To introduce components of Low Voltage Electrical Installations

UNIT-I: D.C. Circuits

Electrical circuit elements (R, L and C), Ohm's Law, Kirchoff's laws, Network reduction of R, L and C series and parallel networks, Active elements (Dependant and independent sources), Analysis of electrical circuits with R, L and C elements for DC excitation, Superposition, Thevenin and Norton Theorems (DC Excitation), Time-domain analysis of RL, RC and RLC circuits (DC Excitation).

UNIT-II: A.C. Circuits

Representation of sinusoidal waveforms, Peak and RMS values, Phasor representation, Real power, Reactive power, Apparent power, Power factor, Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Resonance in series R-L- C circuit, Three-phase balanced circuits, Star-Delta transformation, Analysis of star and delta connections, Three phase power measurement, Problems

UNIT-III: DC Machines & Transformers

Dynamically and statically induced EMF, Fleming's Right hand rule, Fleming's Left hand rule, DC Generator-construction and working, Generated EMF, DC Motor- construction and working, Back EMF, Torque equation, Performance characteristics, Losses and efficiency, Transformers- Principle of operation, Constructional details, EMF equation, Losses and efficiency(Open circuit& Short circuit tests), Problems.

UNIT-IV: AC Machines

Generation of Rotating Magnetic Fields, Three-phase Induction Motor - Construction and working, Its applications, Single-phase induction motor- Construction and working, Its applications, Synchronous Generators- Construction and working, No-Load characteristics, Its applications.

UNIT-V: Electrical Installations

Components of LT Switchgear: Basic operation and applications of Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing, Batteries - Important Characteristics for Batteries.

TEXTBOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGrawHill.

2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India,1989.

REFERENCES:

1.L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011

2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010

ENGLISH

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21EN104HS/21EN204HS **L T P C**

3 0 0 3

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension anddifferent passages may be given for practice in the class. The time should be utilized for workingout the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Learning Objectives: The course will help to

1.Improve the language proficiency of students in English with an emphasis on Vocabulary,Grammar, Reading and Writing skills.
2.Equip students to study academic subjects more effectively and critically using the theoreticaland practical components of English syllabus.
3.Develop study skills and communication skills in formal and informal situations.
4.To prepare learners use English effectively, communicate confidently.
5.It takes not only to the academic needs of the students but also the language skills required for the workplace as well as social interaction.
To revise and reinforce structure already learnt.

Course Outcomes: Students should be able to

CO 1: Choose appropriate vocabulary and sentence structure for their oral and written communication.
CO 2: Demonstrate their understanding of the rules of functional grammar.
CO 3: Develop comprehension skills from the known and unknown passages and respond appropriately.
CO 4: Take an active part in drafting paragraphs, letters, essays, abstracts and reports in various contexts.
CO 5: Adapt basic proficiency in English.

UNIT–I

"Presidential Address by Dr. A.P. J. Abdul Kalam" "Fluency in English"- A course bookfor Engineering Students by Board of Editors.

Vocabulary: Homophones, Homonyms, Homographs and Collocations.

Grammar: Identifying Common Errors in Writing with Reference to Phrasal Verbs.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

"Blue Jeans" the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning.

Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places andEvents – Classifying - Providing Examples or Evidence.

UNIT –IV

"What Should You Be Eating?" from the prescribed textbook 'English for Engineers'published by Cambridge University Press.

Vocabulary: One-word substitutes and Idioms.

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading.

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-PrécisWriting.

UNIT –V

"How a Chinese Billionaire Built Her Fortune" from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage.

Grammar: Common Errors in English.

Reading: Reading Comprehension-Exercises for Practice.

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports.

Formats- Structure of reports (Manuscript Format) – Types of Reports- Writing a Report.

TEXTBOOKS:

1. **"English for Engineers**" by Sudarshana, N.P., and Savitha, C: Cambridge UniversityPress.2018.

2. **"Fluency in English- A Coursebook for Engineering Students"** by Board of Editors: Hyderabad; Orient Black Swan Pvt. Ltd. 2016 print.

REFERENCES:

1.Swan, M.(2016).Practical English Usage. Oxford University Press.
2.Kumar, SandLata,P.(2018).Communication Skills. Oxford University Press.
3.Wood,F.T.(2007).Remedial English Grammar. Macmillan.
4.Zinsser, William.(2001).On Writing Well. Harper Resource Book.
5.Hamp-Lyons,L. (2006).Study Writing. Cambridge University Press.
6.Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad.
OxfordUniversity Press.
7."Fluency in English- A Coursebook for Engineering Students" by Board of Editors:Hyderabad; Orient Black Swan Pvt. Ltd. 2016 print.

ENVIRONMENTAL SCIENCE

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21ES105MC/21ES205MC

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Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:

CO 1: Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable energy sources (Solar energy, Wind energy, Hydrogenpower energy, Tidal energy, Ocean thermal energy, Geothermal energy and Biomass energy) and non-renewableenergy sources (Coal, Petroleum, LPG, CNG and Nuclear energy), use of alternate energy source, case studies.

Activity:

1. Planting tree saplings – Forest resources; knowing the water sources of your local – visit to waterpurifying plant – documentation of the rivers of your state.
2. Food resources - Observe your personal diet for a week (Sunday - Saturday). Just record whatever you eat/drink and the amount. Prepare a chart stating its composition, energy levels itcan produce to your body (Calorific value) along with the photographic prints.

UNIT-II

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

Activity:

1. Visit to local national park, sanctuary or zoo – Photographic shooting of wildlife (flora and fauna).
2. Documentation on water resources and drought Ecosystems.

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

Activity:

1. Biodiversity register – Prepare a list of the flora and fauna observed in the campus

➢ Common plants
➢ Common animals
➢ Common birds
➢ Common insects
➢ Common reptiles

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatmentmethods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **GlobalEnvironmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation anddesertification. International conventions / Protocols: Earth summit, Kyoto protocol, andMontréal Protocol. NAPCC-GoI Initiatives.

Activity:

1. Solid Waste Management activity

➢ Collection of recyclable wastes – old newspapers and books etc, Getting books andstationery – distribute to the needy
➢ Establishment of Vermi Compost pit and reaping the compost

2. Visit to water treatment plants.

3. Eco-friendly models – Clay moulded idols with seeds in it – Upon dissolution, sprouting of seeds are seen. ‘Ganesh Chaturthi’.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

Activity:

1. Document the Wildlife Protection Policies and Legislation.
2. Case study Water Disputes (Krishna Water Disputes, Kaveri Water Disputesetc).

TEXTBOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES:

1. Environmental Science: towards a sustainable future by Richard T. Wright.2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.
7. Ecology and Environment byP. D. Sharma, Published by Rastogi publications.

ENGINEERING CHEMISTRY LAB

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21CH106BS/21CH206BS	L	T	P	C
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Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness in water and amount of Iron in given solutions.
2. To estimate the strength of solutions by instrumental methods.
3. The measurement of physical properties like surface tension and viscosity.
4. To synthesize the drug molecules and preparation of hand sanitizer.

Course Outcomes: The experiments will make the student gain skills on:

CO 1:Estimation of hardness in water and amount of Iron in given solution.
CO 2: Estimation of strength and amount of given solutions by instrumental methods.
CO 3: Determination of physical properties like surface tension and viscosity.
CO 4: Preparation of drug molecules and hand sanitizer.

List of Experiments:

EXPERIMENT-I

1. Estimation of amount of Fe^{2+} by Permanganometry ($KMnO_4$).

EXPERIMENT-II

2. Estimation of amount of Fe^{2+} by Dichrometry ($K_2Cr_2O_7$).

EXPERIMENT-III

3. Estimation of total hardness of water by complexometric method using EDTA.

EXPERIMENT-IV

4. Estimation of Alkalinity of given water sample.

EXPERIMENT-V

5. Estimation of amount of HCl by Conductometry.

EXPERIMENT-VI

6. Estimation of amount of Acetic acid by Conductometry.

EXPERIMENT-VII

7. Estimation of amount of HCl by Potentiometry.

EXPERIMENT-VIII

8. Estimation of amount of Fe^{2+} by Potentiometry using $KMnO_4$.

EXPERIMENT-IX

9. Estimation of amount of Iron in cement by colorimetry.

EXPERIMENT-X

10. Estimation of amount of HCl by pH metry.

EXPERIMENT-XI

11. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.

EXPERIMENT-XII

12. Determination of surface tension of a given liquid using stalagmometer.

EXPERIMENT-XIII

13. Synthesis of Aspirin / Paracetamol.

EXPERIMENT-XIV

14. Preparation of Hand Sanitizer.

Note: Any 12 experiments are to be performed.

REFERENCES:

1.Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R.Chand & Co., Delhi)

2.An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikaspublishing, N. Delhi)

3.Vogel's text book of practical organic chemistry 5th edition

4.Text book on Experiments and calculations in Engineering chemistry – S.S.Dara

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21EN107HS/21EN207HS **L T P C**
0 0 3 1.5

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

Listening Skills
Objectives

1. To enable students, develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.
3. Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress andrecognize and use the right intonation in sentences.
4. Listening for general content
5. Listening to fill up information
6. Intensive listening
7. Listening for specific information

Speaking Skills
Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
3. Oral practice: Just A Minute (JAM) Sessions
4. Describing objects/situations/people
5. Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I
CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice- Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Formsin Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: SituationalDialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech –Extempore.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

BASIC ELECTRICAL ENGINEERING LAB

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21EE108ES/21EE208ES **L T P C**

0 0 2 1

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

CO 1: Get an exposure to basic electrical laws and network theorems

CO 2: Understand the response of different types of electrical circuits to different excitations.

CO 3: Understand the measurement, calculation and relation between the basic electrical parameters

CO 4: Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law, Kirchoff's laws (DC Excitation)
2. Verification of Thevenin's and Norton's Theorem (DC Excitation)
3. Verification of Superposition Theorem (DC Excitation)
4. Transient Response of Series RL and RC circuits using DC excitation
5. Transient Response of RLC Series circuit using DC excitation
6. Resonance in series RLC circuit
7. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
8. Measurement of Active and Reactive Power in a balanced Three-phase circuit
9. Efficiency of a Single-Phase Transformer using open circuit and short circuit tests.
10. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
11. Performance Characteristics of Self Excited DC Shunt Motor
12. Efficiency of a Self-Excited DC Shunt Motor
13. No-Load Characteristics of a Three-phase Alternator .

Note: From the above list, any 10 experiments must be conducted.