ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABUS

SR20

(CHOICE BASED CREDIT SYSTEM (CBCS))

1

COMPUTER SCIENCE AND DESIGN

For

B. Tech. - Regular Four Year Degree Course
(Applicable for the batches admitted from 2020 - 2021)

B. Tech. - Lateral Entry Scheme
(Applicable for the batches admitted from 2021 – 2022
(I to II years Syllabus)

Giving Wings to Thoughts

ST. PETER'S ENGINEERING COLLEGE
(UGC - Autonomous)

Approved by AICTE, Affiliated to JNTUH,
Accredited by NAAC & NBA

Maisammaguda, Dhullapally (V), Kompally Road,
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B.TECH. - REGULAR FOUR YEAR DEGREE PROGRAM
(For batches admitted from the academic year 2020-21)
&
B.Tech. - Lateral Entry Scheme
(For batches admitted from the academic year 2021-22)

PREAMBLE

Institution is gearing up for several initiatives towards academic excellence, quality improvement and administrative reforms. In view of this priority and in-keeping with the Institute Vision and Mission process was already initiated towards introduction of semester system, grading system and credit system.

The above initiatives acquired further strength with University Grants Commission (UGC) guidelines, informing all the Universities/Autonomous Colleges regarding UGC"s new initiatives, on speedy and substantive academic and administrative reforms regarding higher education. Given this background St.Peter's Engineering College has framed this REGULATION-2020 and in short, it will be referred to as SR20.

Academic Programmes of the Institute are governed by rules and regulations approved by the Governing Body. The academic rules and regulations are applicable to the students admitted into four year undergraduate programmes offered by the college leading to Bachelor of Technology (B.Tech) degree from the academic year 2020-21 onwards and lateral entry students admitted from the academic year 2021-2022 onwards.

INSTITUE VISION

VISION: To promote quality education accessible to all sections of the Society without any discrimination of caste, creed, color, gender and religion and help students to discover their true potential.

INSTITUE MISSION:

IM1: To provide and equip stakeholders with knowledge and skills, social values and ethics, scientific attitude and orientations for lifelong learning.

IM2: To create an environment conductive to inhabiting their total involvement and participation

IM3: Provide infrastructure to arm the students with the competence to be at the forefront of cutting-edge technology and entrepreneurship in highly competitive global market.

INSTITUE QUALITY POLICY: St. Peter's Engineering College strives to establish a system of quality assurance to continuously address, monitor and evaluate the quality of education offered to students, thus promoting effective teaching-learning processes for the benefits of our students and making our institution a centre of excellence for engineering and technological studies.

1. UNDER GRADUATE PROGRAMS OFFERED (E&T)

St.Peter's Engineering College, an autonomous college affiliated to JNTUH, offers 4 Year (8 Semesters) Bachelor of Technology (B.Tech.) Degree Programme, under Choice Based Credit System (CBCS) with effect from the Academic Year   2020 - 21 onwards. From the academic year 2021-22 onwards two more branches have been enhanced. The following Branches of Engineering:

AY 2020-21

(i)   B.Tech. - Civil Engineering

(ii)   B.Tech. - Electrical and Electronics Engineering

(iii)   B.Tech. - Mechanical Engineering

(iv)   B.Tech. - Electronics and Communication Engineering

(v)   B.Tech. - Computer Science and Engineering

(vi)   B.Tech. - Information Technology

(vii) B.Tech. - Computer Science and Engineering [Artificial Intelligence & Machine Learning

AY 2021-22

(viii) B.Tech – Artificial Intelligence (AI) & Data Science (DS)

(ix)   B.Tech – Computer Science and Design

2. ADMISSION CRITERIA AND MEDIUM OFINSTRUCTION

2.1 Admission into first year of four year B.Tech. (Regular) Degree Programme:

2.1.1 Eligibility: A candidate seeking admission into the first year of four year B.Tech. Degree Programme should have:

(i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination with Mathematics, Physics or Chemistry as optional subjects recognized by Board of Intermediate Education, Telangana.

(ii) Secured a rank in the TSEAMCET examination conducted by TSCHE for allotment of a seat by the Convener, TSEAMCET.

2.1.2 Admission Procedure: Admissions are made into the first year of four year B.Tech. Degree Programme as per the stipulations of the TSCHE.

(i) Category A: 70% of the seats are filled through TSEAMCET counseling.

(ii) Category B: 30% of the seats are filled by the Management.

2.2 Admission into the second year of four year B. Tech. (Regular) Degree Programme Under Lateral Entry Scheme.

2.2.1 Eligibility: A candidate seeking admission under Lateral Entry Scheme (LES) into the II year I Semester B. Tech. Regular Degree Programme should have passed the qualifying examination (B.Sc. Mathematics or Diploma in concerned course) and have secured a rank at Engineering Common Entrance Test TSECET (FDH). Admissions are made in accordance with the instructions received from the Convener, TSECET and Government of Telangana State.

2.2.2 Admission Procedure: Admissions are made into the II year of four year B.Tech. (Regular) Degree Programme through Convener, TSECET (FDH) against the sanctioned intake in each Programmeof study as lateral entrystudent.

2.3 Branch Transfers: There shall be no Branch transfers after the completion of Admission Process.

2.4 Medium of Instruction: The Medium of Instruction and Examinations for the entire B.Tech. programme will be in **English** only.

3. B.Tech. PROGRAMMESTRUCTURE

3.1 Admitted under Four year B. Tech. (Regular) degree Programme:

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 the student shall forfeit their seat in B.Tech course. Each student shall secure 160 credits (with SGPA ≥ 5 (each Semester) and CGPA ≥ 5) required for the completion of the under graduate programme and award of the B.Tech. Degree.

3.2 Admitted under Lateral Entry Scheme (LES) into B. Tech. degreeProgramme:

3.2.1 The LES students after securing admission shall pursue a course of study for

not less than three academic years (6 Semesters) and not more than six academic years (12 Semesters), failing which the students shall forfeit their seat in B.Tech programme.

3.2.2 The student shall register for 122 credits and secure 122 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree.

3.3 UGC / AICTE 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 B.Tech. (Regular) Programme is of 4 Academic Years (8 Semesters) and B.Tech. (LES) Programme is of 3 Academic Years (6 Semesters)), with the **academic year being divided into two semesters of 22 weeks (≥ 90 Instructional days per semester)**, each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)', Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and Curriculum / Course Structure as suggested by AICTE.

3.3.2 Credit Courses:

All Subjects / Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/Course in a L:T:P:C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) Structure based on the following general pattern:

(i) One Credit - for One hour /Week / Semester for Theory /Lecture (L) Courses; or Tutorials

(ii) One Credit - for Two hours / Week / Semester for Laboratory / Practical (P) Courses. All Mandatory Courses, Industrial Visit, Guest Lecture, Tutorials, etc., will not carry any Credits.

(iii) All Value-Added Courses in each semester carry 1 credit for two hours/week/semester except in I & II Semester of I B.Tech.

Mandatory Courses

Course Code	Course Name
AS20-00MC01	Environmental sciences
AS20-00MC02	Gender sensitisation
AS20-00MC03	Constitution of India
AS20-00MC04	Professional ethics
AS20-00MC05	Artificial intelligence
AS20-00MC06	Cyber security

3.3.3 Subject / Course Classification and Nomenclature:

SPEC has followed almost all the guidelines specified by AICTE / UGC / JNTUH for the classification of all subjects / courses offered at B.Tech. Programme and are mentioned below.

S.No	Broad Course Classification	Course Group / Category	Course Description	Range of Credits	Distributed of Credits
1	Foundation Courses (FnC)	HSMC-Humanities and Social Science	Includes subjects related Humanities, Social Sciences and Management	5% - 10%	13
2		BSC-Basic Sciences	Includes-Mathematics, Physics and Chemistry Subjects	10%-15%	17.5
3		ESC-Engg Sciences	Includes Fundamental Engineering subjects	15%-20%	32
4	Core Courses (CoC)	PCC-Professional Core	Includes core subjects related to the Parent Discipline/ Department / Branch of Engg	30%-40%	55.5
5	Elective Courses (ELC)	PEC-Professional Electives	Includes Elective subjects related to the Parent Discipline/ Department / Branch of Engg	5%-15%	15
6		OEC-Open Electives	Elective subjects which include inter disciplinary subjects or subjects in an area outside the parent Discipline/ Department / Branch of Engg	5%-10%	12
7	Project Based Courses	Project Work	B.Tech project or UG Project or UG Major Project	5%-15%	15
8		Industrial training/ Mini-Project	Industrial training/Internship / UG Mini-project / Mini-Project		
9		Value Added Courses	Technical training based on core contents related to Parent Discipline /Department/Branch of Engg		
10	Mandatory Courses (MC)	Mandatory Courses (MC)	Mandatory Courses (non credits)	---	0
Total Credits for UGP (B.Tech) Programme				**160 (100%)**	**160**

4. COURSEREGISTRATION

4.1 A 'faculty advisor or counselor' shall be assigned to a group of 15 students, who advises the student about the B.Tech. programme, its course structure and curriculum, choice / option for subjects / courses, based on his/her competence, progress, pre-requisites and interest.

The academic section of the college invites 'registration forms' from students before the beginning of the semester through online submission, ensuring 'date and time stamping'. The online registration requests for any 'current semester' shall be completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'.

4.2 A student can apply for online registration, only after obtaining the 'written approval' from his faculty advisor or counselor, which should be submitted to the college academic section through the Head of the Department. A copy of it shall be retained with Head of the Department, faculty advisor and the student.

4.3 Subject / course options exercised through online registration are final and cannot be changed or inter- changed; further, alternate choices will not be considered. However, if the subject / course that has already been listed for registration by 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), which may be considered. Such alternate arrangements will be made by Head of the Department, with due notification and time-framed schedule, within the first week from the commencement of class-work for that semester.

4.4 Open electives: Students have to choose one open elective wherever offered from the list of open electives given for their stream. However, student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.5 Professional electives: Students have to choose professional elective wherever offered from the list of professional electives given. However, students may opt for professional elective subjects offered in the related area.

4.6 Mandatory Courses (Non-Credit): All mandatory courses where ever offered require prior   registration.

4.7 Value Added Courses: Students have to choose one value added course in each semester (2-1 to 3-2) wherever offered from the list of value added courses given for their stream. In 4-1 a value added course is common to all the departments and is mandatory.

5. SUBJECTS / COURSES TO BEOFFERED

A subject/course may be offered to the students, if only a minimum 1/3 of students register to the course.

(i)   More than one faculty member may offer the same subject (lab / practical's may be included with the corresponding theory subject in the same semester) in any semester. However, selection 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 entryfrom the student for registration in that semester, and the second focus, if needed, will be on CGPA of the student).

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

6. ATTENDANCEREQUIREMENTS

6.1 A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum 75% of attendance in aggregate (excluding the days of midterm examinations) for all the subjects / courses (excluding attendance in mandatory courses) in that semester.

6.2 Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be granted by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence. A stipulated fee shall be payable towards condoning of shortage of attendance. If the attendance below 65% in aggregate shall in no case be condoned.

6.3 Students whose shortage of attendance is not condoned in any semester are not eligible to take the end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to

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the next semester. They may seek re-registration for all those subjects registered in that semester in which student was detained, by seeking re-admission into that semester as and when offered. In case 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.

6.4 If a student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class.

7. ACADEMICREQUIREMENTS

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no. 6.

7.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course, if the student secures not less than 35% marks in the semester end examination (SEE), and a minimum of 40% of marks in the sum total of the Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) taken together; in terms of letter grades, this implies securing **C** grade or above in that subject /course. If the student secured **F** grade in any subject, he/she can apply for recounting/ revaluation by paying prescribed fee. If the student is not satisfied after the declaration of recounting/ revaluation he/she can apply for challenge valuation with prescribed fee.

7.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to industry oriented mini-project, if the student secures not less than 40% of the total marks.

The student would be treated as failed, if student

(i) If the student does not submit a report on his industry oriented mini-project before the evaluation committee as per the schedule,

(ii) Secures less than 40% of marks in industry oriented mini-project evaluations.

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, student has to reappear for the same in the next subsequent semester, as and when it isscheduled.

7.3 Promotion Rule

Every student has to fulfill the attendance and academic requirements by receiving the required number of credits as shown below

7.3.1 Four-year B.Tech. (Regular):

Sl. No.	Promotions	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 19 credits out of 38 credits i.e., 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 47 credits out of 79 credits i.e., 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 72 credits out of 120 credits i.e., 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.

7.3.2 Three-year B.Tech.(LES):

S. No.	Promotion	Conditions to be fulfilled
1.	Second year first semester to second year second semester	Regular course of study of second year first semester.
2.	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 25 credits out of 41 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	Third year first semester to third year second semester	Regular course of study of third year first semester.
4.	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 49 credits out of 82 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5.	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

7.4 A student has to register for all subjects covering 160 credits (122 credits in case of LES) as specified and listed (with the relevant course / subject classifications as mentioned) in the course structure, fulfill all the attendance and academic requirements for 160 credits (122 credits in case of LES) securing a minimum of **'C'** grade or above in each subject, and 'earn all 160 credits (122 credits in case of LES) securing SGPA>=5.0 (in each semester), and CGPA (at the end of each successive semester)>=5.0, to successfully complete the under graduate programme.

7.5 A student eligible to appear in the semester end examination for any subject / course, but absent from it or failed (thereby failing to secure **'C'** 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.

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

7.7 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.

8. EVALUATION - DISTRIBUTION AND WEIGHTAGE OFMARKS

8.1 The performance of a student in each semester shall be evaluated subject-wise / course-wise (irrespective of credits assigned) with a maximum of 100 marks. These evaluations shall be based on 30 marks allotted for CIE (Continuous Internal Evaluation) and 70 marks for SEE (Semester End Examination), and a letter grade corresponding to the percentage of marks obtained shall be given.

8.2. Evaluation of Theory Subjects /Courses

(A) Continuous Internal Evaluation: For each theory subject, during the semester, there shall be two mid-term examinations of 30 marks each.

I.   The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

II. The Descriptive paper shall be conducted for duration of 1 hour and 30 Minutes. Each descriptive paper consists of three compulsory questions (May contain Sub Questions carrying 2/3/5/10 marks) each with internal choice covering the prescribed syllabus.

MID- Term Examinations			
Type of Questions	Questions	Marks Distribution	Marks
Internal Choice Questions (Unit wise)	3	Unit-I (10 Marks) Unit-II (10 Marks) Unit-III (5 Marks)	25 Marks
Assignment		Each Unit- One Assignment	5 Marks
Grand Total			**30 Marks**

III. First assignment consists of One video from either (1/2/3Units) and two written assignments from 1st& 2nd units, should be submitted before the commencement of the first mid-term examinations, and the second assignment consist of One video from either (3/4/5Units) and two written assignments from 3rd&4th units, should be submitted before the commencement of the second mid-term examinations. Five Marks for each Assignment.

Assignment 1: -   Unit 1 – 2 Marks, Unit 2 – 2 Marks, Unit 3 – 1 Mark.

Assignment 2: -   Unit 3 – 1 Mark, Unit 4 – 2 Marks, Unit 5 – 2 Marks.

The marks secured by the student in I and II Internal examinations are considered and the AVERAGE of the two Internal examinations shall be taken as the final marks secured by the student towards Continuous Internal Evaluation in the theory subject. If he/she is absent for any test, he/she will be awarded zero marks in the internal examination. However, as per the notification releasedthey can attempt the computer-based test (CBT) to improve the marks.

(B) Semester End Examinations:

The duration of SEE is 3 hours. The details of the question paper pattern are as follows:

Semester End Examinations				
Part	Type of Question	No. of Questions	Marks per Questions	Total
Part-A	Without Choice	10	2	20 Marks
Part-B	Internal Choice	5	10	50 Marks
Grand Total				**70 Marks**

8.3. Evaluation of Practical Subjects / Courses: In any semester, a student has to complete all the experiments / exercises in each laboratory course and get the record certified by the concerned Head of the Department to be eligible for Semester End Examination. For practical subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 internal marks and 70 marks for Semester End Examination (SEE). The semester end examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the

examination branch of the Parent Institution.

(C) Continuous Internal Evaluation (CIE): Out of the 30 marks, 15 marks are allocated for day- to-day work evaluation and 10 Marks for Lab Examination and 5 marks for Viva voce which will be conducted by the faculty (Subject Experts Nominated by HoD) for a duration of two hours and the best of the two mid-term examinations is taken into account.

ABSENCE IN LABORATORY INTERNALEXAMINATIONS:

If any student is absent in both the laboratory internal examinations on health grounds for any valid reasons approved by the college academic committee, only one test shall be conducted on all experiments and the marks secured out of 30 marks shall be divided by two, which shall be awarded against the said laboratory Internal Evaluation.

(D) Semester End Examination (SEE): The SEE for practical subject / course shall be conducted at the end of the semester with duration of 3 hours by one internal and one external examiner appointed by the Head of the Institution as per the recommendation of the concerned Head of the Department.

8.4 Evaluation of Design / Drawing Subjects / Courses: For the subjects such as Engineering Graphics, Machine Drawing and estimation, the distribution shall be 30 marks for CIE (15 marks for day-to-day work and 15 marks for internal examination) and 70 marks for SEE. There shall be two internal examinations in a semester and the average of the two shall be considered for the award of marks for internal examinations. For subjects like Engineering Graphics/Engineering Drawing, the SEE shall consist of five questions. Each question having internal choice from each unit with equal weightages.

Semester End Examinations			
Type of Questions	No. of Questions	Marks per Question	Total
Internal Choice from each unit wise	5	14	70 Marks

8.5Evaluation of Major Project: Out of a total of 100 marks for the major project work, 30 marks shall be for Internal Evaluation and 70 marks for the End Semester evaluation. The End Semester evaluation (viva-voce) shall be conducted

by committee. The committee consists of an external examiner, Head of the Department, the supervisor of project and a senior faculty member of the department. The topics for industry oriented mini project, and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year II Semester. The Departments have to evolve rubrics for evaluation of Project work. The marks may be distributed among various components like selection of topic, problem statement, literature review, methodology, oral and written presentation of the work done and performance in viva-voce examination.

8.6 Evaluation of Mandatory/Non-Credit Courses:

For Non Credit subjects the distribution shall be 100 marks for the Semester End- Examination (SEE). The Semester End Examination will be conducted for 100 marks. The question paper consists of 8 questions where each question should contain a/b or a/b/c or a/b/c/d from different units. Out of 8 questions any 5 questions should be answered carrying 20 marks each. A Student must secure minimum 40 marks to pass.

For non credit courses, 'Satisfactory' or "Not Satisfactory" is indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

8.7 Evaluation of Value Added Courses

Students have to submit a project by the end of the semester, which will be evaluated by the Project Review Committee consisting of Head of the Department, a Senior Faculty of the department and concerned faculty of that Course and the Project will be evaluated for 75 marks in which 50 marks are allotted by evaluating the submitted project and 25 marks is considered as internal review marks. Remaining 25 marks are obtained by conducting Quiz(Multiple Choice Questions) during the Internal I & II Examinations and the average is considered.

8.8 MOOCs/SWAYAM Courses:

Meeting with the global requirements, to inculcate the habit of self learning and in compliance with UGC guidelines, MOOC (Massive Open Online Course) courses have been introduced as electives. The proposed MOOCs courses would be additional choices in all the elective groups subject to the availability during the respective semesters and respective departments will declare the list of the

courses at the beginning of the semester. Course content for the selected MOOCs courses shall be drawn from respective MOOCs links or shall be supplied by the department. Evaluation of the Course shall be done by the provider. Student has to submit the certificate of MOOCs given from the provider.

If a student fails in the MOOCs Examination conducted by Provider then the student may be allowed to write Supplementary Examination in the subsequent semester wherein the evaluation and Assessment will be done by the Parent Institution.

There shall be one Mid Sessional Examination (30 marks) obtained from the Assignment of the NPTEL/SWAYAM Course ,semester end evaluation (Descriptive exam for 70 marks) shall be done along with the other regular courses by the parent Institution. Three credits will be awarded upon successful completion of each MOOCs course. Students who are interested to do MOOCs courses need to register at their department office by the start of the semester against the courses that are announced by the department.

9. GRADINGPROCEDURE

9.1 Marks will be awarded to indicate the performance of each student in each theory subject, lab/practical's, design/drawing practice, industry oriented mini-project and major project. Based on the percentage of marks obtained in Continuous Internal Evaluation plus Semester End Examination, both taken together, as specified in item 8 above, a corresponding letter grade shall begiven.

9.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following letter grades (UGC Guidelines) and corresponding percentage of marks shall befollowed

Marks Secured (Class Intervals)	Letter Grade	Grade Points
≥ 90%	O (Outstanding)	10
≥ 80% to< 90%	A$^+$ (Excellent)	9
≥ 70% to< 80%	A (Very Good)	8
≥ 60% to< 70%	B$^+$ (Good)	7
≥ 50% to< 60%	B (above Average)	6
≥ 40% to< 50%	C (Pass)	5
< 40%	F(Fail)	0
Absent	Ab	0

9.3 A student obtaining 'F' grade in any subject shall be considered 'failed' and will be

required to reappear as 'supplementary student' in the end semester examination (SEE), as and when offered. In such cases, his internal marks (CIE marks) in those subject(s) will remain same as those he obtained earlier.

9.4 A letter grade does not imply any specific % of marks. In general, 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 if he is detained.

9.5 A student earns grade point (GP) in each subject/course, on the basis of the letter grade obtained by him in that subject/course (excluding mandatory non-credit courses). Then the corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/course.

Credit Points (CP) = Grade Point (GP) x Credits

9.6 The student passes the subject/course only when he gets GP $\geq$ 5 (C grade or above).

9.7 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

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

where 'i' is the subject indicator index C_i (takes into account all subjects in a semester), N is theno. 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 that ith Subject, and G_i represents the grade points (GP) corresponding to the letter grade awarded for that ith subject.

9.8 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over 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 I year second semester onwards, at the end of each semester, as per theformula

CGPA = $\{\sum_{j=1}^{M} SGPA \times C_j G_j \} / \{ \sum_{j=1}^{M} C_j \}$ .... for all M Semestersregistered

where 'M' is the total no. of semesters (as specifically required and listed under the

course structure of the parent department) the student has 'registered' from the 1st semester onwards up to and inclusive of the semester M, 'j' is the semester indicator index (takes into account all semesters from 1 to M semesters), C_j is the no. of credits allotted to the jth semester, and G_j represents the grade points (GP) corresponding to the letter grade awarded for that j^{th} semester. After registration and completion of I year I 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 Point	Credits Points
Course 1	3	A	8	3 × 8 = 24
Course 2	3	B+	7	3 × 7 = 21
Course 3	3	B	6	3 × 6 = 18
Course 4	3	A	8	3 × 8 = 24
Course 5	3.5	C	5	3.5×5 = 17.5
Course 6	1.5	A	8	1.5 × 8 = 12
Course 7	1.5	O	10	1.5 × 10 =15
Course 8	2	O	10	2 × 10 = 20
	20.5			154.5

SGPA = 154.5/20.5 = 7.53

Illustration of calculation of CGPA

Semester	Credits	SGPA	Credits * SGPA
Semester 1	20.5	7.53	20.5 × 7.53 = 154.36
Semester 2	17.5	6.48	17.5 × 6.48 = 113.4
Semester 3	20.5	7.43	20.5 × 7.43 = 52.315
Semester 4	20.5	8.21	20.5 × 8.21 =168.305
Semester 5	20.5	7.65	20.5 × 7.65 = 56.825
Semester 6	20.5	6.42	20.5 × 6.42 =131.61
Semester 7	21	7.75	21 × 7.75 = 162.75
Semester 8	19	8.25	19 × 8.25 = 156.75
Total Credits	**160**	**Total Credit Points**	**1196.32**

CGPA = 1196.32/160 = 7.47

9.9   For merit ranking or comparison purposes or any other listing, only the 'rounded off' values of the CGPAs will be used.

9.10   For calculations listed in Item 9.6–9.10, performance in failed subjects/courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. However, mandatory courses will not be taken intoconsideration.

10. PASSINGSTANDARDS

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

10.2 A Student shall be declared 'successful' or 'passed' in any non-credit subject/ course, if he secures a 'Certificate' for that mandatory course.

After the completion of each semester, a grade card or grade sheet (or transcript) 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. DECLARATION OFRESULTS

11.1 Computation of SGPA and CGPA are done using the procedure listed in 9.6–9.9.

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

Percentage of Marks = (final CGPA – 0.5) x 10

12. AWARD OFDEGREE

12.1 After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. degree he shall be placed in one of the following four classes based onCGPA:

Class Awarded	Grade to be Secured	Remarks
First Class with Distinction	≥ 8.00	From the aggregate marks secured from 160 Credits for Regular Students and 144 Credits for Lateral Entry Students.
First Class	≥ 6.50to<8.00	
Second Class	≥ 5.50to<6.50	
Pass Class	≥ 5.00to<5.50	

12.2 First class with distinction will be awarded to those students who clear all the subjects in single attempt during his / her regular course of study by fulfilling the following conditions:

(i) Should have passed all the subjects/courses in 'first appearance' within the first 4

academic years (or 8 sequential semesters) for B.Tech. (Regular) and first 3 academic years (or 6 sequential semesters) for B.Tech. (LES) from the date of commencement of first year first semester for B.Tech. (Regular) and II year I semester for B.Tech.(LES).

(ii) Should have secured a CGPA ≥ 8.00, at the end of each of the 8 sequential semesters (6 sequential semesters for LES), starting from I year I semester (starting from II year I semester for LES)onwards.

(iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in 'first class with distinction'.

12.3 Award of Medals: Students fulfilling the conditions listed under item 12.2 alone will be eligible for award of 'College Ranks' and 'Medals'.

12.4Graduation Day: The College shall have its own Annual Graduation Day for the award of Degrees issued by the University.

12.5 Transcripts: After successful completion of prerequisite credits for the award of degree a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms invogue.

13. WITH HOLDING OFRESULTS

If the student has not paid the fee to college at any stage, or has dues pending against his/her name due to any reason what so ever, or if any case of indiscipline is pending against him/her, the result of the student may be withheld, and he/she will not be allowed to go into the next higher semester.

14. SUPPLEMENTARYEXAMINATIONS

Supplementary examinations for odd semester subjects will be conducted along with even semester regular examinations and vice versa.

15. TRANSITORYREGULATIONS

A. For students detained due to shortage of attendance:

1. A Student who has been detained in I year ofR18 Regulations due to lack of attendance, shall be permitted to join I year I semester of SR20 Regulations and he is required to complete the study of B.Tech. programme within the stipulated period of eight academic years from the date of first admission in I Year.

2. A student, who has been detained in any semester of II, III and IV years of R18 regulations for want of attendance, shall be permitted to join the corresponding semester of SR20 regulations and is required to complete the study of B.Tech. within the stipulated period of eight academic years from the date of first admission in I Year. The SR20 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester.

   See rule (C) for further Transitory Regulations.

B. For students detained due to shortage of credits:

A student of R18 Regulations, who has been detained due to lack of credits, shall be promoted to the next semester of SR20 Regulations only after acquiring the required credits as per the corresponding regulations of his/her first admission. The student is required to complete the study of B.Tech. within the stipulated period of eight academic years from the year of first admission. The SR20 Academic Regulations are applicable to a student from the year of readmission onwards.

   See rule (C) for further Transitory Regulations.

C. For readmitted students in R18Regulations:

1. A student who has failed in any subject under any regulation has to pass those subjects in the same regulations.

2. The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his/her study including SR20 Regulations. The performance evaluation of the student will be done after the exemption of two subjects if total credits acquired are ≤ 206, three subjects if total credits acquired are> 206 (see R16 Regulations for exemption details).

3. If a student readmitted to SR20 Regulations, has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in R18 Regulations will be substituted by another subject to be suggested by the SPEC Academic Council.

Note: If a student readmitted to SR20 Regulations, has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in SR20 Regulations, the Principal shall conduct remedial classes

to cover those subjects/topics for the benefit of the students.

D. Promotion Rule: Where the credits allotted to a semester/year under the regulations studied in are different from that under SR20 regulations for the corresponding semester/year, the promotion rules of SR20 vide section 7.3 shall be applied after normalization. Normalization is done by scaling down or up the number of credits of a semester/year under the previous regulations to equal the number of credits of the corresponding semester/year under SR20 regulations and revising the secured credits also in the same proportion.

16.   STUDENTTRANSFERS

There shall be no branch transfers after the completion of admission process. If the student seeking transfer from other colleges/universities have to pass the failed subjects which are equivalent to the subjects in SPEC Autonomous and also pass the subjects of SPEC Autonomous, which are not studied in the earlier institution. If the student already studied any subject in the previous institution for those subjects they need to take substitute subjects.

17.   RULES OFDISCIPLINE

17.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

17.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

17.3 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

17.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

18. MALPRACTICE

18.1 Malpractice Prevention Committee: A malpractice prevention committee shall be constituted to examine and punish the student who does malpractice / behaves indiscipline in examinations.

The committee shall consist of:

(a) Controller of Examinations – Chairman

(b)Addl. Controller of Examinations.-Convener

(c) Subject Expert –Member

(d) Head of the Department of which the student belongs to – Member

(e) The Invigilator concerned -Member

The committee shall conduct the meeting after taking explanation of the student and punishment will be awarded by following the malpractice rules meticulously.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the staff who are in charge of conducting examinations, valuing examination papers and preparing/keeping records of documents relating to the examinations, in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and will be recommended for appropriate punishment after thorough enquiry and submit the report to Head of the Institution.

18.2 Malpractice Rules: Disciplinary Action for Improper Conduct in Examinations

S.No	Nature of Malpractices/ Improper Conduct	Punishment
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 he is appearing but has not made use of (material shall include any marks on the body of the candidate 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
1(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an

		outsider, he will be handed over to the police and a case is registered against him.
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 candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate 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 candidate is to be cancelled and sent to the Principal.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from the examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate 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 candidate 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 candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate 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

S.No	Nature of Malpractices/ Improper Conduct	Punishment
6	Refuses to obey the orders of the Controller of examinations / 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 addl. Controller of examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the addl. Controller of examinations, 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 hasthe 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 candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates 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 candidate 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 candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

S.No	Nature of Malpractices/ Improper Conduct	Punishment
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate 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 candidate is also debarred and forfeits the seat.
9	If the /a student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to8	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate 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 candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to 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 candidate 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
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 candidate hasappeared 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 11 shall be reported to the principal for further action to award suitable punishment.	

19. SCOPE

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

(ii) The above mentioned rules and regulations are applicable in general to both B.Tech. (Regular) and B.Tech. (LES), unless and otherwise specific.

(iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

20. REVISION AND AMENDMENTS TOREGULATIONS

The Academic Council may revise 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 Academic Council.

COMPUTER SCIENCE AND DESIGN CURRICULUM

GENERAL, COURSE STRUCTURE & THEME & SEMESTER-WISE CREDIT DISTRIBUTION
SR 20

A.   **Definition of Credit**:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1Hr. Practical (P) per week	0.5 credits
3Hours Practical (Lab)/week	1.5 credit

B.Range of credits - A total of 160 credits are required for a student to be eligible to get Under Graduate degree in Engineering.

C.Structure of Undergraduate Engineering program:

S.No.	Category	Code	Break up of Credits
1	Humanities and Social Sciences including Management courses	HSMC	13
2	Basic Science courses	BSC	17.5
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	ESC	32
4	Professional core courses	PC	55.5
5	Professional Elective courses relevant to chosen specialization/branch	PE	15
6	Open subjects – Electives from other technical and /or emerging Subjects	OE	12
7	Project work, seminar, value added courses and internship in industry or elsewhere	PW	15
8	Mandatory Courses [Environmental Sciences, Gender Sensitization, Constitution of India, Professional Ethics, Artificial Intelligence, Cyber Security]	MC	(non-credit)
	Total		160

I.   **Semester-wise structure of curriculum**
        [L= Lecture, T = Tutorials, P = Practicals & C = Credits]

COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	**T**	**P**				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED CALCULUS	BSC	3	1	-	3	30	70	100
AS20-00BS02	ENGINEERING CHEMISTRY	BSC	3	1	-	3	30	70	100
AS20-02ES01	BASIC ELECTRICAL ENGINEERING	ESC	3	1	-	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	-	-	2	30	70	100
AS20-04ES01	ELECTRONIC DEVICES AND CIRCUITS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-04ES05	ELECTRONIC DEVICES AND CIRCUITS LAB	ESC	-	-	2	1	30	70	100
AS20-00HS02	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	HSMC	-	-	3	1.5	30	70	100
AS20-00BS03	ENGINEERING CHEMISTRY LAB	BSC	-	-	2	1	30	70	100
VALUE ADDED COURSE									
AS20-00HS03	SOFT SKILLS-I	HSMC	3	0	0	0	-	100	100
					TOTAL	**17.5**			

I BTECH I SEM (AI&DS, CSD) is the title of the first table above.

I BTECH II SEM (AI&DS , CSD)

COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	**T**	**P**				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1		3	30	70	100
AS20-00BS08	APPLIED PHYSICS	BSC	3	1		3	30	70	100
AS20-05ES01	PROGRAMMING FOR PROBLEM SOLVING	ESC	3	1		3	30	70	100
AS20-03ES02	ENGINEERING GRAPHICS AND DESIGN	ESC	2	-		3.5	30	70	100
AS20-00HS07	UNIVERSAL HUMAN VALUES II	HSMC	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS09	APPLIED PHYSICS LAB	BSC	-	-	3	1.5	30	70	100
AS20-05ES02	PROGRAMMING FOR PROBLEM SOLVING LAB	ESC	-	-	3	1.5	30	70	100
AS20-03ES04	ENGINEERING PRACTICES	ESC	-	-	4	2	30	70	100
VALUE ADDED COURSE									
AS20-00HS04	SOFT SKILLS -II	HSMC	3	0	0	0		100	100
					TOTAL	**20.5**			

*Tentative structure Subject to approval by the BOS

B.TECH
FIRST YEAR
FIRST SEMESTER
SYLLABUS

LINEAR ALGEBRA AND ADVANCED CALCULUS
I B.Tech., I SEM

Course Title: LINEAR ALGEBRA AND ADVANCED CALCULUS	Course Code: AS20-00BS06
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs : 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1.Basic definitions of Matrices 2.Knowledge of Calculus 3.Differentiation and Integration rules	

Course Overview: Course include
• Types of matrices and their properties.
• Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
• Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
• Concept of Sequence.
• Concept of nature of the series.
• Geometrical approach to the mean value theorems and their application to the mathematical problems .
• Evaluation of improper integrals using Beta and Gamma functions.
• Partial differentiation, concept of total derivative
• Finding maxima and minima of function of two and three variables.

Course Objective To learn
• Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
• Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
• Concept of nature of the series.
• Geometrical approach to the mean value theorems Evaluation of improper integrals using Beta and Gamma functions.
• Partial differentiation, concept of total derivative. Finding maxima and minima of function of two and three variables

Course Outcomes:

CO#	Course Outcomes
C111.1	Convert the set of linear equations in to matrix notation and analyse its solution
C111.2	Apply the concept of orthogonal transformation and reduce quadratic form to canonical form
C111.3	Analyze the nature of series.
C111.4	Describe the applications of the mean value theorems
C111.5	Evaluate the improper integrals using Beta and Gamma functions.
C111.6	Categorize the extreme values of functions of two variables with constraints and without constraints.

COURSE CONTENT (SYLLABUS)

UNIT I: MATRICES
Matrices: Types of Matrices(only definitions);rank of a matrix by Echelon form and Normal form; Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations: solving system of Homogeneous and Non-Homogeneous equations- consistency, Gauss elimination method;Gauss Jacobi Iteration Method. Gauss Seidel Iteration Method.

UNIT-II: EIGEN VALUES AND EIGEN VECTORS
Eigen values and Eigenvectors and their properties; Cayley-Hamilton Theorem (without proof): finding inverse and power of a matrix by Cayley-Hamilton Theorem; Diagonalization; Quadratic forms and Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: SEQUENCES & SERIES
Sequence: Definition of a Sequence, Convergence of a sequence (definitions and examples only).
Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert's ratio test; Raabe's test; logarithmic test; Integral test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: SINGLE VARIABLE CALCULUS
Mean value theorems(all the theorems without proof): Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: MULTIVARIABLE CALCULUS
Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables with constraints; without constraints; method of Lagrange's Multipliers.

Text Books:
1.   B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43nd Edition, 2014.
2.   R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd.,5 thEdition,2016
References Books:
1.   N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2.   B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1.https://www.khanacademy.org/math/linear-algebra
2.https://onlinecourses.nptel.ac.in/noc20_ma27
3.https://www.mooc-list.com/course/calculus-two-sequences-and-series-coursera
Web Reference/E-Books:
   1   www.ee.ic.ac.uk
   2   http://en.m.wikipedia.org
   3   www.math.odu.edu

ENGINEERING CHEMISTRY
I B.Tech., I SEM

Course Title: Engineering Chemistry	Course Code: AS20-00BS02
Teaching Scheme (L:T:P): 3:1:0	Credits:4
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs : 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Students must have studied two years of intermediate chemistry	

Course Overview:

The primary objective of an Engineering Chemistry course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. This course aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Molecular Orbital Concepts, Electrode Potential, Electrodes, types of batteries and their industrial applications, Fuels, UV-VIS, IR and NMR concepts.

Course Objective
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To know the modern technology and interpret different problems involved in industrial utilization of water.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of Electrochemistry and Corrosion which are essential for engineers in Industry.
- Ability to impart the knowledge of fuels to apply the role of chemistry in energy production.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course Outcomes (s)

CO#	Course Outcomes
C112.1	Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems.
C112.2	To know the modern technology and interpret different problems involved in industrial utilization of water.
C112.3	Interpret the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
C112.4	Summarize the principles and concepts of electrochemistry, corrosion to predict the behavior of a system under different variables.
C112.5	Define and classify the fuels, distinguishing the quality of fuels based on calorific values as well as understand the concepts of petroleum refining.
C112.6	Apply the concepts on basic spectroscopy and application to medical and other fields.

COURSE CONTENT (SYLLABUS)

Unit - I:

Water and its Treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems on Hardness of Water – Estimation of hardness of water by complexometric method. Boiler troubles: Scales and Sludge's and its treatment. Potable water and its specifications - Steps involved in treatment of Potable water – Disinfection of water by ozonization and chlorination – Breakpoint of Chlorination. Boiler feed water and its treatment – Internal Treatment of water: Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange Process. Desalination of Brackish water – Reverse Osmosis.

Unit – II:

Molecular Structure and Theories of Bonding: Introduction - Atomic and Molecular Orbital's. Linear Combination of Atomic Orbital's (LCAO), Molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. Π-molecular orbital's of butadiene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbital's in Tetrahedral, Octahedral and Square planar geometries. Band Structure of solids and effect of doping on conductance.

Unit - III:

Electrochemistry and Corrosion: Electro chemical cells – electrode potential, standard electrode potential, Nernst equation, Types of electrodes – Calomel, Quinhydrone and Glass electrode. Determination of P^H of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Batteries – Primary: Lithium cell, secondary batteries: Lead – Acid storage battery and Lithium ion battery.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, Differential Aeration Corrosion - water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods - Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing , Tinning, Metal Cladding.

Unit - IV:

Fuels and Combustion: Introduction-Classification of Fuels – Calorific value, Characteristics of a good fuel - Solid fuels: coal –Classification of a coal by Rank – Analysis of coal – Proximate and Ultimate analysis and their significance. Liquid fuels – Petroleum and its refining, Cracking –types – Fixed bed Catalytic Cracking - Moving bed catalytic cracking. Synthetic Petrol – Fischer-Tropsch's process- Knocking – Octane and Cetane rating, Flash Point, Fire point, Cloud point & Pour Point; Gaseous fuels – Composition and uses of Natural Gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

Unit-V

Spectroscopic Techniques and applications: Introduction, Principles of Electronic Spectroscopy: Beer-Lamberts law, Types of electronic transitions, applications of UV–Visible spectroscopy.

 IR Spectroscopy: Introduction, Principle, Modes of Molecular vibrations, selection rules, Force Constant, Wave number regions of Some common organic functional groups (C-H, NH_2, OH, -COOH, C=O, C≡N, C=C, C≡C, C-O-C), Applications of IR Spectroscopy.

^{1}H-NMR Spectroscopy, Principles of NMR spectroscopy, Chemical shift - Shielding and Deshielding effects, Chemical shifts of some organic protons, Interpretation of NMR Spectra (Alkanes, Alcohol, carbonyl compounds, Alkyl halides) Applications of NMR: Introduction to Magnetic Resonance Imaging.

Text Books:
1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. R.V. Gadag & A. Nityananda Shetty., **"Engineering Chemistry"**, I K International Publishing House Private Ltd. New Delhi (2015- Edition).

References Books:
1. O.G. Palanna, **"Engineering Chemistry"**, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).
2. **"Wiley Engineering Chemistry"**, Wiley India Pvt. Ltd. New Delhi. Second Edition 2013.
3. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015- Edition).
4. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://nptel.ac.in/courses/105/104/105104102/
2. https://nptel.ac.in/courses/105/106/105106119/
3. https://nptel.ac.in/courses/103/103/103103163/
4. https://nptel.ac.in/courses/104/106/104106096/
5. https://nptel.ac.in/courses/115/102/115102025/
6. https://nptel.ac.in/courses/103/108/103108162/
7. https://nptel.ac.in/courses/103/105/103105110/
8. https://nptel.ac.in/courses/104/102/104102113/

Web Reference/E-Books:

S.No	Advanced concepts in syllabus	Website Referred
1	Water & Its Treatment	https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/
2	Lithium Ion Batteries	https://www.youtube.com/watch?v=fo3DMXwD9ig
3	Fuel Cells	https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf
4	IR Spectroscopy	www.chem.ucalgary.ca
5	stereochemistry	research.cm.utexas.edu
6	Synthesis of Aspirin	http://vlab.amrita.edu/?sub=2&brch=191&sim=849&cnt=1
7	Deflouridation of fluoride water	www.csir.res.in
8	Engineering Chemistry IIT-MUMBAI	http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm
9	MR Spectroscopy	https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy

BASIC ELECTRICAL ENGINEERING
I B.Tech., I SEM

Course Title: Basic Electrical Engineering	Course Code: AS20-02ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of Physics and Mathematics	

Course Overview:

Electrical engineering principles are taught in this course. Topics include circuit theory, alternating current theory, DC Machines, induction, motors, Synchronous Machine, cabling, batteries and Switches.

Course Objective

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

Course Outcomes(s)

CO#	Course Outcomes
C113.1	Understand the basic concepts of Electrical Circuits.
C113.2	Study various concepts in AC circuits
C113.3	Discuss the concepts of transformer and Induction motor.
C113.4	Discuss the concepts of DC Machines and synchronous machines.
C113.5	Describe the operation of different types of cables, wires and batteries.
C113.6	understand the Performance of different protecting equipment's like MCB, FUSE.

COURSE CONTENT (SYLLABUS)

UNIT-I: D.C. CIRCUITS

Electrical circuit elements R, L and C, voltage and current sources, Kirchoff's laws, Network reduction techniques, Series –parallel, Y-Δ transformation, analysis of simple circuits with dc excitation. Superposition theorem, Thevenin's theorem and Norton's Theorem.

UNIT-II: A.C. CIRCUITS

Representation of sinusoidal waveform, phasor representation, peak and RMS values, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations, series resonance in series R-L-C circuit. Three-phase balanced circuits. Voltage and current relations in star and delta connections.

UNIT-III: TRANSFORMERS AND INDUCTION MOTORS

Transformers: Principle of operation of transformer, Equivalent circuit, losses and efficiency, voltage regulation. Auto-transformer. Three phase transformer connections.

Induction motors: **W**orking principle and operation of three phase induction motor, Losses and efficiency-Brake test. Single-phase induction motor-working principle, operation and applications.

UNIT-IV: DC MACHINES AND SYNCHRONOUS MACHINES

DC machines: Constructional details and working of DC Generator, Methods of excitation, Applications of DC generators. DC Motor - principle of operation, speed control of separately excited DC motor. Applications of DC motors.

Synchronous machines**:** Construction and working of synchronous generator and its applications.

UNIT-V: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

Text Books:

1. "Basic Electrical Engineering", D.C. Kulshreshtha, McGraw Hill, 2019.
2. "Basic Electrical Engineering", A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
3. "Basic Electrical Engineering" - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
4. "Principle of Electrical Engineering", V.K Mehta, R. Mehta, S. Chand Limited, 2011.
5. **"**Basic Electrical Engineering", V. Mittle & Arvind Mittal, TMH, Second Edition.

References Books:

1. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3**.** Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. NPTEL Videos on Course "*Basic Electrical* Technology" Co-ordinated by IISc Bangalore
Link: https://nptel.ac.in/courses/108/108/108108076/
2. NPTEL Videos on Course "*Basic Electrical* Technology" Co-ordinated by IIT Kharagpur
Link: https://nptel.ac.in/courses/108/105/108105053/

Web Reference/E-Books:

1) Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009
   Link: https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
2) Basic Electrical Engineering By Chakrabarti · 2009
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
3)Basic Electrical Engineering By R. K. Rajput · 2009
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
4) Basic Electrical Engineering By SK Sahdev · 2015
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover

ENGLISH
I B.Tech., I SEM

Course Title: English	Course Code: AS20-00HS01
Teaching Scheme (L:T:P): 2:0:0	Credits:2
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks

Prerequisites:
1.   Basic knowledge of English language
2.   Must obtain Grammar, and basic reading skills
3.   Able to communicate in English language with basic writing skills
4.   Able to use different types of vocabulary in different types of situations

Course Overview:
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 and different passages may be given for practice in the class. The time should be utilized for working out 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.

Course Objective: The course will help to
- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Train the students to use language appropriately for Interviews, Group discussions and Public speaking
- Enhance and empower the students in communication skills by concentrating on LSRW skills.

Course Outcomes(s)

CO#	Course Outcomes
C114.1	Apply English language effectively in spoken and written forms
C114.2	Analyze the given texts and respond appropriately
C114.3	Apply various grammatical structures in personal and academic fronts.
C114.4	Develop appropriate vocabulary for professional communication
C114.5	Improve competency in various forms of academic and professional writing.
C114.6	Perceive the importance of language skill for the enhancement of employability opportunities.

COURSE CONTENT (SYLLABUS)

UNIT I:
'Of Parents and Children' from the Essays of Francis Bacon

Vocabulary: The Concept of Word Formation –The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
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:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: Homonyms, Homophones and Homographs
Grammar:Misplaced Modifiers
Reading:Sub-skills of Reading- Skimming and Scanning
Writing:Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT III:
'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: Comprehension- Intensive Reading and Extensive Reading
Writing**:** Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – 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: Standard Abbreviations and Acronyms in English
Grammar: Sequence of Tenses
Reading**:** Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Information Transfer- Flow Chart- Pie Chart– Essay Writing-Précis Writing.

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:Collocations, Commonly Confused Words-Common Errors in English
Reading: Reading Comprehension-Exercises for Practice
Writing**:** Technical Reports- Introduction - Structure of Reports- Types of Reports - Manuscript Format.

Text Books:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

2.The Essays of Frances Bacon,Edited,with introduction and notes by Mary Augusta Scott.Charales Scribner's Sons,New york,1908**,**

References Books:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.

2.Kumar, S and Lata, 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. Oxford University Press.

7. English Grammar Usage for Technical Students. DPS Publications, G Victor Emmanuel Raju, G Shailaja Reddy and M Sanjay Saahul.

1. Practice English Your Own-

https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

2. Longman English Grammar Practice-
file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Edition%20(learnenglishteam.com).pdf

3. English Grammar through stories by Alan Townend-
file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

ELECTRONIC DEVICES AND CIRCUITS
I B.Tech.,   -I SEM

Course Title: ELECTRONIC DEVICES AND CIRCUITS	Course Code: AS20-04ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 Hrs+ 16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams: 70 Marks
Prerequisites: Physics	

Course Overview:

The creation of electronic circuits requires knowledge of the physics and device technology for the emission and flow control of electrons in vacuum and matter. It uses active devices to control electron flow by amplification and rectification. Electronics has had a major effect on the development of modern society.

Course Objective
- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To know the switching characteristics of components
- To know the need of biasing in Transistors
- To understand of various types of transistor's with its principle of operation

Course Outcomes(s)

CO#	Course Outcomes
C115.1	Understand and analyse the characteristics of various components of semiconductor devices and its applications
C115.2	Understand and remember the applications of semiconductor diodes with examples.
C115.3	Analyze different types of transistor configurations with its parameters
C115.4	Understand and Analyze the relation between current amplification factors of the three configurations
C115.5	Analyze different biasing techniques of three terminal semiconductor Bipolar Semiconductor device.
C115.6	Understand and remember the operation of different types of FET's with its characteristics.

COURSE CONTENT (SYLLABUS)

UNIT I:
JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES:
Diode and its characteristics, Static and Dynamic resistances, Diode current equation,Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Zener diode and its characteristics ,Breakdown Mechanisms in Semi-Conductor (Avalanche and Zener breakdown) Diodes, Varactor Diode, LED, LCD and photo diodecharacteristics.

UNIT II:
DIODE APPLICATIONS:
Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor filter, L- section filter,

Pi- section filter and comparison of various filter circuits, Clipping Circuits, Clamper circuits, Application of a zener diode as a voltage regulator. Applications of LED and LCD's. Hall Effect and its applications.

UNIT III:
BIPOLAR JUNCTION TRANSISTOR:

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Volt-ampere characteristics of CB,CE and CC. Transistor current components, Transistor as a switch, switching times. BJT acts

as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha , Beta and Gamma, Comparison of CE,CB,CC configurations.

UNIT IV:
BIASING AND STABILISATION: Transistor Biasing and Stabilization - criteria for fixing operating point, DC & AC load lines, Need for Biasing –Types of biasing's-Fixed Bias, collector to base bias, Self-Bias and voltage divider bias techniques for stabilization, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co}, β) Thermal run away, Thermal stability, Bias Stability, Bias Compensation using Diodes and thermistors.

UNIT V:
FIELD EFFECT TRANSISTORS:

Types-The Junction Field Effect Transistor (construction, principle of operation, symbol)- pinch -off Voltage -Volt -Ampere characteristics, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion modes.

Text Books:
1.Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2.Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.
References Books:
1.The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2.Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3.Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, McGraw Hill.
Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1.https://nptel.ac.in/courses/115/102/115102014/
2.https://nptel.ac.in/courses/117/101/117101106/
3.https://www.coursera.org/learn/electronics
4. https://onlinecourses.nptel.ac.in/noc20_ee77/preview
5. https://www.classcentral.com/course/swayam-semiconductor-devices-and-circuits-19997
6. https://sggs.ac.in/wp-content/uploads/2020/08/SWAYAM-NPTEL-Equivalence-Courses-w.e.f.2020-21-Electronics.pdf
Web Reference/E-Books:
  1. https://www.springer.com/gp/book/9789811502668
  2. https://www.pdfdrive.com/basic-electronics-for-scientists-and-engineers-e28939124.html
  3. https://www.smartzworld.com/downloads/download/edc-unit-1-pdf-notes/
  4. https://www.smartzworld.com/downloads/download/edc-unit-2-pdf-notes/
  5. https://www.smartzworld.com/downloads/download/edc-unit-3-pdf-notes/
  6. https://www.smartzworld.com/downloads/download/edc-unit-4-pdf-notes/

ELECTRONIC DEVICES & CIRCUITS LAB
I B.Tech., I SEM

Course Title:ELECTRONIC DEVICES & CIRCUITS LAB	Course Code: AS20-04ES05
Teaching Scheme (L:T:P):0:0:2	Credits:1
Type of Course: PRACTICALS	Total Contact Periods:48 hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Physics	

Course Overview: In This Practical Sessions Students can able to know, how to conduct Experiments by using breadboards and connections on it with different components, and make use of input and output peripherals, and measuring parameters on that equipment. Different semiconductor devices and its characteristics they should understand and analyze through that they can identify the applications of those devices, which may help them to develop prototype model of mini and major projects.

Course Objective:
- To know the applications of Semiconductor devices through their characteristics
- To determine characteristics of JFET.
- To understand the amplifying action of a transistor.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Course Outcomes(s)

CO NO:	Student will be able to	POS	PIS	PSOS
C117.1	Understand the modifications in its characteristics of two terminal semiconductor devices	1,2,4,12	1.1.1	2
C117.2	Understand the analyze specific application of Zener diode through its characteristics.	1,2,4,12	1.3.1	2
C117.3	Understand the application of diode as a rectifier	1,2,3,4,6,12	1.1.1	1,2
C117.4	Understand and apply different configurations of transistors (BJT, FETs) pertaining to its nature of characteristics.	1,2,3	1.3.1	2
C117.5	Analyze and evaluate h-parameters of Bipolar Junction Transistor and its importance.	1,2,4,12	2.1.2	2
C117.6	Understand and Evaluate the amplifying action of a transistor	1,3	1.1.1	2

LIST OF EXPERIMENTS

(TWELVE EXPERIMENTS TO BE DONE):

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. V-I Characteristics of LED
3. Photo Diode characteristics
4. Zener diode characteristics
5. ZenerDiode acts as a voltage Regulator
6. Full Wave Rectifier with & without filters
7. Input and output characteristics of BJT in CE Configuration
8. Drain and Transfer characteristics of JFET in CS Configuration
9. Drain and Transfer characteristics of MOSFET in CS Configuration
10. Measurement of h-parameters from its CE and CB configurations
11. Verification of Amplifier action of a Transistor
12. Switching characteristics of a transistor

EXTRA EXPERIMENTS:

1. Half wave rectifier with and without filter

2. Input and output characteristics of BJT in CB Configuration

3. Input and output characteristics of BJT in CC Configuration

TEXT BOOKS:

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

REFERENCE BOOKS:

1. The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, Mc Graw Hill.
4. Electronic Devices and Circuits-by J.B.Guptha.

Web Reference/E-Books:

W1	**https://www.electronics-tutorials.ws/amplifier/amplifier-classes.html**
W2	https://www.seas.upenn.edu/~ese319/Lecture_Notes/Lec_10_HF_Model_10.pdf
W3	https://whatis.techtarget.com/definition/MOSFET-metal-oxide-semiconductor-field-effect-transistor
W4	https://www.daenotes.com/electronics/digital-electronics/oscillators
W5	https://www.tutorialspoint.com/amplifiers/classification_of_power_amplifiers.htm

VIDEO REFERNCES

V1	**https://www.youtube.com/watch?v=NESchIntkR8**
V2	https://www.youtube.com/watch?v=yUEss0Dl6ww&t=580s
V3	https://www.youtube.com/watch?v=4_nGFY7zgDM
V4	https://www.youtube.com/watch?v=NMZUevvwMlw
V5	https://www.youtube.com/watch?v=gRcE2t_28co

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
I B.Tech., ECE -I SEM

Course Title: English Language Communication Skills Lab	Course Code: AS20-00HS02
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course : Practical	Total Contact Periods: 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: 1. The students should have a basic knowledge of English language 2. Must obtain Grammar, and basic Speaking skills 3. Should able to communicate in English language 4. Able to use different types of vocabulary in different of situations	

Course Overview:

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 Language Communication Skills Lab has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In ELCS Lab the focus should be on the skills development in the areas of vocabulary, grammar, reading and speaking. For this, the teachers should use the prescribed Lab manual for detailed study. The students should be encouraged in improving communication skills in the lab. The time should be utilized for activity based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objective: The course will help to

To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning

To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm

To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking

To train students to use language appropriately for public speaking and interviews

To improve the fluency of students in spoken English and neutralize their mother tongue influence

CO#	Course Outcomes
C117.1	Learn how to pronounce words using phonetic transcription
C117.2	Improves collaborative skills and maximizes speaking skills
C117.3	Develops Neutralization of accent for intelligibility
C117.4	Develops better understanding of nuances of English language through audio-visual experience
C117.5	Improves language skills according in the different situations, discussions and interviews
C117.6	Develops linguistic, communicative and critical thinking

COURSE CONTENT (SYLLABUS)

Listening Skills Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:
- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

Exercise – I : CALL Lab: Introduction to Pronunciation – Speech Sounds – Vowels and Consonants.
- ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language
- Practice: Greetings – Introducing Oneself and Others -Taking Leave – JAM Session- Situational Dialogues.

Exercise – II : CALL Lab: Understand: Structure of Syllables – Word Stress .
- Practice: Basic Rules of Word Accent.
- **ICS Lab:** Understand: Features of Good Conversation – Non- verbal Communication.
- Practice: Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions – Telephone Etiquette.

Exercise – III CALL Lab: Understand: Intonation- Rhythm-The Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
- **ICS Lab:** Oral Presentations- Introduction to Formal Presentations
- Practice: Formal Presentations- Poster Presentations and PPT's.

Exercise – IV

CALL Lab: Understand: Listening for General Details.

Practice: Listening Comprehension Tests.
- **ICS Lab:** Public Speaking – Exposure to Structured Talks- Group Discussion
- Practice: Group Discussion.

Exercise – V

CALL Lab: Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.
- ICS Lab: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews.

Practice: Mock Interviews
References
1. ELCS LAB MANUAL
2. Practice English Your Own-
https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf
3. Longman English Grammar Practice-
file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Edition%20(learnenglishteam.com).pdf
4. English Grammar through stories by Alan Townend-
file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

ENGINEERING CHEMISTRY LAB
I B.Tech.,   I SEM

Course Title: Engineering Chemistry Lab	Course Code: AS20-00BS03
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of chemistry	

Course Overview:

The course emphasizes active resolution of experimental problems involving volumetric, analytical and instrumental usage; their design and optimization. Analytical, oral presentation, written report, and cooperative problem-solving skills are stressed in the context of chemical sciences practices. Safety awareness is integrated throughout the course.

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 to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin

layer chromatographic (TLC) technique.

Course Outcomes (s)

CO#	Course Outcomes
C118.1	Analyze the need, design and perform a set of experiments.
C118.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C118.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C118.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conductometric Measurements, Ostwlad's viscometer and stalagmometer.
C118.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C118.6	Learn safety rules in the practice of laboratory investigations.

COURSE CONTENT (syllabus)

1. Determination of total hardness of water by Complexometric method using EDTA
2. Estimation of Iron using Standard $KMnO_4$.
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Dichrometry
7. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate
8. Determination of acid value of coconut oil
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid using Stalagmometer
11. Synthesis of Aspirin and Paracetamol
12. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols

Reference Books:

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 (Vikas publishing, 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.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1..http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html
   2.http://vlabs.iitb.ac.in/vlab/labscs.html
3.https://www.vlab.co.in/broad-area-chemical-engineering

SOFT SKILLS 1
I B.Tech., ECE-I SEM

Course Title: Soft Skills 1	Course Code: AS20-00HS03
Teaching Scheme (L:T:P): 2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods:32 Hrs
Continuous Internal Evaluation: No	Semester End Exams : 100 Marks

Course Overview:

The students will enhance their communication skills. The course will enable them to become responsible towards their lives and will be able to faces challenges , the course will also enable to develop work culture, orientation and will enable them with problem solving abilities.

Course Objective:-
1. To develop Communicative Methodology.
2. To lead the life with utmost responsibility.
3. To accept challenges.
4. To develop work orientation in the mindset of the students.
5. To have problem solving ability.

Course Outcomes(s)

CO#	Course Outcomes
C119.1	Facilitates better interaction among students.
C119.2	Enhance and improve documentation.
C119.3	Demonstrate leadership qualities.
C119.4	Demonstrate effective presentation skills.
C119.5	Express benevolence.
C119.6	Enhance their communication skills

COURSE CONTENT (SYLLABUS)

UNIT I: Importance of Soft Skills

Successful Career - Communication - Body Language - Written Communication - Presentation
Team Work - Professionalism - Interpersonal Skills - Time and Stress Management - Leadership Qualities

UNIT II: Self Introduction

Introductory Speech - General Speech - Academic Speech - Evaluation of Speech - Steps of Self Introduction - Basic Questions and Answers -Deliver Self Introduction - Tips of Self Introduction - Body Gestures- Good Eye Contact - Never be Nervous - Do's and Don'ts' of Self Introduction- Examples on Self Introduction

UNIT III: Body Language

Introduction – Communicating Body – Studying of body language – 17 concepts of learning body language.

UNIT IV: Communication Skills

Sounds of English – English as a World Language – Speech formation – Pronunciation – Oral Communication – Written Communication – Face to Face Communication Effective Communication – Presentation – Information Transfer.

UNIT V: Positive Attitude and Positive Thinking

Introduction – Possible Reactions – Dual Attitude – Indifference Attitude – Negative Attitude – Think Positively – Depend on Positive Thinking – Know – What we are – Benefits of Behaviour – Myths of negative thinking – Tips to become a positive thinker – Moving towards success

Text Books:
1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:
1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips https://www.youtube.com/watch?v=VczVqHJW0gg
2. Effective Communication Skills Training Video in Hindi https://www.youtube.com/watch?v=kxAXOh5RmwU
3. A guide to effective communication https://www.youtube.com/watch?v=JwjAAgGi-90
4. A Failure to Communicate https://www.youtube.com/watch?v=8Ox5LhIJSBE
5. Non Verbal Communication https://www.youtube.com/watch?v=SKhsavlvuao

B.TECH
FIRST YEAR
SECOND SEMESTER
SYLLABUS

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
I B.Tech., - II SEM

Course Title: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	Course Code: AS20-00BS01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. knowledge on Derivatives 2. knowledge on Integrations 3. knowledge on Functions	

Course Overview:
- Students will able to identify Exact and Non-Exact D.E. and find the solutions by using different methods.
- Students will able to identify Homogeneous and Non-Homogeneous D.E. and find the solutions by using different methods.
- Students will learn and evaluate Double and Triple Integrals.
- Students will learn Gradient, Divergent, Curl and Vector Identities.
- Students will learn and evaluate Line, Surface and Volume Integrals and Vector Integral Theorems.

Course Objective:
- Methods of solving the differential equations of first order.
- Methods of solving the differential equations of higher order.
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes(s)

CO#	Course Outcomes
C121.1	Acquires various skills pertaining to differential and vector calculus and apply them in different fields of Engineering
C121.2	Determine whether the given differential equation of first order is exact or not.
C121.3	Apply the concept of higher order ODE to real world problems.
C121.4	Analyze and apply the concept of multiple integrals to find areas, volumes.
C121.5	Define Directional Derivative and Scalar Potential Function
C121.6	Evaluate the line, surface and volume integrals and convert them from one to another.

COURSE CONTENT (SYLLABUS)

UNIT I: FIRST ORDER ODE
Exact equations; Non-Exact equations; Linear equations; Bernoulli's equations; Newton's Law of Cooling; Law of Natural Growth and Decay; Orthogonal Trajectories.

UNIT II: HIGHER ORDER LDE

Higher Order Linear Differential Equations with Constant Coefficients; Non-Homogeneous Differential Equations with RHS of the type: e^{ax}, sinax, cosax, x^k, $e^{ax}v$, xv, Method of Variation of Parameters.

UNIT III: MULTIPLE INTEGRALS

Evaluation of Double Integrals (Cartesian and Polar);Change of Variables(Cartesian to Polar);Change of Order of Integration(Cartesian form);Areas and Volumes by Double Integrals. Triple Integrals(Cartesian form).

UNIT IV: VECTOR DIFFERENTIATION

VectorPointFunction;ScalarPointfunction;Gradient;Divergent;Solenoidal;Curl;Irrotational;Directional Derivative; Scalar Potential Function; Vector Identities.

UNIT V: VECTOR INTEGRATION

Line Integral; Surface Integral; Volume Integral; Green's Theorem in a plane; Gauss's Divergence Theorem;Stoke's Theorem (without proofs) and Applications.

Text Books:
1.   B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2010.
2.   S.R.K. Iyengarand R.K.Jain,Advanced Engineering Mathematics, Narosa Publishing House,5th Edition, 2016.
3.

References Books:
1.   Dr. M.D. Rai Singhania ,Ordinary and Partial Differential Equations, S.Chand and Company Ltd.,18 th Edition,2008.
2.   Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3.   Murray R.Spiegel, Seymour Lipschutz, Dennis Spellman,Vector Analysis:Schaum's Outlines Series,Tata McGrawHill,2 nd Edition,2009.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
   https://www.coursera.org/learn/ordinary-differential-equations
    2. https://onlinecourses.nptel.ac.in/noc20_ma15/preview

Web Reference/E-Books:
1. ENGINEERIMG MATHEMATICS-II BY Dr.M.SURYANARAYANA REDDY
2. MATHEMATICS-I BY P. SHIVARAMAKRISHNA DAS, C. VIJAYA KUMARI
3. ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS BY Dr.M.D.RAISINGHANIA

APPLIED PHYSICS
I B.Tech., -II SEM

Course Title: ENGINEERING PHYSICS	Course Code: AS20-00BS08
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs +16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Prerequisites:
1. The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics.
2. The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory.
3. The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.

Course Overview:
This course deals with quantum principles and explores their applications in studying the behavior of fundamental entities of atom. It deals with semiconductor devices which are employed in designing electronic systems and in communication field. It deals with the fundamental properties of dielectric and magnetic materials and explore their application in all engineering streams.

Course Objective
1. Student explores the dual nature of the particle and applications of Schrodinger Equation.
2. Student identifies the Concept of Energy band formation and analyzes classification of solids.
3. Student distinguishes the differences between Intrinsic and Extrinsic Semiconductors
4. Student explores the different applications of semiconductor devices.
5. Student identifies the behaviour of solids under electric and magnetic field and Understand the concept of superconductivity
6. Student interprets the characteristics of Lasers, types of Lasers, Optical fiber principle and their applications.

Course Outcomes(s)

CO#	Course Outcomes
C122.1	Interprets the dual nature of matter waves using quantum principles.
C122.2	Differentiates the physical properties of conductors, insulators and semiconductors using energy band.
C122.3	Identifies the different types of semiconductors using Hall Effect
C122.4	Analyzes the different properties of semiconductor devices and their applications.
C122.5	Explores the different types of Dielectric and Magnetic materials and their applications in different fields.
C122.6	Identifies the different characteristics and applications of lasers and fiber optics

COURSE CONTENT (SYLLABUS)

UNIT I: QUNATUM MECHANICS
Introduction to Quantum Mechanics (Origin of QM), Dual nature of particles, De Broglie's hypothesis, Matter waves, Heisenberg's uncertainty principle, Photo-electric effect(qualitative), Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT II: INTRODUCTION TO SOLIDS

Classical Statistics – Maxwell-Boltzmann Distribution(qualitative) Quantum Statistics – Bose-Einstein statistics(qualitative), Fermi – Dirac statistics(qualitative), Density of Energy states, Electrons in a periodic potential – Bloch theorem, Kronig – Penny Model(qualitative), Brillouin Zones (E-K curve), Concept of effective mass of electron, Energy band formation in solids, Classification of solids into Metals, Semiconductors and insulators.

UNIT III: SEMICONDUCTOR PHYSICS AND DEVICES

Semiconductor Physics: Intrinsic and Extrinsic semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Hall Effect.
Semiconductor Devices: PN Junction Diode – Junction Formation, Energy Band Diagram, V-I characteristics of PN junction diode, Direct and Indirect band gap semiconductors, LED & Solar cell.

UNIT IV: DIELCTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectric properties: Introduction, Types of Polarizations (Electronic and Ionic) and Calculation of their polarizabilities, Internal fields in solids: (Lorentz Method), Clausius-Mossotti relation, Piezo-electricity, Ferroelectricity, Pyro-electricity and their applications.
Magnetic Properties: Introduction, Bohr magneton, classification of magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Applications.
Superconductors: Introduction, type – I and type – II Superconductors, Applications of Superconductors

UNIT V: LASERS AND FIBER OPTICS

Lasers: Introduction, Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Relation between Einstein's Coefficients, Population inversion, Metastable state, Pumping, Block Diagram of laser, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers in Defense, Medical field.
Fiber Optics: Introduction to optical fiber, Construction and working of an Optical Fiber, Acceptance angle, Numerical aperture, Types of Optical fibers –Mode & Propagation through Step and Graded index fibers, Attenuation, Applications of optical fibers in Communication System and Sensors**.**

Text Books:
1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Halliday and Resnick, Physics - Wiley
References Books:
1. Engineering physics 2nd edition –H.K.Malik and A.K. Singh Richard.
2. Introduction to Solid State Physics - Charles Kittel
Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://onlinecourses.nptel.ac.in/noc20_ph24/preview
2. https://onlinecourses.nptel.ac.in/noc20_ph16/preview
3. https://www.coursera.org/learn/semiconductor-physics
4. https://www.coursera.org/lecture/leds-semiconductor-lasers/active-optical-devices-specialization-introduction-0jner
Web Reference/E-Books:
1. Physics for Engineers by N. K. Verma
2. Essentials of Applied Physics by Royal M. Frye

PROGRAMMING FOR PROBLEM SOLVING
I B.Tech., - II SEM

Course Title: PROGRAMMING FOR PROBLEM SOLVING	Course Code: AS20-05ES01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Mathematics knowledge, Analytical and Logical skills	

Course Overview:
It introduces students to the field of computer science as a discipline for solving problems through computation and provides the foundation for more advanced courses on programming and software development.

Course Objective

- To learn the fundamentals of computers.

- To understand the various steps in program development.

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

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

Course Outcomes(s)

CO#	Course Outcomes
C123.1	Designs algorithms and draws flowcharts for solving problems.
C123.2	Converts the algorithms/flowcharts to C programs.
C123.3	Develops the code and tests a given logic in C programming language.
C123.4	Dissects a problem into functions and develops modular reusable code.
C123.5	Demonstrates arrays, pointers, strings and structures in C.
C123.6	Explains Searching and sorting problems.

COURSE CONTENT (SYLLABUS)

UNIT - I
Problem Solving Using Computers: Computer Overview, Introduction to components of a computer system, Algorithms, Flowchart, Pseudo code with examples, Number systems (Decimal & Binary Conversion).
Overview of C **:** History of C, Basic structure of C- program, Creating and Running C-Program, Input and output statements.

UNIT - II
Fundamentals of C: C-Tokens, Data types, Operators, Expressions, Type conversions, Types of Errors, Input and output statements. Control Statements in C, Decision making and branching, Decision making and Looping statements.

UNIT – III

Structured Programming :Functions: Syntax, Steps ,Types and Category of Functions, parameter passing mechanism. Recursion and Storage Classes

Dynamic memory allocation**:** malloc(), calloc(), realloc(), free() with example

UNIT - IV

Arrays & Strings: Declaration , Initialization and Accessing Elements, String handling functions, Array of Strings.

Structures and Unions: Defining structures, initializing structures, unions, Array of structures, self referential structures.

Pointers: Types of Pointers Use of Pointers, Dereferencing operations, Examples

UNIT - V

Numerical methods: Roots, Integration and Differentiation Methods, Examples

Linked List: Definition, Types, Implementation Using Self referential Structures:

Files: (only if time is available, otherwise should be done as part of the lab)

Text Books:

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. Ashok N. Kamthane, Programming in C, 2/e, Pearson Education.
4. Programming with C, by K.R. Venugopal, Tata Mcgraw Hill Publishing Co Ltd

References Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4.Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/learn/computational-thinking-problem-solving

2. nptel.ac.in/courses/106105085/4

3. nptel.ac.in/courses/106105085/2

Web Reference/E-Books:

1. https://onlinecourses.nptel.ac.in/noc18_cs33/preview

2. http://www.thenewboston.com/

3. https://www.codesdope.com/

ENGINEERING GRAPHICS AND DESIGN
I B.Tech., II SEM

Course Title: ENGINEERING GRAPHICS AND DESIGN	Course Code: AS20-03ES02
Teaching Scheme (L:T:P): 2:0:3	Credits: 3.5
Type of Course: Lecture + Practical	Total Contact Periods: 32Hrs+ 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
Engineering graphics & Design has a well-defined set of standards by which technical drawings are produced. This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

Course Objective
The objectives of this course are to
- To know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
- To understand the importance of engineering curves.
- To learn to use the orthographic projections for points, lines, planes and solids in different positions.
- To make the students draw the projections of the planes.
- To understand the isometric projections.
- To create simple solid models of various domain applications.

Course Outcomes(s)
At the end of the course, students will be able to

CO#	Course Outcomes
C124.1	Apply the concepts of engineering curves in construction using AutoCAD.
C124.2	Solve the problem of projections of points and lines, in different positions using AutoCAD.
C124.3	Solve the problem of projections of planes and solids in different positions using AutoCAD.
C124.4	Solve the problems of Projections of solids and its positions using AutoCAD.
C124.5	Solve the problems on Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions using AutoCAD.
C124.6	Solve the problems on Orthographic Projections and its conversions using AutoCAD.

COURSE CONTENT (SYLLABUS)

Introduction to AutoCAD Software**:** The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

UNIT I:
Introduction to Engineering Drawing**:** Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.

Engineering Curves**:** Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

UNIT II:
Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes.
Projections of Planes**:** Projections of Planes- Surface Inclined to both the Planes.

UNIT III:
Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone.
Sections and Sectional Views**:** Right regular solids - prism, cylinder, pyramid, cone – use of Auxiliary views.

UNIT IV:
Isometric Projections**:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids.

UNIT V:
Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.
 Introduction to Solid Modelling**:** Creation of simple solid models relevant to the domain.

Text Books:
1. Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016.
2. Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, SciTech Publishers, 2010.
3. Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.
5. Engineering graphics and design, Pradeep Jain, A.P Gautam and Ankitha Maheshwari.

References Books:
1. Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton (Auto CAD 2019), 1st Edition, John Wiley & Sons, Indianapolis, Indiana.
2. AutoCAD Software Theory and User Manuals.
3. Engineering Design, George E. Dieter, Linda C. Schmidt/third edition.
4. Engineering Drawing and design, Cencell Jonson,Jay D.Helsel,Dennis R.Short.
5. Engineering Drawing, Jolhe/fourth edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://nptel.ac.in/courses/112/103/112103019/
2. https://nptel.ac.in/courses/112/104/112104172/

Web Reference/E-Books:
1. http://nptel.ac.in/courses/112103019
2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_science_students/engineeringdrawing.pdf

Software Required: AutoCADD

UNIVERSAL HUMAN VALUES II
I B.TECH -II SEM

Course Title: UNIVERSAL HUMAN VALUES II	Course Code: AS20 – 00HS07
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Prerequisites:
1. The student must have basic knowledge of Need, Basic Guidelines, Content and Process for Value Education
2. Understanding Harmony in the Human Being - Harmony in Myself
3. The student must have fundamental knowledge Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
4. The student can able to Understanding Harmony in the Nature and Existence - Whole existence asCoexistence

Course Overview:

This course is designed for transferring the right understanding and definite human conduct in the students. The conduct of every human differs from human to human. Through this course an attempt is being made to introduce the definite human conduct in students. The conduct of a human being can be definite only if knowledge of right understanding and right human conduct is taught to them.

Course Objective

The objective of the course is four fold:

1.Development of a holistic perspective based on self-exploration aboutthemselves (human being), family, society and nature/existence.

2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence

3. Strengthening of self-reflection.

4. Development of commitment and courage to act.

Course Outcome(s)

CO#	Course Outcomes
C211.1	Basic guideline of human values universally.
C211.2	Understanding the harmony in the human being
C211.3	Learn the rights and responsibilities as an employee, team member and a global citizen
C211.4	To know about society – Harmony @ human relation
C211.5	The student can study the professional ethics and values.
C211.6	Understand the importance of Values and Ethics in their personal lives and Professional careers

COURSE CONTENT (SYLLABUS)

UNIT – I
Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
Purpose and motivation for the course, recapitulation from Universal Human Values-I-Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and ExperientialValidation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels. (Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking)

UNIT – II
Understanding Harmony in the Human Being - Harmony in Myself!
Understanding human being as a co-existence of the sentient 'I' and the material 'Body' . Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensureSanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT- III
Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

UNIT - IV
Understanding Harmony in the Nature and Existence - Whole existence as Coexistence
Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and selfregulation in nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT – V
Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly, and eco-friendly production systems, c. Ability to identify and develop appropriate, technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations, Sum up, Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books
1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books
1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

E-RESOURCES:
1. https://www.yourmorals.org/schwartz.2006.basic%20human%20values.pdf
2. https://web.archive.org/web/20080311200942/https://kroc.nd.edu/ocpapers/op_16_1.pdf
3. https://kroc.nd.edu/ocpapers/op_16_1.pdf
4. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&q
5. https://www.researchgate.net/publication/270388493_Variations_in_Value_Orientation

WEB REFERENCES:
1. https://furhhdl.org/our-programmes/education-and-ethics/universal-human-values-ethics/
2. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&qWEB RESOURSES
3. https://www.un.org/press/en/2003/sgsm9076.doc.htm
4. https://www.kobo.com/ebook/the-psychology-of-conservatism-routledge-revivals

APPLIED PHYSICS LAB
I B.Tech., II SEM

Course Title: APPLIED PHYSICS LAB	Course Code: AS20-00BS09
Teaching Scheme (L:T:P): (0:0:3)	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Prerequisites:
1.   The student must know the usage of basic tools for measurement of physical quantities.
2.   The students must have knowledge of error analyses, types of errors, principles of optics, mechanics, waves and Oscillations

Course Overview:
The course deals with experiments in various fields of physics such as Wave Optics, Wave mechanics, Electronics, Electricity and Magnetism.

Course Objective

1. To identify the active and passive elements and gain ability to build electronic circuits for solving complex engineering problems.
2. To classify the semiconductor materials into p-type or n-type semiconductor and estimate the energy gap of semiconductor diode
3. To explore the characteristics of optoelectronic devices
4. determines the work function of given material.
5. estimate magnetic field intensity and explores the generation of magnetic field.
6. To determines the properties of optical fibers using lasers

Course Outcomes(s)

CO#	Course Outcomes
C126.1	Compute time constant of RC circuit and resonant frequency of LCR circuit.
C126.2	Identify the type of semiconductor using Hall Effect and determine the Energy gap of a semiconductor diode.
C126.3	Analyze the V-I characteristics of Solar cell and LED.
C126.4	Evaluate work Function of a photo metal using photo electric effect.
C126.5	Summarize the variation of Magnetic Field along the current carrying coils.
C126.6	Estimate the light gathering ability and bending losses of Optical fibers.

COURSE CONTENT (SYLLABUS)

The Students has to perform any eight of the following experiments
1. LCR Circuit: To study the frequency response of LCR series and parallel resonance circuit.
2. R-C Circuit: To study the time response of RC circuit.
3. Hall Effect: To determine Hall voltage and Hall Coefficient of given semiconductor material.
4. Energy Gap: To determine the energy gap of a given Semiconductor.
5. Solar Cell: To study V-I Characteristics of Solar Cell.
6. LED: To study the V-I characteristics of LED.
7. Photoelectric effect: To determine the work function of given material.

8. Stewart- Gee apparatus – To study the variation of magnetic field along the axis of circular current carrying loop.

9. Optical fibre: To determine the Numerical aperture and Acceptance angle of a given fibre.

10.   Optical fibre: To study the bending losses in Optical fibres.

References Books:

1. Practical physics by Dr. Aparna, V.G.S.publications.

2. Physics practical lab manual –SPEC

Online Resources

1. https://www.futurelearn.com/courses/teaching-practical-science-physics

2. https://www.vlab.co.in/broad-area-physical-sciences

PROGRAMMING FOR PROBLEM SOLVING LAB
I B.Tech., II SEM

Course Title: PROGRAMMING FOR PROBLEM SOLVING LAB	Course Code: AS20-05ES02
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:- Mathematics knowledge, Analytical and Logical skills	

Course Overview:

This course provides the fundamental concepts of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

Course Objective

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes(s)

CO#	Course Outcomes
C127.1	Develops algorithms for simple problems.
C127.2	Translate given algorithms to a working and correct program.
C127.3	Identifies and correct syntax errors as reported by the compilers.
C127.4	Identifies and correct logical errors encountered during execution.
C127.5	Demonstrates data operations using arrays, strings, structures and pointers of different types.
C127.6	Creates, reads and writes to and from simple text and binary files.

COURSE CONTENT (SYLLABUS)

Practice Sessions:

Week1:

Tutorial 1: Problem solving using computers(Creating, Compiling & Running Steps , Basic Structure of C Program)-:

Lab1: Familiarization with programming environment

Week2:

Tutorial 2: Variable types and Rules, Formatted I/O statements

Lab 2: Reading and Displaying Different Values Using scanf() & Printf()

Week3:

Tutorial 3: Types of Operators

Lab 3: Simple Computational problems using operators

Week4:

Tutorial 4: Branching and logical expressions:

Lab 4: Problems involving if-then-else structures

Week5:

Tutorial 5: Loops, while, do-while and for loops:

Lab 5: Iterative problems e.g., sum of series, sum of n- natural numbers

Week6:

Tutorial 6: 1D Arrays: searching, sorting:

Lab 6: 1D Array manipulation : insertion, selection and bubble sort

Week7:

Tutorial 7: 2D arrays and Strings

Lab 7: Matrix problems, String operations, string sorting , palindrome string

Week8:

Tutorial 8: Functions, call by value:

Lab 8: Simple functions: factorial ,sum of individual digits, Fibonacci series etc.,

Week9:

Tutorial 9: Recursion, structure of recursive calls

Lab 9: Recursive functions: factorial, Fibonacci, GCD and towers of Hanoi

Week10:

Tutorial 10: Pointers, structures and dynamic memory allocation

Lab 10: Problem solving using Pointers and structures

Week11:

Tutorial 11: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 11: Programming for solving Numerical methods problems

Week12

Tutorial 12: Single Linked List using self referential structures

Lab 12: Implementation of Single liked list using self referential structures

Week13:

Tutorial 13: File data type , File pointer, modes of operations, file handling functions

Lab 13: Programs using file handling functions: File copy, Merging of Files

Text Books:

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.

References Books:

1. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).

2. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.

3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. http://nptel.ac.in/courses/106105085/
2. http://nptel.ac.in/courses/106106127/

Web Reference/E-Books:
1. www.leetcode.com
2. www.thenewboston.com
3. www.codesdope.com

ENGINEERING PRACTICES
I B.Tech. II SEM

Course Title: ENGINEERING PRACTICES	Course Code: AS20-03ES02
Teaching Scheme (L:T:P): 0:0:4	Credits: 2
Type of Course: Practical	Total Contact Periods: 64 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:

Mechanical Engineering Practices is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment.

Course Objective
The objectives of this course are to
- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes(s)

CO#	Course Outcomes
C128.1	Apply the concepts of engineering workshop practice on machine tools and their operations.
C128.2	Expertise on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
C128.3	Recognize the tools and apply different trades of Engineering practices on drilling, material removing, measuring, chiseling etc.
C128.4	Apply basic knowledge on electrical engineering for house wiring practice.
C128.5	Manufacture the given material to desired product in a particular pattern by tin smithy.
C128.6	Mould the component of different size and shape by black smithy in on Furnace

COURSE CONTENT (SYLLABUS)

1. TRADES FOR EXERCISES:
At least two exercises from each trade:

I.	Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint).
II.	Fitting – (V-Fit, Dovetail Fit & Semi-circular fit).
III.	Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel).
IV.	Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern).
V.	Welding Practice – (Arc Welding & Gas Welding).
VI.	House-wiring – (Parallel & Series, Two-way Switch and Tube Light).
VII.	Black Smithy – (Round to Square, Fan Hook and S-Hook).

2. TRADES FOR DEMONSTRATION & EXPOSURE:
Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working.

Text Books:
1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

References Books:
1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://nptel.ac.in/courses/112/107/112107145/
2. https://nptel.ac.in/courses/112/107/112107144/

Web Reference/E-Books:
1. https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-_ye4C
2. https://www.youtube.com/watch?reload=9&v=4gpjof5ESKQ

SOFT SKILLS 2
I B.Tech., II SEM

Course Title: Soft Skills 2	Course Code: AS20-00HS04
Teaching Scheme (L:T:P):2:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation: Nil	Semester End Exams: 100 Marks

Course Objective:-
1. To develop Optimistic Nature.
2. To enhance the skills related to Group Discussion.
3. To make the students to have commitment.
4. To have dedication as well determination.
5. To develop confidence.

Course Outcomes:

CO#	Course Outcomes
C129.1	Analyze excellent behavioral attitude.
C129.2	Apply amicable solutions to problematic issues in life.
C129.3	Understand the importance of functional and practical work.
C129.4	Create goal oriented personality.
C129.5	Understand soft skills and life skills.
C129.6	Remember to be committed and determined.

COURSE CONTENT (SYLLABUS)

UNIT I: Linguistic Ability
Writing Skills - Reading Skills - Listening Skills - Speaking Skills - Just a Minute Program – JAM – Improving Vocabulary.

UNIT II: Effective Communication
Introduction – Communicative Methodology – Way to Communicate perfectly – Communicative series – Descriptive Communication – Process of Communication – Barriers of Communication – Essentials of Communication – Improving existing Communication – Strategies to improve Communication – Corporate Communication – Assess the Communication – How to be a successful Communicator.

UNIT III: Ethical Values
Meaning of Ethics- Importance of Education – Moral Values – Eradication of problems – Influence of the society – Developing self-motivational skills – Source of Ethics – Develop Ethics – Ethics related to Life.

UNIT IV: Confidence
Self Confidence – Self Esteem – Importance of Confidence – Right decision Making – Turn towards Productivity – Things can be had with Confidence – Self Identity – Building good career – Self Reliance – Quotes of Confidence.

UNIT V: Introduction – Initiation – Verbal Oriented – Purpose of Group Discussion –Importance of Group Discussion – Involvement in Group Discussion - Learning Attitude – Skill Development Platform – Primary Level Topics and Discussion – Able Participation – Practice Group Discussion.

Text Books:
1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:
1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips https://www.youtube.com/watch?v=VczVqHJW0gg
2. Effective Communication Skills Training Video in Hindi https://www.youtube.com/watch?v=kxAXOh5RmwU
3. A guide to effective communication https://www.youtube.com/watch?v=JwjAAgGi-90
4. A Failure to Communicate https://www.youtube.com/watch?v=8Ox5LhIJSBE
5. Non Verbal Communication https://www.youtube.com/watch?v=SKhsavlvuao