ACADEMIC REGULATIONS

COURSE STRUCTURE AND

DETAILED SYLLABUS

ELECTRONICS AND COMPUTER ENGINEERING

B.TECH 4 YEAR UG COURSE

(Applicable for the batches admitted from 2016-2017)

REGULATION: R16

(I, II, III & IV Year Syllabus)

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
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J.B. INSTITUTE OF ENGIEERING & TECHNOLOGY
UGC AUTONOMOUS

Institute Vision & Mission

Vision

To be a centre of excellence in engineering and management education, research and application of knowledge to benefit society with blend of ethical values and global perception.

Mission:

- To provide world class engineering education, encourage research and development.
- To evolve innovative applications of technology and develop entrepreneurship.
- To mould the students into socially responsible and capable leaders.

DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING

Department Vision and Mission

Vision

To nurture excellence in the field of engineering and technology by imparting core values to the learners with focus on social responsibilities to mold the department into a center of excellence through Research and development.

Mission

- To prepare Electronics and Computer Engineering graduates with competence in engineering with interdisciplinary subjects, so that they can excel in professional career, to pursue higher studies and/or research and development activities.
- To develop liaison with Academia - Industry for exposure to the practical aspects in engineering, entrepreneurial pursuit and to promote social responsibility in the graduates.
- To inculcate technical skills and life skills with core values in students to improve their employability.

J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (JBIET)
UGC AUTONOMOUS
Bhaskar Nagar, Moinabad, Hyderabad – 500075, Telangana, India

ACADEMIC REGULATIONS FOR B.TECH. REGULAR STUDENTS

WITH EFFECT FROM THE ACADEMIC YEAR 2016-17 (R-16)

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

1.1 JBIET offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2016-17 in the following branches of Engineering:

Sl. No.	Branch
1	Civil Engineering
2	Electrical and Electronics Engineering
3	Mechanical Engineering
4	Electronics and Communication Engineering
5	Computer Science and Engineering
6	Information Technology
7	Electronics and Computer Engineering
8	Mining Engineering

2.0 Eligibility for Admission

2.1 Admission to the under graduate programme shall be made either on the basis of the merit rank obtained by the qualified candidate in entrance test conducted by the Telangana State Government (EAMCET) or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time.

2.2 The medium of instructions for the entire under graduate programme in E&T will be **English** only.

3.0 B.Tech. Programme structure

3.1 A student after securing admission shall pursue the under graduate programme in B.Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B.Tech course.

Each semester is structured to provide 24 credits, totalling to 192 credits for the entire B.Tech. programme. Each student shall secure 192 credits (with CGPA ≥ 5) required for the completion of the under graduate programme and award of the B.Tech. degree.

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

3.2.1 Semester scheme

Each under graduate programme is of 4 academic years (8 semesters) with the academic year being divided into two semesters of 22 weeks (≥ 90 instructional days) each, 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 are followed.

3.2.2 Credit courses

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

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

Courses like Environmental Studies, Professional Ethics, Gender Sensitization lab are identified as **mandatory courses**. These courses **will not carry any credits**.

3.2.3 Subject Course Classification

All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows. JBIET has followed almost all the guidelines issued by AICTE/UGC.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental Engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5		Project Work	B.Tech. project or UG project or UG major project
6		Industrial training/ Mini- project	Industrial training/ Internship/ UG Mini-project/Mini-project

7		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
8	Elective Courses (EℓC)	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
9		OE – Open Electives	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
10	Mandatory Courses (MC)	-	Mandatory courses (non-credit)

4.0 Course registration

4.1 A 'faculty advisor or counsellor' shall be assigned to a group of 15 students, who will advise student about the under graduate programme, its course structure and curriculum, choice/option for subject s/ courses, based on their competence, progress, pre-requisites and interest.

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

4.3 A student can apply for **on-line** registration, **only after** obtaining the '**written approval**' from faculty advisor/counsellor, 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/ counsellor and the student.

4.4 A student may be permit ted to register for the subjects/ courses of **choice** with a total of 24 credits per semester (minimum of 20 credits and maximum of 28 credit s per semester and permitted deviation of ± 17%), based on **progress** and SGPA/ CGPA, and completion of the '**pre-requisites'** as indicated for various subjects/ courses, in the department course structure and syllabus contents. However, a **minimum** of 20 credits per semester must be registered to ensure the '**studentship**' in any semester.

4.5 Choice for 'additional subjects/ courses' to reach the maximum permissible limit of 28 credits (above the typical 24 credit norm) must be clearly indicated, which needs the specific approval and sig nature of the faculty advisor/ counsellor.

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

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

4.8 Dropping of subjects/courses may be permitted, only after obtaining prior approval from the faculty advisor/counsellor (subject to retaining a minimum of 20 credits), '**within a period of 15 days**' from the beginning of the current semester.

4.9 Open electives: The students have to choose one open elective (OE -I) in III year I semester, one (OE-II) in III year II semester, and one (OE-III) in IV year II semester, from the list of open electives given. However, the 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.

4.10 Professional electives: students have to choose professional elective – I (PE-I), professional elective – II (PE-II) in III year II semester, Professional electives – III (PE-III), Professional electives – IV(PE-IV) in IV year I semester, Professional electives – V (PE-V), Professional electives – VI (PE-VI) in IV year II semester, from the list of professional electives given. However, the students may opt for professional elective subjects offered in the related area.

5.0 Subjects/courses to be offered

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

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

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

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

6.0 Attendance requirements:

6.1 A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (excluding attendance in mandatory courses Environmental Science, Professional Ethics, Gender Sensitization Lab, NCC/ NSO and NSS) for that semester.

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

6.3 A stipulated fee shall be payable towards condoning of shortage of attendance.

6.4 Shortage of attendance below 65% in aggregate shall in **no** case be condoned.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester. They may seek re-registration for all those subjects registered in that semester in which 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.

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

7.0 Academic requirements

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 student secures not less than 35 % marks (26 out of 75 marks) in the semester end examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing **'C'** grade or above in that subject/ course.

7.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to UG mini-project and seminar, if student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student would be treated as failed, if student (i) does not submit a report on UG mini-project, or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) does not present the seminar as required in the IV year I Semester, or (iii) secures less than 40% marks in UG mini-project/ seminar evaluations.

Student may reappear once for each of the above evaluations, when they are scheduled again; if student fails in such 'one reappearance' evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	i. Regular course of study of first year second semester. ii. Must have secured at least 24 credits out of 48 credits i.e., 50% of 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 58 credits out of 96 credits i.e., 60% of 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 86 credits out of 144 credits i.e., 60% of 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.

7.4 A student shall register for all subjects covering 192 credits as specified and listed in the course structure, fulfils all the attendance and academic requirements for 192 credits, 'earn all 192 credits' by securing SGPA $\geq$ 5.0 (in each semester) and CGPA (at the end of each successive semester) $\geq$ 5.0 to successfully complete the under graduate programme.

7.5 After securing the necessary 192 credits as specified for the successful completion of the entire under graduate programme, the student can avail exemption of two subjects up to 6 credits, that is, one open elective and one professional elective subject or two professional elective subjects for optional drop out from these 192 credits earned;

resulting in 186 credits for under graduate programme performance evaluation, i.e., the performance of the student in these 186 credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of under graduate programme, which takes the SGPA of the IV year II semester into account)' , and shall be indicated in the grade card of IV year II semester. However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

7.6 If a student registers for some more '**extra subjects'** (in the parent department or other **departments**/branches of Engineering.) other than those listed subjects totaling to 192 credits as specified in the course structure of his department, the performances in those '**extra subjects**' (although evaluated and graded using the same procedure as that of the required 192 credits) will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects'** registered, % of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations 6 and 7.1 – 7.5 above.

7.7 A student eligible to appear in the end semester 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, 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.

7.8 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 fulfilment of academic requirement s**. The academic regulations under which 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.

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

8.0 Evaluation - Distribution and Weightage of marks

8.1 The performance of a student in every subject/course (including practical's and UG major project) will be evaluated for 100 marks each, with 25 marks allotted for CIE (Continuous Internal Evaluation) and 75 marks for SEE (Semester End-Examination).

8.2 For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of one objective paper, one descriptive paper and one assignment. The objective paper and the essay paper shall be for 10 m arks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The objective paper is set with 20 bits of multiple choice, fill-in the blanks and matching type of questions for a total of 10 marks. The essay paper shall contain 4 full

questions out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus. Five marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-examination, and the second assignment should be submitted before the conduct of the second mid-examination. The total m arks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each student in internals/sessionals. If any student is absent from any subject of a mid-term examination, an on-line test will be conducted for him by the university. The details of the question paper pattern are as follows,

- The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.
- Part-A is compulsory question which consists of ten sub-questions. The first five sub-questions are from each unit and carry 2 marks each. The next five sub-questions are one from each unit and carry 3 marks each.
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each.
- Each of these questions is from one unit and may contain sub-questions. For each question there will be an “either” “or” choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

8.3 For practical subjects there shall be a continuous internal evaluation during the semester for 25 sessional marks and 75 semester end examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The semester end examination shall be conducted with an external examiner and the laboratory teacher. The external examiner s hall be appointed from the clusters of colleges which are decided by the examination branch of the university

8.4 For the subject having design and/or drawing, (such as engineering graphics, engineering drawing, machine drawing) and estimation, the distribution shall be 25 marks for continuous internal evaluation (15 marks for day-to-day work and 10 m arks for internal tests) and 75 marks for semester end examination. There shall be two internal tests in a semester and the average of the two shall be considered for the award of marks for internal tests.

8.5 There shall be an UG mini-project, in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester examinations and pursue it during summer vacation. The UG mini -project shall be

submitted in a report form and presented before the committee in IV year I semester. It shall be evaluated for 100 marks. The committee consists of an external examiner, Head of the Department, supervisor of the UG mini-project and a senior faculty member of the department. There shall be no internal marks for UG mini-project

8.6 There shall be a seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report and submit it to the department. It's hall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 100 marks. There shall be no semester end examination for the seminar.

8.7 Out of a total of 100 m arks for the UG major project, 25 marks shall be allotted for internal evaluation and 75 marks for the end semester examination (viva voce). The end semester examination of the UG major project shall be conducted by the same committee as appointed for the UG mini-project. In addition, the UG major project supervisor shall also be included in the committee. The topics for UG mini project, seminar and UG major project shall be different from one another. The evaluation of U G major project shall be made at the end of IV year II semester. The internal evaluation shall be on the basis of two seminars given by each student on the topic of UG major project.

8.8 The laboratory records and internal test papers shall be preserved in the institution for two Semesters.

8.9 For mandatory courses viz. environmental studies, professional ethics and gender sensitization lab, a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course.

8.10 For mandatory courses NCC/ NSO and NSS, a '**satisfactory participation certificate'** shall be issued to the student from the authorities concerned, only after securing ≥ 65% attendance in such a course.

8.11 No marks or letter grade shall be allotted for all mandatory/non-credit courses.

9.0 Grading procedure

9.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory / practical's, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

9.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage of marks shall be followed:

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

9.3 A student obtaining '**F'** grade in any subject shall be deemed to have '**failed'** and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

9.4 A student who has not appeared for examination in any subject, '**Ab'** grade will be allocated in that subject, and student shall be considered '**failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

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

9.6 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (C P) = grade point (GP) x credits …. For a course

9.7 The student passes the subject/ course only when **GP $\geq$ 5 ('C' grade or above)**

9.8 The semester grade point average (SGPA) is calculated by dividing the sum of credit points ($\sum$CP) secured from all subjects/courses registered in a semester, by the total numbers 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 (takes into account all subjects in a semester), 'N' is the no. of subjects **'registered'** for the semester (as specifically required and listed under the course structure of the parent department). $\mathbf{G_i}$ is the no. of credits allotted to the i^{th} subject, and $\mathbf{G_i}$ represents the grade points (GP) corresponding to the letter grade awarded for that i^{th} subject.

9.9 The cumulative grade point average (CGPA) is a measure of the overall cumulative performance4 of a student in all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in all registered courses in all semesters, and the total number of credits registered in all the semesters. CGPA is rounded off to two decimal places. CGPA is thus computed from the I year II semester onwards at the end of each semester as per the formula

CGPA = $\{\sum_{j=1}^{M} C_j G_j\}$ **/** $\{\sum_{j=1}^{N} C_j\}$ **. . . . . For all S semester registered (i.e., up to and inclusive of S semester, S** $\geq$ **2),**

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

Illustration of calculation of SGPA

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

SGPA = 152/21 = 7.24

Illustration of calculation of SGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24
I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	16	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
Total Credits =	42		Total Credit Points=	327

CGPA = 327/42 = 7.79

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

9.11 For calculations listed in regulations 9.6 to 9.9, 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. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

10.0 Passing standards

10.1 A student shall be declared successful or 'passed' in a semester, if 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 s hall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

10.2 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, and grade earned etc.), credits earned, SGPA, and CGPA.

11.0 Declaration of results

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

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

% of Marks = (final CGPA – 0.5) x 10

12.0 Award of degree

12.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 192 credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified'** for the award of the B.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

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

12.3 Students with final CGP A (at the end of the under graduate programme) ≥ 8.00, and 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) from the date of commencement of first year first semester.

(ii) Should have secured a CGPA ≥ 8.00, at the end of each of the 8 sequential semesters, starting from first year first semester 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'**.

12.4 Students with final CGP A (at the end of the under graduate program me) ≥ 6.50 but < 8.00, shall be placed in '**first class'**.

12.5 Students with final CGP A (at the end of the under graduate program me) ≥ 5.50 but < 6.50, shall be placed in '**second class'**.

12.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate programme) ≥ 5.00 but < 5.50, shall be placed in '**pass class**'.

12.7 A student with final CGP A (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

12.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of '**First Rank**' and '**Gold Medal**'.

13.0 Withholding of results

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

14.0 Transitory regulations

14.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for re admission to the same subjects/courses (or equivalent subjects/ courses, as the case may be), and same professional electives/open electives (or from set/category of elective s or equivalents suggested, as the case m ay be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

15.0 Student transfers

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

15.2 There shall be no transfers from the college/stream to another college.

16.0 Scope

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

16.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.

16.3 The institution may change or amend the academic regulations, course structure or syllabi at any time if necessary, and the changes or amendments made shall be applicable to all students with effect from the date notified by the JBIET authorities.

J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (JBIET)
UGC AUTONOMOUS
Bhaskar Nagar, Moinabad, Hyderabad – 500075, Telangana, India

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the A Y 2017-18

1. **Eligibility for award of B. Tech. Degree (LES)**

   The LES students after securing admission shall pursue a course of study for not less than three academic year s and not more than six academic years.

2. The student shall register for 144 credits and secure 144 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree. **Out of the144 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 138 credits for B.Tech programme performance evaluation**.**
3. The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.
4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).
5. **Promotion Rule:**

S. No	Promotion	Conditions to 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 29 credits out of 48 credits i.e., 60% of 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 58 credits out of 96 credits i.e., 60% of 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.

6. **All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).**

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No.	**Nature of Malpractice/Improper conduct**	**Punishment**
	If the student:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which student is appearing but has not made use of (material shall include any marks on the body of the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in the subject only of all the students 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 student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The hall ticket of the student is to be cancelled and sent to the university.
3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and UG major project) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also debarred for two consecutive

		semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of sea. If the imposter is and 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 our 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 the subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the chief superintendent/assistant – superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizers a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or writer or by signs or by spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the college campus or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the student(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of seat.
9.	If student of the college, who is not a student for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of 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 performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project 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 performance in that subject and all other subjects the student has appeared including practical examinations and UG major project 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 university for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators will be further investigated through a committee and suitable punishment will be given to the students as mentioned by the University guidelines.

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC AUTONOMOUS

Bhaskar Nagar, Yenkapally, Moinabad(M), RR Dist., Telangana-500075

ELECTRONICS AND COMPUTER ENGINEERING

COURSE STRUCTURE – R16

I B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E110A	Mathematics – I	3	1-0-0	3
2	E110B	Engineering Chemistry	4	0-0-0	4
3	E110C	Engineering Physics-I	3	0-0-0	3
4	E110D	Professional Communication in English	3	0-0-0	3
5	E113A	Engineering Mechanics	3	1-0-0	3
6	E112A	Basic Electrical and Electronics Engineering	4	0-0-0	4
7	E1101	English Language Communication Skills Lab	0	0-3-0	2
8	E1102	Engineering Workshop	0	0-3-0	2
9	E110F	Professional Ethics	2	0-0-0	0
		Total	**22**	**2-6-0**	**24**

I B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E120A	Engineering Physics – II	3	0-0-0	3
2	E120B	Mathematics – II	3	1-0-0	4
3	E120C	Mathematics – III	3	1-0-0	4
4	E125A	Computer Programming in C	3	0-0-0	3
5	E123A	Engineering Drawing	2	0-4-3	4
6	E1201	Engineering Chemistry Lab	0	0-3-0	2
7	E1202	Engineering Physics Lab	0	0-3-0	2
8	E1203	Computer Programming in C Lab	0	0-3-0	2
9	E120E	Environmental Studies	2	0-0-0	0
		Total	**16**	**2-13-3**	**24**

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ELECTRONICS AND COMPUTER ENGINEERING

COURSE STRUCTURE – R16

II B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E210B	Complex Analysis and Transforms	3	1-0-0	4
2	E217A	Operating Systems	3	0-0-0	3
3	E214A	Analog Electronics	3	1-0-0	4
4	E214C	Switching Theory & Logic Design	3	0-0-0	3
5	E217B	Object Oriented Programming	4	0-0-0	4
6	E2123	Operating Systems Lab	0	0-3-0	2
7	E2124	Basic Electronics Lab	0	0-3-0	2
8	E2125	Java Programming Lab	0	0-3-0	2
9	E2126	Gender Sensitization lab	0	0-3-0	0
		Total	**16**	**2-12-0**	**24**

II B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E220A	Managerial Economics and Financial Analysis	3	0-0-0	3
2	E224B	Pulse & Digital Circuits	3	1-0-0	4
3	E227A	Computer Organization	3	1-0-0	4
4	E225A	Design & Analysis of Algorithms	3	0-0-0	3
5	E227B	Web Technologies	3	1-0-0	4
6	E2214	Analog Electronics lab	0	0-3-0	2
7	E2222	Pulse & Digital Circuits Lab	0	0-3-0	2
8	E2223	Web Technologies Lab	0	0-3-0	2
		Total	**15**	**3-9-0**	**24**

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ELECTRONICS AND COMPUTER ENGINEERING

COURSE STRUCTURE – R16

III B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E315F	Data Structures Through C	3	1-0-0	4
2	E314B	Linear Integrated Circuits and Applications	3	1-0-0	4
3	E314D	Microprocessors and Microcontrollers	4	0-0-0	4
4	E310B	Management Science	3	0-0-0	3
5		**Open Elective – I**	3	0-0-0	3
6	E3119	Data Structures Lab	0	0-3-0	2
7	E3120	Linear Integrated Circuits and Applications Lab	0	0-3-0	2
8	E3121	Microprocessors and Microcontrollers Lab	0	0-3-0	2
Total			16	2-9-0	24

III B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E327A	Database Management Systems	3	1-0-0	4
2	E3245	Analog Communications	4	0-0-0	4
3		**Open Elective – II**	4	0-0-0	3
4		**Professional Elective – I**	3	1-0-0	4
5		**Professional Elective – II**	3	1-0-0	4
6	E3219	Database Management Systems Lab	0	0-3-0	2
7	E3220	Analog Communications Lab	0	0-3-0	2
8	E3221	Employability Skills Lab	0	0-3-0	1
Total			17	3-9-0	24

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COURSE STRUCTURE – R16

IV B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E414B	VLSI Design	4	0-0-0	4
2	E417A	Linux Programming	3	1-0-0	4
3		**Professional Elective – III**	4	0-0-0	4
4		**Professional Elective – IV**	4	0-0-0	4
5		**Professional Elective – V**	3	1-0-0	4
6	E4114	Linux Programming Lab	0	0-3-0	2
7	E4115	Industry Oriented Mini Project	0	0-3-0	2
Total			18	2-6-0	24

IV B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	E427A	Software Engineering	3	1-0-0	4
2		**Open Elective – III**	3	0-0-0	3
3	E4220	Seminar	0	0-0-0	1
4	E4219	Software Engineering Lab	0	0-3-0	2
5	E4221	Major Project	0	0-0-0	14
Total			6	1-3-0	24

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture, T – Tutorial, P – Practical, D – Drawing, C – Credits.

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COURSE STRUCTURE – R16

Professional Elective - I

Sl. No.	Code	Subject	L	T-P-D	C
1	E327B	Automata and Compiler Design	4	0-0-0	4
2	E327C	Computer Forensics	4	0-0-0	4
3	E327D	Introduction to Neural Networks	4	0-0-0	4

Professional Elective - II

Sl. No.	Code	Subject	L	T-P-D	C
1	E324K	Embedded systems	4	0-0-0	4
2	E327E	Electronics Measurement and Instrumentation	4	0-0-0	4
3	E327F	Telecommunication Switching Systems and Networks	4	0-0-0	4

Professional Elective – III

Sl. No.	Code	Subject	L	T-P-D	C
1	E417B	Computer Networks	4	0-0-0	4
2	E417C	Artificial Intelligence	4	0-0-0	4
3	E417D	Computer Graphics	4	0-0-0	4

Professional Elective - IV

Sl. No.	Code	Subject	L	T-P-D	C
1	E414F	Optical Communications	4	0-0-0	4
2	E417E	Control Systems	4	0-0-0	4
3	E417F	Image Processing and Pattern Recognition	4	0-0-0	4

Professional Elective - V

Sl. No.	Code	Subject	L	T-P-D	C
1	E417G	Cloud Computing	4	0-0-0	4
2	E416C	Internet of Things	4	0-0-0	4
3	E417H	Network Security	4	0-0-0	4

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COURSE STRUCTURE – R16

List of Subjects offered by various Board of Studies

Open Elective – I

S. No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	E31OC	Disaster Management	Civil Engineering
2	E31OD	Elements of Civil Engineering	Civil Engineering
3	E31OE	Network Analysis and Synthesis	Electrical and Electronics Engineering
4	E31OF	Measurements and Instruments	Electrical and Electronics Engineering
5	E31OG	Automobile Engineering	Mechanical Engineering
6	E31OI	Engineering Materials and Fabrication Processes	Mechanical Engineering
7	E31OJ	Principles of Electronic Communications	Electronics and Communication Engineering
8	E31OK	Matlab Programming	Electronics and Communication Engineering
9	E31OL	Data Structures through C	Computer Science and Engineering
10	E31OM	Python Programming	Computer Science and Engineering
11	E31ON	E-Disaster Management	Information Technology
12	E31OO	Human Computer Interaction	Information Technology
13	E31OP	Introduction to Microprocessors and Microcontrollers	Electronics and Computer Engineering
14	E31OQ	Internet of Things	Electronics and Computer Engineering

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COURSE STRUCTURE – R16

List of Subjects offered by various Board of Studies

Open Elective – II

S. No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	E32OA	Estimation, Quantity Survey & Valuation	Civil Engineering
2	E32OB	Waste Management	Civil Engineering
3	E32OC	Non-Conventional Energy Sources and Applications	Electrical and Electronics Engineering
4	E32OD	Electrical Technology	Electrical and Electronics Engineering
5	E32OE	Operation Research	Mechanical Engineering
6	E32OG	Nanotechnology	Mechanical Engineering
7	E32OH	Applications of Micro Processors and Controllers	Electronics and Communication Engineering
8	E32OI	Fundamentals of HDL	Electronics and Communication Engineering
9	E32OJ	Database Management Systems	Computer Science Engineering
10	E32OK	Cloud Computing	Computer Science Engineering
11	E32OL	E-Waste Management	Information Technology
12	E32OM	Introduction to Web Design	Information Technology
13	E32ON	Introduction to Embedded systems	Electronics and Computer Engineering
14	E32OO	Fundamentals of E-Commerce	Electronics and Computer Engineering

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COURSE STRUCTURE – R16

List of Subjects offered by various Board of Studies

Open Elective – III

S. No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	E42OA	Environmental Impact Assessment	Civil Engineering
2	E42OB	Green Building Technology	Civil Engineering
3	E42OC	Materials in Electrical Systems	Electrical and Electronics Engineering
4	E42OD	Field Theory and Circuits	Electrical and Electronics Engineering
5	E42OE	Reliability Engineering	Mechanical Engineering
6	E42OG	Special Manufacturing Processes	Mechanical Engineering
7	E42OH	Principles of Computer Communication and Networks	Electronics and Communication Engineering
8	E42OI	Speech Processing	Electronics and Communication Engineering
9	E42OJ	Soft Computing	Computer Science Engineering
10	E42OK	E-commerce	Computer Science Engineering
11	E42OL	Internet of Things	Information Technology
12	E42OM	Semantic Web and Social Networks	Information Technology
13	E42ON	Fundamentals of Intelligence Systems	Electronics and Computer Engineering
14	E42OO	Introduction to Neural Networks	Electronics and Computer Engineering

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B.Tech.: ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**1-0-0**	**3**

(E110A) MATHEMATICS – I

(Common to CE,EEE,ME,ECE,CSE,IT,ECM & MIE)

Course Objectives:
The student will

1. Understand the methods of solving the linear differential equations of first and higher order and applications of the differential equations
2. Recognize the types of matrices and their properties and the concept of rank of a matrix and applying the same to understand the consistency
3. Learn how to solve the linear systems and the concepts of eigen values and eigen vectors and reducing the quadratic forms into their canonical forms
4. Equipped with the concept of total derivative and finding maxima and minima of functions of two variables
5. Formation of the partial differential equations and solving the first order equations.

UNIT–I: Initial Value Problems and Applications

Exact differential equations - Reducible to exact.
Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type e^{ax} , sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x)-Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters.
Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

UNIT–II: Linear Systems of Equations
Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordon and LU decomposition methods- Applications: Finding current in the electrical circuits.

UNIT–III: Eigen values, Eigen Vectors and Quadratic Forms
Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

UNIT–IV:Partial Differentiation
Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and Mclaurin's series expansion of functions of two variables, functional dependence, Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

UNIT-V:

First Order Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Lagranges method to solve the first order linear equations and the standard type methods to solve the non linear equations.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
2. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers

REFERENCES:

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

Course Outcomes:

The student will be able to

1. solve higher order DE's and apply them for solving some real world problems
2. write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
3. analyze the Eigen values and Eigen vectors which come across under linear transformations
4. examine the values of functions of two variables with/ without constraints.
5. solve linear partial differential equations of first order

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**4**	**0-0-0**	**4**

(E110B) ENGINEERING CHEMISTRY

(Common to EEE, ECE, CSE,IT & ECM)

Course objectives:

The student will

1. Acquire the skills to critically assess and solve problems related to water requiring the application of chemical principles.
2. Be made familiar with research design methodology and to use problem-solving techniques associated with electrochemistry.
3. Understand to organize and present chemical information coherently through oral and written discourse based on polymers.
4. Learn how be to apply science and engineering in the analysis and evaluation of process involved in production of energy efficient fuels.
5. Be equipped with the ability to invent or discover new environmental friendly , energy efficient and economically effective engg materials in a sustainable manner.

UNIT-I: Water and its treatment

Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique - Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water (Calgon conditioning – Phosphate conditioning - Colloidal conditioning) .Softening of water by ion-exchange processes. Desalination of water – Electrodialysis& Reverse osmosis. Numerical problems.

UNIT-II:Electrochemistry and Batteries

Electrochemistry: Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel, Quinhydrone and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction and cell emf – Potentiometric titrations and Applications- Determination of pH and EMF. Concept of concentration cells-electrolyte concentration cell. Numerical problems.

Batteries: Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell), **Fuel cells:** Hydrogen –oxygen, phosphoric acid and methanol-oxygen fuel cells – Applications.

UNIT-III: Polymers

Definition – Classification of polymers with examples – Types of polymerization – addition and condensation polymerization with examples. **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Kevlar- Liquid crystal polymers-Applications.

Rubbers: Natural rubber and its vulcanization.

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

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT-IV: Fuels and Combustion

Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

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

UNIT-V: Engineering Materials and applications

Lubricants-Classification of lubricants with examples-characteristics of a good lubricants – mechanism of lubrication-properties of lubricants.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Nanomaterials: Introduction, Preparation-Top down & bottom up process-sol gel method and self assembly process. Applications of nanomaterials.

Composites: Introduction- Constituents of composites – advantages, classification and constituents of composites. Fiber reinforced plastics (FRP). Applications of composites.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi
2. Engineering Chemistry by Rama Devi, VenkataRamana Reddy and Rath, Cengage learning, New Delhi
3. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi

REFERENCES:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi
2. Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai
3. Engineering Chemistry by Andhra Naidu. B.S Publications.
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

Course Outcomes:

The student will be able to:

1. asses and solve problems requiring the application of chemical principles.
2. use problem solving techniques associated with research design methodology.
3. present chemical information through oral and written discourse and evaluate engineering components and systems based on polymers.
4. produce new innovative methods and engineering materials that are useful in every walk of life.
5. Develop and apply new chemical techniques for the production of engineering materials that are useful in every walk of life.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**1-0-0**	**3**

(E110C) ENGINEERING PHYSICS-I

(Common to EEE, ECE, CSE,IT & ECM)

Course objectives:
The student will

1. The understand interaction of light with matter through interference, diffraction and polarization.
2. The distinguish between ordinary light with a laser light and to realize propagation of light through optical fibers.
3. Various crystal systems and there structures elaborately.
4. Various crystal imperfections and probing methods like x-rd.
5. the concepts of latest developments in fiber optics

UNIT-I : Crystallography

Space lattice, unit cell and lattice parameters, crystal systems, Bravaislattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

UNIT-II : X-ray Diffraction and Defects in Crystals

Bragg's law, X-ray diffraction methods: Lauemethod, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

UNIT-III: Fiber Optics

Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors**.**

UNIT-IV: Interference

Coherence, division of amplitude and division of wave front, interference in thinfilms (transmitted and reflected light), Newton's rings experiment.

Diffraction: Distinction between Fresnel and Fraunhoffer diffraction, diffraction due to singleslit, N-slits, Diffraction grating experiment.

UNIT-V: Polarization

Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and halfwave plates.

Lasers: Characteristics of lasers, spontaneous and stimulated emission of radiation, Einsteincoefficients, population inversion, ruby laser, helium – neon laser, semi conductor laser, applications of lasers.

TEXT BOOKS:

1. Applied Physics – P.K.Mittal (I.K.Internationalhosesepvt Ltd) (New Edition)
2. Enginnering Physics-P.K Palaniswamy (Scitech Publications India) Pvt Ltd, Fifth Print 2010.)
3. Engineering Physics-Senthilkumar ((VRB Publishers Limited,)

REFERENCES:

1. Applied Physics for Engineers – A.J. Dekker (Macmillan).
2. Elements of Material Science – V.Raghavant (PHI Publications).
3. Solid State Physics – M. Armugam (Anuradha Publications).
4. A Text Book of Engg Physics – M. N. Avadhanulu& P. G. Khsirsagar– S. Chand & Co.
5. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand &Co.Ltd

Course Outcomes:

The student will be able to:

1. Distinguish between various crystal systems
2. Identify the crystal defects by using X-RD
3. Get familiarized with the latest developments and applications like Fiber optics
4. Realize the importance of light phenomena in thin films and resolution.
5. Know principle, working of various laser systems and light propagation through optical fibers.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**0-0-0**	**3**

(E110D) PROFESSIONAL COMMUNICATION IN ENGLISH

(Common to CSE,ECE,EEE,IT & ECM)

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative 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 book for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are 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, from newspaper articles, advertisements, promotional material, etc. *The focus in this syllabus is onskill development, fostering ideas and practice of language skills.*

Course Objectives:

The student will:

1. understand the speech of Dr.APJ Abdul Kalam
2. know how Satya Nadella succeeded in his life.
3. learn the concept of technical communication.
4. learn how to behave with everyone.
5. know the influence of parents in their life.

Reading Skills:

Objectives:

- To develop an awareness in students about the significance of silent reading and comprehension.
- To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
- Skimming and Scanning the text
- Intensive and Extensive Reading
- Reading for Pleasure
- Identifying the topic sentence

NOTE: The **The student will:** be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different 'unseen' passages
which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives:

- To develop an awareness in the students about writing as an exact and formal skill
- To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
- Writing of sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

UNIT –I:

Chapter entitled '***Presidential Address' by Dr. A.P.J. Kalam*** from ***"Fluency in English–A Course book for Engineering Students"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Word Formation -- Root Words --The Use of Prefixes and Suffixes–Collocations– Exercises for Practice.

Grammar: Punctuation – Parts of Speech- Articles -Exercises for Practice.

Reading: ***Double Angels*** by David Scott-Reading and Its Importance-Techniques forEffective Reading- Signal Words- Exercises for Practice

Writing: Writing Sentences- Techniques for Effective Writing-- Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

UNIT –II:

Chapter entitled ***Satya Nadella: Email to Employees on his First Day as CEO*** from ***"Fluencyin English– A Course book for Engineering Students"*** Published by Orient BlackSwan, Hyderabad.

Vocabulary: Synonyms and Antonyms–Homonyms, Homophones, Homographs-Exercisesfor Practice (Chapter 17 ***'Technical Communication-Principles and Practice'. Third Edition*** published by Oxford University Press may also be followed.)**Grammar:** Verbs-Transitive, Intransitive and Non-finite Verbs–Mood and Tense—

Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

Reading: Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - ***The Road Not Taken*** by **Robert Frost** -- Exercises for Practice

Writing: Letter Writing–Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition –- Exercises for Practice

UNIT –III:

From the book entitled ***'Technical Communication-Principles and Practice'. Third Edition*** published by Oxford University Press.

Vocabulary: Introduction- A Brief History of Words–Using the Dictionary and Thesaurus–
Changing Words from One Form to Another – Confusables (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Grammar: Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive
Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From
Chapter 17 entitled '*Grammar and Vocabulary Development*')

Reading: Improving Comprehension Skills – Techniques for Good Comprehension-
Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author's viewpoint (Inference) – Reader
Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled '*Reading*
Comprehension')

Writing: Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled '*Formal Letters,*
Memos, and Email')

UNIT –IV:

Chapter entitled ***'Good Manners' by J.C. Hill*** from ***Fluency in English–A Course book for***
Engineering Students" published by Orient Blackswan, Hyderabad.

Vocabulary: Idiomatic Expressions–One- word Substitutes --- Exercises for Practice(Chapter 17 ***'Technical Communication-Principles and Practice'. Third***
Edition published by Oxford University Press may also be followed.)**Grammar:** Sequence of Tenses- Concord (Subject in Agreement with the Verb)–Exercises for Practice

Reading: ***'If'*** poem by**Rudyard Kipling**--Tips for Writing a Review --- Author'sViewpoint – Reader's Anticipation-- Herein the **The student will:** be required to
Read and Submit a Review of a Book (Literary or Non-literary) of their

choice
– Exercises for Practice.

Writing: Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice.
Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter
12 entitled '*The Art of Condensation*' from ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press)

UNIT –V:

Chapter entitled ***'Father Dear Father'*****by Raj Kinger** from ***Fluency in English–A Coursebook for Engineering Students"*** Published by Orient BlackSwan, Hyderabad

Vocabulary: Foreign Words—Words borrowed from other Languages- Exercises forPractice

Grammar: Direct and Indirect Speech- Question Tags- Exercises for Practice

Reading: Predicting the Content- Understanding the Gist – SQ3R Reading Technique-
Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled **'Reading Comprehension'-**
Technical Communication- Principles and Practice. Third Edition publishedby Oxford University Press.)

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of
Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled **'Technical**
Reports' - ***Technical Communication- Principles and Practice. Third Edition***published by Oxford University Press.)

TEXT BOOKS :

1. ***"Fluency in English – A Course book for Engineering Students"*** by Board of Editors**:**
   Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
2. Raman, Meenakshi and Sharma, Sangeeta*.* ***"Technical Communication- Principles andPractice".*** **Third Edition. New Delhi: Oxford University Press. 2015. Print.**

REFERENCES :

1. Green, David. *Contemporary English Grammar–Structures and Composition.* MacMillan India. 2014 (Print)
2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print).

Course Outcomes:

The student will be able to:

1. identify himself and try to develop the nation.

2. implement how to dedicate themselves for the development of their organization and career.
3. make use of technical vocabulary properly,
4. follow good manners in their life.
5. make the parents to realize their over consciousness of their wards.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**1-0-0**	**3**

(E113A) ENGINEERING MECHANICS

(Common to CE,EEE,ME,ECE,CSE,IT,ECM&MIE)

Course objectives:
The student will

1. Reads the concept of system of forces and its applications.
2. Determine the centroid and centre of gravity of different structures
3. Understand the concept of inertia and its real time applications
4. Analyze the bodies in motion

UNIT–I: Introduction to Engineering Mechanics
Basic Concepts. Systems of Forces: Coplanar Concurrent Forces–Forces in Space–Moment of Force and its Application–Couples and Resultant of Force Systems.
Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems -Equilibrium of Spatial Systems.

UNIT–II: Centroid : Centroids of simple figures (from basic principles)–Centroids of Composite Figures
Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorem.

UNIT–III: Area moment of Inertia
Definition–Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

UNIT–IV: Kinematics
Rectilinear and Curvilinear motions–Velocity and Acceleration–Motion of Rigid Body Types and their Analysis in Planar Motion.

UNIT–V: **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation–Central Force Motion Equations of Plane Motion–Fixed Axis Rotation–Rolling Bodies.

TEXT BOOKS:

1. Engineering Mechanics / Timoshenko & Young.
2. Engineering Mechanics, Basudev Bhattacharya, Oxford Univ. Press, New Delhi, Second Edition, 2014.
3. Engineering Mechanics / Fedinand . L. Singer / Harper–Collins

REFERENCES:

1. Engineering Mechanics / S.S. Bhavikatti& J.G. Rajasekharappa
2. 2.Engineering Mechanics / Irving. H. Shames Prentice–Hall.
3. 3.Engineering Mechanics UmeshRegl / Tayal.
4. Engineering Mechanics-Basic Concepts, Y.V.D.Rao, M.Manzoor Hussain, K.GovindaRajulu, Academic Publishing Company

Course Outcomes:

The student will be able to

1. solve the resultant of a force system acting on an object.
2. evaluate the surface area of complex objects.
3. acquire the knowledge on various applications of Moment of Inertia
4. discuss the kinematics involved in a moving object
5. discuss the kinetics involved in a moving objects

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**4**	**0-0-0**	**4**

(E112A) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE,ECE,EEE,IT & ECM)

Course objectives:
The student will

1. Describe electric circuits.
2. Acquire knowledge the given circuit with various theorems and methods.
3. Learn in recognizing of basic electronic devices such as diodes, transistors, to build circuits like amplifiers and oscillators etc.
4. Acquire knowledge on the various parameters useful for designing lectronic system.
5. Acquire the knowledge of various configurations, characteristics and applications.

UNIT – I: Electrical circuits

R-L-C Parameters, voltage and current, Independent and Dependent Sources, Source Transformation-V-I relationship for passive elements, Kirchhoff's Laws, Network reduction techniques-series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis .

Single Phase AC Circuits : R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance –phase and phase difference, concept of power factor, phasor notation, complex and polar forms of representation.

UNIT-II: Resonance

Series and parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for various parameters.

Network Theorems: Thevenin's, Norton's, Maximum power Transfer, Superposition, Reciprocity, Tellegen's, Milliman's and Compensation theorems for DC and AC excitations.

UNIT-III: P-N Junction Diode

P-N junction as a Diode, Symbol, Diode equation, volt-Ampere characteristics, Temperature dependence, Ideal versus practical Diode, static and dynamic resistances, Diffusion and Transition Capacitances.

Rectifiers and Filters: Diode rectifier, Half wave Rectifier, Ripple Factor-Full Wave Rectifier, Bridge Rectifier, Rectifiers with Filters: Inductive Filters, Capacitive Filters, L-section Filters, π- section Filters.

UNIT-IV: Bipolar Junction Transistor (BJT)

Symbol, Construction, principle of Operation, Current Components in a junction transistor Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing -Operating point, DC and AC load lines, Fixed Bias, Collector to Base bias, Self Bias (Voltage divider bias), Bias stability, Stabilization against variations in V_{BE} ,

β, and $I_{co.}$

Small signal Transistor Analysis, h- Parameters, Definitions, Determination of h-parameters from CE transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters and their Comparison.

UNIT-V: Junction Field Effect Transistor

Construction, Principle of Operation, pinch-off voltage, Volt-Ampere characteristics, comparison of BJT and JFET, small signal Model, MOSFET: Depletion and Enhancement FETs-construction characteristics.

Special Purpose Devices: Breakdown Mechanisms in semi-Conductor Diodes, Zener diode characteristics, Zener diode as a simple regulator, principle of operation and Characteristics of Tunnel Diode (with help of Energy band diagram) Varactor Diode, Principle of operation of SCR.

TEXT BOOKS:

1. Millman's Electronic Devices and circuits –J.Millman and C.Halkias, Mc Graw Hill
2. Micro Electronics by David bell
3. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

REFERENCES:

1. Network Theory by N.C.Jagan and C.Lakshminarayana, B.S.Publications.
2. Electronic Devices and Circuits- R.L.Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
3. Engineering circuit analysis-by William Hayt and Jack E.Kemmerly, Mc Graw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches)-2nd edition by Raymond A.DeCarlo and Pen-Min-Lin, Oxford University Press-2004.

Course Outcomes:

The student will be able to:

1. Demonstrate strong fundamental back ground in electrical engineering.
2. Analyze and solve problems of ac and dc circuits.
3. Identify the value of different resistors.
4. Analyze and design various electronic circuits through various numerous.
5. design examples using currently-available devices and standard-value components

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**0**	**0-3-0**	**2**

(E1101) ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB

(Common to EEE,ECE,CSE,IT&ECM)

The **English Language Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

The student will:

1. Recognize sounds of English .
2. Apply stress and intonation while speaking .
3. Develop Listening skills.
4. Develop intoducing himself and others.
5. Understand how to describe, debate and knows the types of presentations.

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

- **Computer Assisted Language Learning (CALL) Lab**
- **Interactive Communication Skills (ICS) Lab**

Listening Skills:

Objectives

- To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and

professional contexts :

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language Communication SkillsLab**.

Exercise – I

CALL Lab:

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

Practice: Introduction to Phonetics–Speech Sounds–Vowels and Consonants– MinimalPairs- Consonant Clusters- Past Tense Marker and Plural Marker.

Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

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

Exercise – II

CALL Lab:

Understand: Structure of Syllables–Word Stress–Weak Forms and Strong Forms– SentenceStress – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

Testing Exercises

ICS Lab:

Understand: Features of Good Conversation–Strategies for Effective Communication.

Practice: Situational Dialogues–Role-Play- Expressions in Various Situations– MakingRequests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

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

Practice: Common Indian Variants in Pronunciation – Differences between British andAmerican Pronunciation.

Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines.

Practice: Giving Instructions–Seeking Clarifications–Asking for and Giving Directions–Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Public Speaking–Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.

Practice: Making a Short Speech–Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Group Discussion- Interview Skills.

Practice: Group Discussion- Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

   The Computer Assisted Language Learning Lab has to accommodate 40 students with40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

   System Requirement (Hardware component):

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

   Computers with Suitable

   Configuration High Fidelity

   Headphones

2. **Interactive Communication Skills (ICS) Lab:**

   The Interactive Communication Skills Lab: A Spacious room with movable chairs andaudio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo – audio and video system and camcorder etc.

Lab Manuals:

1. A book entitled "***ELCS Lab Manual– A Workbook for CALL and ICS Lab Activities"*** by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
2. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. ***"EMBARK- English forundergraduates"*** Delhi: Cambridge University Press. 2016. Print.

   Suggested Software:
3. Cambridge Advanced Learners' English Dictionary with CD.
4. Grammar Made Easy by Darling Kindersley.
5. Punctuation Made Easy by Darling Kindersley.
6. Oxford Advanced Learner's Compass, 8th Edition.
7. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
8. English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
9. TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

REFERENCES:

1. Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print. Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

Course Outcomes:

The student will be able to:

1. Analyze and use correct pronunciation.
2. Make use of stress and intonation properly while speaking and writing.
3. Tell the answers effectively after listening
4. Describe himself and others in day to day life situations.
5. Improve in handling debates and oral presntation

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - I Semester	**0**	**0-3-0**	**2**

(E1102) ENGINEERING WORKSHOP

(Common to EEE,ECE,CSE,IT&ECM)

Course objectives:
The student will

1. Execute application of various tools in carpentry, lathe machine works, house wiring
2. Recognize application of metal cutting and drilling
3. Analyse to perform various shape of wood material and metals
4. Fabricate metal items using welding and power tools
5. Demonstrate the works in foundry and plumbing

TRADES FOR EXERCISES:

1) Carpentry
2) Fitting
3) Tin-Smithy and Development of jobs carried out and soldering.
4) Black Smithy
5) House-wiring
6) Foundry
7) Welding

TRADES FOR DEMONSTRATION AND EXPOSURE:

Plumbing, Machine Shop, Power tools in construction, wood working and mechanical engineering.

Course Outcomes:
The student will be able to

1. Identify the tools used in workshop of different trades.
2. Perform the carpentry works of small shape and size.
3. Perform the basic fitting and electrical works .using the required tools
4. Perform welding works both gas and electrical
5. Perform the minor foundry and plumbing works using the required tools.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year – I Semester	**2**	**0-0-0**	**0**

(E110F) PROFESSIONAL ETHICS

(Common to CE,EEE,ECE & ECM)

Course objectives:

The student will:

1. Learn ethical values and attitudes.
2. Understand the roles of a professional.
3. Understand the current scenario and engineers responsibility towards the society
4. Know the types of professional ethical codes.
5. Learn the need for ethical audit.

UNIT - I:Basic Concepts

Introduction, Ethics-Ethical Dilemma-Morals, , emotional, intelligence, Indian and western thoughts on ethics, value education, domains of learning, human values, attitudes, Basic Ethical Principles. Meaning of profession, professionalism, professional's roles and professional risks, professional accountability, successful professional, engineering professionals, engineering ethics, roles of engineers.

UNIT - II: Global issues and safety

Introduction, current scenario, business ethics, environmental ethics, computer ethics, ethical hacking and its dilemma,, ethics in research, intellectual property rights, patents, trade marks, managers and engineers responsibility , Engineerng ethics.

UNIT - III: Ethical codes and audits

Introduction need and types of professional ethical codes, sample standard codes, ethical codes for corporate entities and non-profit organization, charitable institutions, limitations of the codes, need for ethical audit, ethical profile of organizations.

REFERENCES:

1. Professional ethics and human value by D.R.Kiran, Tata McGraw Hills education.
2. Ethics in engineering by Mike W. Martin and Roland Schinzinger, Tata McGraw Hills education.
3. Fundamental of Ethics by Edmund G Seebauer and Robert L.Barry, Oxford university press.
4. Professional ethics and human values by R.S.Nagarajan, New age international.
5. Professional ethics by R. Subramanian, Oxford press.

Course Outcomes:

The student will be able to:

1. Make use of ethical value sand attitudes in their life.
2. Imlement once he/she becomes a professional.
3. Solve the issues related with environment and technology
4. Apply the different types of professional ethical codes in their organization.
5. Make use of the rules framed by the auditors.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**3**	**0-0-0**	**3**

(E120A) ENGINEERING PHYSICS – II

(Common to EEE, ECE,CSE,IT&ECM)

Course objectives:

The student will:

1. Understand the behavior of a particle quantum mechanically.
2. Distinguish pure and impure semi conductors and understand formation of p-n junction.
3. Understand various magnetic and dielectric properties of materials.
4. Reads super conductor behavior of materials.
5. Practical focus in this curriculum is on nano structured materials, their structural and mechanical properties, and their applications.

UNIT - I: Principles of Quantum Mechanics

Waves and particles, de-Broglie hypothesis, matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, Schrodinger time independent wave equation, physical significance of wave function, particle in 1-D potential box, electron in periodic potential, Kronig-Penny model (qualitative treatment), E-K curve, origin of energy band formation in solids.

UNIT - II: Semiconductor Physics

Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic & extrinsic semiconductors, direct and indirect band gap semiconductors, formation of PN junction, open circuit PN junction, energy diagram of PN junction diode, solar cell: I-V characteristics and applications.

UNIT - III: Dielectric Properties

Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilitites, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-$BaTiO_3$ structure.

UNIT - IV: Magnetic Properties & Superconductivity

Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri magnetic materials, Superconductivity: Superconductivity phenomenon, Meissner effect, applications of
superconductivity

UNIT - V: Introduction to nanoscience:

Origin of nanoscience, nanoscale, surface to volume ratio,quantum confinement, dominance of electromagnetic forces, random molecular motion, bottom-up fabrication: Sol-gel, CVD and PVD techniques, top-down fabrication: ball mill method,characterization by XRD, SEM and TEM.

TEXT BOOKS:

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson,Tata McGraw hill Publishers.

REFERENCES:

1. Modern Engineering Physics, K. Vijaya Kumar, S. Chandralingam S. Chand & Co. Pvt. Ltd.,
2. University Physics, Francis W. Sears, Hugh D. Young, MarleZeemansky and Roger A Freedman, Pearson Education.
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.
4. Introduction to Quantum Mechanics Leonard I. Schiff McGraw-Hill.

Course Outcomes:

The student will be able to:

1. Realize the importance of behavior of a particle quantum mechanically.
2. Estimate concentration estimation of charge carriers in semi conductors.
3. Categorize various magnetic dielectric properties and apply them in engineering applications.
4. Analyze the basic principles and applications of super conductors.
5. Demonstrate a working knowledge of nanotechnology principles and industry Applications.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**4**	**1-0-0**	**4**

(E120B) MATHEMATICS – II

(Common to EEE, ECE,CSE,IT&ECM)

Course objectives:

The student will:

1. Understand the concepts & properties of laplace transforms and solving differential equations using laplace transform techniques.
2. Examine the evaluation of integrals using beta and gamma functions.
3. Describe multiple integrals and applying them to compute the volume and areas of regions and the physical quantities involved in engineering field related to the vector valued functions.
4. Evaluate the basic properties of vector valued functions and their applications.
5. Describe the vector integral theorems on line, surface and volume integrals

UNIT–I: Laplace Transforms

Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT-II: Beta and Gamma Functions

Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Applications: Evaluation of integrals.

UNIT–III: Multiple Integrals

Double and triple integrals, Change of variables, Change of order of integration.

Applications: Finding areas, volumes& Center of gravity (evaluation using Beta and Gamma functions).

UNIT–IV: Vector Differentiation

Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

UNIT–V: Vector Integration Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems.

TEXT BOOKS:

1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers.
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.

2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

Course Outcomes:

The student will be able to:

1. Use laplace transform techniques for solving de's.
2. Evaluate integrals using beta and gamma functions.
3. Evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space.
4. Calculate the unit tangent vector, the unit normal vector and the unit binormal vector at a point on a space curve described by a vector-valued position function.
5. Analyze the line, surface and volume integrals and converting them from one to another.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**4**	**1-0-0**	**4**

(E120C) MATHEMATICS – III

(Common to CE,EEE,ME, ECE,CSE,IT,ECM& MIE)

Course Objectives:
The student will

1. Understand random variables that describe randomness or an uncertainty in certain realistic situation and binomial geometric and normal distributions
2. Formulate sampling distribution of mean, variance, point estimation and interval estimation and the testing of hypothesis and ANOVA
3. Describe the topics that deals with methods to find roots of an equation
4. Discuss how to fit a desired curve by the method of least squares for the given data
5. Identify how to solve ordinary differential equations using numerical techniques

UNIT–I: Random variables and Distributions

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability ,Distribution function, Probability density function, Expectation, Moment generating function, Moments and properties. Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

UNIT – II: Sampling Theory

Introduction, Population and samples, Sampling distribution of means (σKnown)-Central limit theorem, t-distribution, Sampling distribution of means (σunknown)-Sampling distribution of variances – $\chi^2$and F- distributions, Point Estimation, Maximum error of estimate, Interval estimation.

UNIT – III: Tests of Hypothesis

Introduction, Hypothesis, Null and Alternative Hypothesis, Type I andType II errors,
Level of significance, One tail and two-tail tests, Tests concerning one mean and proportion, two means -proportions and their differences-ANOVA for one-way classified data.

UNIT – IV: Algebraic and Transcendental Equations & Curve Fitting

Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by
Gauss-Jacobi and Gauss-Seidal Methods.
Curve Fitting: Fitting a linear, second degree, exponential, power curve by method of least squares.

UNIT – V: Numerical Integration and solution of Ordinary Differential equations

Trapezoidal rule-Simpson's 1/3rd and 3/8th rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

TEXT BOOKS:

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.

2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R.
4. K. Iyengar and R. K. Jain, New Age International Publishers

REFERENCES:

1. Fundamentals of Mathematical Statistics by S. C. Guptha& V. K. Kapoor, S. Chand.
2. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematics for engineers and scientists by Alan Jeffrey, 6th edition, CRC press.

Course Outcomes:

The student will be able to:

1. Differentiate among random variables involved in the probability models which are useful for all branches of engineering
2. Evaluate mean, proportions and variances of sampling distributions and to make Important decisions for few samples which are taken from a large data
3. Solve the tests of ANOVA for classified data
4. Identify the root of a given equation and solution of a system of equations &design a curve for a given data
5. Identify the numerical solutions for a given first order initial value problem

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**3**	**0-0-0**	**3**

(E125A) COMPUTER PROGRAMMING IN C

(Common to EEE,ECE,CSE,IT&ECM)

Course Objectives:

The student will:

1. Understand the fundamentals of computers.
2. Reads the fundamentals of c programming such as variables, constants, basic data types, selection statements, repetition statements etc.
3. Studies the need for user-defined functions and understand the concept of arrays and its memory organization
4. Reads the significance of pointers and describe about various character and string functions.
5. Understand the concept of structures and unions.

UNIT - I:

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number systems-Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.

Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II:

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.

Arrays – Concepts, using arrays in C, inter function communication, array applications-linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III:

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

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

UNIT - IV:

Enumerated, Structure ,and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

UNIT – V:

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek ,rewind and ftell), C program examples.

TEXT BOOKS:

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

REFERENCES:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education(India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.

Course Outcomes:

The student will be able to:

1. Demonstrate the basic knowledge of computer hardware and software.
2. Write effective programs using c programming language.
3. Choose between different argument passing mechanisms and use multidimensional arrays.
4. make use of pointers with arrays and apply various character and string functions.
5. differentiate between structures and unions.

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B.Tech. : ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**2**	**0-0-3**	**4**

(E123A) ENGINEERING DRAWING

(Common to EEE,ECE,CSE,IT&ECM)

Course Objectives:

The student will

1. Understand basic knowledge of conventions used in engineering graphics, constructing engineering scales and various methods in getting engineering curves.
2. Identify the different angles of projections, conventions and the position of objects in various planes.
3. Distinguish the different orientations of two dimensional planes and right regular solids at different inclinations with respect to projection planes able to identify the internal features of object.
4. Analyze the size and shape of required sheet to form a right regular solid.
5. Solving the typical problems from 3-dimensional view to simplified 2-dimensional view and vice versa.

UNIT – I: INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Drawing and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.

CONSTRUCTION OF CURVES USED IN ENGINEERING PRACTICE:

a) Conic Sections, Ellipse- General, Concxentric Circle, Arcs of circle and Oblong Method

Parabola- General, Tangent and Rectangle Methods, Hyperabola-General, Point/Rectangle Method

b) Cycloid, Epicycloid and Hypocycloid

c) Involute for Circle, Rectangle and Triangle

UNIT – II: PROJECTIONS OF POINTS AND LINES

Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to planes, True lengths, traces.

UNIT – III: PROJECTIONS OF PLANES

Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes.

UNIT –IV: PROJECTIONS OF SOLIDS

Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT- V: ISOMETRIC PROJECTIONS

Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

ORTHOGRAPHIC PROJECTIONS: Conversion of Isometric Views to Orthographic Views – Conventions.

TEXT BOOKS :

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing and Graphics, Venugopal / New age.
3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES:

1. Engineering drawing – P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.

Course Outcomes:

The student will be able to:

1. Construct scales and can draw the objects of various sizes in a prescribe given size of sheet. And also can know how to get various curves used in engineering design.
2. Illustrate the projections of point and line in different positions and different inclinations respectively. Construct traces of lines.
3. Identify the projections of plane and solid with different positions of surfaces edges and axis with respect to reference planes.
4. Sketch the sectional views to view inside features of right regular syllabus.
5. Identifying the objects of complicated shape and to draw the same in 2-diemnsional view. Can draw 3-diemensional views and isometric projections by observing front view and top view (2-dimensional views).

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**0**	**0-3-0**	**2**

(E1201) ENGINEERING CHEMISTRY LAB

(Common to CE,EEE,ME,ECE,CSE,IT,ECM&MIE)

Course Objective:

The student will

1. Understand the importance of Chemical analysis in their daily life
2. Perform the different practical skills in conducting the lab experiments
3. Analyze the different results of the experiments when different external factors are being applied
4. Acquire experimental skills
5. Prepare more environment friendly engineering compounds at low cost.

Experiments:

1. Determination of Conc. of $KMnO_4$ by colorimetric method.
2. Estimation of copper by colorimetric method.
3. Conductometric titration of mixture of acids vs strong base.
4. Titration of strong acid vs strong base by potentiometry.
5. Determination of pH of the given solution.
6. Determination of viscosity of sample oil by redwood viscometer
7. Preparation of Fe nanoparticles
8. Estimation of hardness of water by EDTA method.
9. Estimation of manganese dioxide in pyrolusite.
10. Determination of Surface tension of lubricants
11. Preparation of Aspirin
12. Preparation of Thiokol rubber

Note: Minimum 10 experiments must be performed.

Course Outcomes:

The student will be able to

1. identify the importance of chemical analysis in their daily life
2. use different practical skills to analyse the results associated with the experiments build practical skills
3. develop new environmental friendly and cost effective engineering compounds
4. analyze the concepts of laboratory procedure.
5. determine the partition coefficient of a organic compound in two immissible liquids

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**0**	**0-3-0**	**2**

(E12O2) ENGINEERING PHYSICS LAB

(Common to EEE, ECE,CSE,IT&ECM)

Course Objective:

The student will:

1. Works with uses of torsional pendulum
2. Examine energy gap of semiconductors
3. Analyze the behavior and characteristics of various materials for its optimum utilization.
4. Practice about the various electronic communication mechanisms and their usage in a practical manner.
5. Demonstrate the ability to prepare a valid laboratory notebook.

Experiments:

1. Dispersive power of the material of a prism – Spectrometer.
2. Torsional pendulum – Rigidity modulus.
3. Newton's Rings – Radius of curvature of Plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Charging, discharging and time constant of an R-C circuit.
6. L-C-R circuit – Resonance & Q-factor.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
8. Study the characteristics of LED and LASER diode.
9. Bending losses of fibres& Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Determination of wavelengths of white source – Diffraction grating.
12. Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
13. Dielectric constant of a material / V-I characteristics of a solar cell.

Note: Minimum 10 experiments must be performed.

Course Outcomes:

The student will be able to:

1. Sketch the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
2. Identify the characteristics and the behavior of various materials in a practical manner and gain knowledge about various communication mediums and its usage.
3. Implement various experimental skills which is very essential for an engineering student
4. Employ to various tools like screw gauge, vernier callipers, physical balance, spectrometer and microscope.
5. Write a lab notebook (template provided) that documents their experience in each lab procedure.

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**0**	**0-3-0**	**2**

(E1203) COMPUTER PROGRAMMING IN C LAB

(Common to EEE,ECE,CSE,IT & ECM)

Course Objective:

The student will:

1. Implement linked list, stack , queue, tree
2. Develop programming skills using the fundamentals and basics of c language
3. Change character strings in c programs.
4. Use pointers to efficiently solve problems
5. Memorize functions from the portable c library and to describe the techniques for creating program modules using functions and recursive functions.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- GNU C Compiler

1. **a)** Write a C program to find the factorial of a positive integer.
   b) Write a C program to find the roots of a quadratic equation.
2. **a)** Write a C program to determine if the given number is a prime number or not.
   b)A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first nterms of the sequence.
3. **a)** Write a C program to construct a pyramid of numbers.
   b) Write a C program to calculate the following Sum: Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!
4. **a)** The least common multiple (lcm) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls lcm (a, b) function that takes two integer arguments and returns their lcm. The lcm (a, b) function should calculate the least common multiple by calling the gcd (a, b) function and using the following relation:CM (a,b) = ab / gcd (a,b)
   b) Write a C program that reads two integers n and r to compute the ncr value using the following relation: ncr (n,r) = n! / r! (n-r)! . Use a function for computing the factorial value of an integer.
5. **a)** Write C program that reads two integers x and n and calls a recursive function to
   compute xn
   b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
   c) Write a C program that reads two integers and calls a recursive function to

compute ncr value.

6. **a)** Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
   b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
7. a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
   b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.
8. **a)** Write a C program that implements the Bubble sort method to sort a given list of
   integers in ascending order.
   b) Write a C program that reads two matrices and uses functions to perform the following:
   i) Addition of two matrices
   ii) Multiplication of two matrices
9. **a)** Write a C program that uses functions to perform the following operations:
   a. to insert a sub-string into a given main string from a given position.
   b. to delete n characters from a given position in a given string.
   b) Write a C program that uses a non recursive function to determine if the given string is a Palindrome or not.
10. **a)** Write a C program to replace a substring with another in a given line of text.
    b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
11. **a)** 2's complement of a number is obtained by scanning it from right to left and
    complementing all the bits after the first appearance of a 1. Thus 2's complement of
    11100 is 00100. Write a C program to find the 2's complement of a binary number.
    b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
12. **a)** Write a C program to display the contents of a file to standard output device.
    b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
13. **a)** Writ**e a C** program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
    b) Write a C program to compare two files, printing the first line where they differ.
14. **a)** Write a C program to change the nth character (byte) in a text file. Use

fseek function.

b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.

15. **a)** Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).

    b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

REFERENCES:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.

Course Outcomes:

The student will be able to:

1. Write, compile and debug programs using different programming constructs in c language.
2. Design programs using modular structures
3. Apply and practice logical ability to solve the problems using c
4. Desgin and present the algorithms flow charts and program.
5. apply operations like searching, insertion, deletion, traversing mechanism etc. On various data structures

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B.Tech. ECM	**L**	**T-P-D**	**C**
I Year - II Semester	**2**	**0-0-0**	**0**

(E120E) ENVIRONMENTAL STUDIES

(Common to CE,EEE,ECE & ECM)

Course Objectives:
The student will

1. Discover about the different natural resources available and how to use them.
2. Reads about biodiversity.
3. Reads about environmental impact assessment and management.
4. Studies about the global environmental problems.
5. Study about sustainability.

UNIT-I : Ecosystems , Natural Resources &**Biodiversity** concept, Classification of Resources:Water resources, Land resources, Forest resources, Mineral resources , Energy resources. Concept of ecosystem, Classification of ecosystem, Functions of ecosystem. Biodiversity, levels, hotspots, values of biodiversity, threats to biodiversity, conservation of biodiversity.

UNIT-II: Global Environmental Problems And Global Efforts

Deforestation Green house effect, Global Warming, Sea level rise, Ozone depletion. International conventions/protocols green-belt-development, Concept of Green Building, Clean Development Mechanism(CDM).

Environmental Impact Assessment (Eia) And Environmental Management Plan: definition of Impact, classification of impacts, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society, impact assessment methodologies. Environmental management plan (EMP)

UNIT-III: **Environmental Policy, Legislation, Rules And Regulations & Towards Sustainable Future**

Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing.

TEXT BOOKS:

1. Text Book Of Environmental Science And Technology By M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao
3. Introduction to Environmental Studies by K.Mukkanti
4. Text book of Envirtonmental Studies by Kaushik&Anubha Kaushik

REFERENCES:

1. Tata McgrawHill : Introduction to Environmental Studies by Benny Joseph
2. Environmental studies by ErachBharucha 2005, University Grants Commission, University Press

Course Outcomes:

The student will be able to

1. Identify the importance of natural resources and use them efficiently.
2. Understand the concept of biodiversity.
3. Apply environmental plan in developing any sort of environmental projects.
4. Solve the sources and risks caused by pollution.
5. Apply the environmental legislation in every walk of life and importance of sustainability

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**3**	**1-0-0**	**4**

COMPLEX ANALYSIS AND TRANSFORMS

Course Objectives

The student will:

1. Define the maximum flow in a transport network and determine the corresponding mincut by designing an algorithm
2. Learn about lattices and complete partial orderings which are the correct frame work for a study of denotational semantics of programming languages
3. Understand the solution of difference equations by using Z-transforms
4. Describe the differentiation of the complex functions
5. Describe the complex line integrals and use the residue theorem

UNIT–I:

Fourier Series

Introduction-Euler‟s Formulae-Conditions foe Fourier Expansion-Functions having points of Discontinuity-change of interval-Odd and Even function-Expansions of Odd or Even periodic functions-Half range series.

UNIT–II:

Z-Transforms

Introduction-Definition-Some standard Z-Transforms-Linearity Property-Damping Rule-some standard result-Shifting u_n to the right and to the left Multiplication by n-Two basic theorems (Initial and Final) – Some useful Z-transforms-Some useful inverse Z-transforms-Convolution Theorem-Convergence of Z-Transforms-Two side Z-Transform-Evaluation of Z-Transforms-Applications to Difference Equations

UNIT–III:

Functions of a complex variable

Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann conditions, Maxima – Minima principle, Harmonic and conjugate harmonic functions – Milne – Thompson method

UNIT–IV:

Complex integration

Line integral – evaluation along a path and by indefinite integration – Cauchy‟s integral theorem – Cauchy‟s integral formula – Generalized integral formula. Radius of convergence – Expansion in

Taylor‟s series, Maclaurin‟s series and Laurent series

UNIT-V:

Complex power series

Singular point –Isolated singular point – pole of order m – essential singularity. (Distinction between the real analyticity and complex analyticity)

Contour Integration

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem, Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_C f(\cos\theta,\sin\theta)d\theta$

Text Books:

1. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
2. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher
3. Graph Theory with Applications to Engineering and Computer science by NarsingDeo, Prentice Hall, Inc

References:

1. Engineering Mathematics by N. P. Bali, Lakshmi Publications.
2. Advanced Engineering Mathematics by H.K.Dass, S.Chand Publications

Course Outcomes:

The student will be able to:

1. Apply the knowledge in computer design.
2. Identify whether a given function is differentiable, and if so find its derivative. And use differentiation rules to compute derivatives.
3. Show complex-differentiable functions as power series. Use anti derivatives to compute line integrals and Cauchy's integral theorem and formula to compute line integrals.
4. Evaluate complex line integrals and real integrals by residue theorem.
5. Relate the relationship between transform and the Fourier transform for discrete-time signals and the characteristics and properties of transform
6. Evaluate transform and inverse transform and apply transform for analyzing linear time invariant (LTI) system

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UGC AUTONOMOUS

B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**3**	**0-0-0**	**3**

(E217A) OPERATING SYSTEMS

(Common to IT,CSE & ECM)

Course Objectives

The student will

1. Learn basics of operating system, different types and its structures, and identify processes, threads, schedulers and scheduling algorithms and synchronization
2. Identify the memory partition, memory management techniques and different algorithms used.
3. Demonstrate the deadlock when it occurs and its consequences.
4. Become familiar with storage of information in file systems and directories
5. Recognize how to provide the protection and security to the system.

UNIT - I:

Operating System Overview

Overview of Computer Operating Systems, Operating System Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating System Structures, Operating System Services and Systems Calls, Operating Systems Generation. **Process Management**: Process Concepts, Threads, Scheduling-Criteria, Algorithms Evaluation, Thread Scheduling.

UNIT - II:

Concurrency

Process Synchronization, Critical-Section Problem, Peterson‟s Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples, Atomic Transactions.

Memory Management

Swapping, Contiguous Memory Allocation, Paging, Page-Table Structure, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Frames Allocation, Thrashing.

UNIT - III:

Principles of Deadlock

System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance,Recovery from Deadlock. File System Interface, File Concepts, Access Methods and Directory Structure, File System Mounting, File Sharing and Protection.

UNIT - IV:

File System Implementation

File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance. Case Studies: UNIX, Linux and Windows.

Mass Storage Overview

Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Swap-Space Management, RAID Structure, Stable-Storage Implementation, Tertiary Storage Structure.

UNIT - V:

Protection

Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

Security

Security Problem, Program Threats, System and Network Threats Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, firewalling to protect Systems and Networks, Computer-Security Classifications, Case Studies: UNIX, Linux and Windows.

Advanced Operating Systems

Distributed Operating Systems, Multi-Processor Operating Systems, Real-Time Operating Systems and Mobile Operating Systems.

TEXT BOOKS:

1. Operating System Concepts-Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th Edition, John Wiley.
2. Operating Systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition,TMH.

REFERENCE BOOKS:

1. Principles of Operating Systems-Naresh Chauhan, Oxford Higher Education.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems-Andrew S Tanenbaum, 2nd Edition Pearson, PHI.

Course Outcomes:

The student will be able to:

1. Differentiate various types of operating systems and their structures, processes, threads scheduling and synchronization.
2. Identify the memory management techniques and its usage of algorithms.
3. Define the problem of deadlock, its prevention, its avoidance, detection and recovery.
4. Analyze the storage of information and data in computers.
5. Examine the security problems and protection methods.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**3**	**1-0-0**	**4**

(E214A) ANALOG ELECTRONICS

Course Objectives

The The student will:

1. Know the basic concept of amplifier designing and its analysis using hybrid model
2. Understand the amplifier operation at low and high frequency and its frequency responses.
3. Learn about different types of feedback amplifiers and oscillators.
4. Generalize the large signal amplifiers.
5. Learn about different types of Tuned amplifiers.

UNIT – I:

ANALYSIS AND DESIGN OF SMALL SIGNAL LOW FREQUENCY BJT AMPLIFIERS Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier,

Darlington pair, Frequency response of BJT amplifier – Analysis at low and high frequencies, The Hybrid- pi ( ) – Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier response, Gain-bandwidth product

UNIT – II: FET AMPLIFIERS

Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOS Amplifiers, –MOSFET – MOSFET Characteristics in Enhancement and Depletion mode – MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier – frequency response.

UNIT –III: POSITIVE & NEGATIVE FEEDBACK IN AMPLIFIERS

Classification of amplifiers, Concepts of feedback – Classification of feedback amplifiers – General characteristics of negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.

Condition for oscillations. RC and LC type Oscillators – Frequency and amplitude stability of oscillators – Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators – RC-phase shift and Wien-bridge oscillators.

UNIT – IV:

LARGE SIGNAL AMPLIFIERS

Class A Power Amplifier, Maximum Value of Efficiency of Class – A Amplifier, Transformer Coupled Amplifier, Push Pull and Complimentary Symmetry Class B and Class AB Power Amplifiers – Principle of operation of class –C Amplifier, Transistor Power Dissipation, Heat Sinks.

UNIT – V:

TUNED AMPLIFIERS

Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading single Tuned amplifiers on Bandwidth, Effect of Cascading Double Tuned amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned amplifiers

TEXT BOOKS:

1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Electronic Devices and Circuits, S. Salivahanan, N.Suresh Kumar, A Vallvaraj, 2nd Edition, TMH.

REFERENCES:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, TMH
2. Introductory Electronic Devices and Circuits (Conventional flow version) – Robert T. Paynter, 7th Edition, 2009, PEI.
3. Microelectronic Circuits – Sedra / Smith – 5th Edition – Oxford, 2009
4. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
5. Electronic Devices and Circuits, Anil.K. Maini, Varsha Agrawal, 1st Edition, WILEY.
6. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nashelsky, 9th Edition, Pearson Education.
7. Electronic Devices and Circuits – 2nd Edition by Muhammad H.Rashid, Cengage Learning.

Course Outcomes:

The The student will: be able to

1. Identify the classification of amplifiers and analyze the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance.
2. Elongate different types of the coupled amplifiers.
3. Compare different types of the MOS amplifiers and their frequency response by using the small signal model.
4. Write the different types of feedback amplifiers.
5. Find the condition for oscillations in oscillators, identify different types of oscillators.
6. Interpret different types of power (large signal) amplifiers and compare them in terms of efficiency.

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(UGC AUTONOMOUS)

B.Tech. ECM	**L**	**T-P-D**	**C**
II Year – I Semester	**3**	**0-0-0**	**3**

(E214C) SWITCHING THEORY AND LOGIC DESIGN

Course Objectives

The The student will:

1. Explore the knowledge of switching theory which will enable the process of logical design.
2. Learn mathematical foundations and tools for digital system design that is an essential part in the research and development in almost all areas of modern technology.
3. Analyze and simplify a given digital electronic circuit using different methods of simplification.
4. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
5. To implement synchronous state machines using flip-flops.

UNIT I

Number Systems & Codes: Philosophy of Number Systems, Complement Representation of Negative Numbers, Binary Arithmetic, Binary Codes, Error Detecting & Error Correcting Codes, Hamming codes.

UNIT II

Boolean Algebra and Switching Functions : Fundamental Postulates of Boolean Algebra, Basic theorems and Properties, Switching Functions, Canonical and Standard forms, Algebraic simplification Digital Logic Gates, Properties of XOR gates, Universal Gates, Multilevel NAND/NOR Realizations.

Minimization of Switching Functions: Map method, Prime implicants, Don‟t care combinations,

Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, Simplification rules.

UNIT III

Combinational Logic Design Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and Hazard free Realizations. Programmable Logic Devices & Threshold Logic: Basic PLD‟s-ROM, PROM, PLA, PAL,Realization of Switching functions using PLD‟s, Capabilities and Limitations of Threshold gate,Synthesis of Threshold functions, Multigate Synthesis.

UNIT IV

Sequential Circuits - I : Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Steps in Synchronous Sequential Circuit Design, Design of modulo-N Ring & Shift counters, Serial binary adder, Sequence detector.
Sequential Circuits - II : Finite State Machine-Capabilities and Limitations, Mealy and Moore models, Minimization of Completely Specified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

UNIT V

Algorithmic State Machines: Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, Control implementations, Examples of Weighing Machine and Binary multiplier.

TEXTBOOKS :

1. Switching & Finite Automata theory – Zvi Kohavi, 2 ed., TMH.
2. Digital Design – Morris Mano, 3 ed., 2006, PHI.
3. Switching Theory and Logic Design – A. Anand Kumar, 2008, PHI.

REFERENCES:

1. An Engineering Approach to Digital Design – Fletcher, PHI.
2. Fundamentals of Logic Design – Charles H. Roth, 5 ed.,2004, Thomson Publications
3. Digital Logic Applications and Design – John M. Yarbrough, 2006, Thomson Publications.

Course Outcomes:

The student will be able to:

1. Apply knowledge of switching theory which will enable the process of logical design.
2. Resolve mathematical foundations and tools for digital system design that is an essential part in the research and development in almost all areas of modern technology.
3. Analyze and simplify a given digital electronic circuit using different methods of simplification.
4. Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
5. Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**4**	**0-0-0**	**4**

(E217B) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives

The The student will:

1. Learn how Compile and run a Java application.
2. Map the role of the Java Virtual Machine in achieving platform independence.
3. Navigate through the API docs.
4. Acquaint to use the Object Oriented paradigm in Java programs.
5. Differentiate the division of classes into Java packages.

UNIT - I: Oops Concepts

Data abstraction, encapsulation, inheritance, benefits of inheritance, Polymorphism, Classes & objects, procedural & object oriented programming paradigm.

Java Programming: History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT -II: Inheritance

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

Interfaces differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Packages Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Inner Classes Uses of Inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

UNIT -III: Exception handling

Dealing with errors, Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, checked & unchecked exceptions, usage of try, catch, throw, throws and finally, & rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading Differences between multithreading and multitasking, thread life cycle,creating threads, thread priorities synchronizing threads, inter thread communication,

producer consumer pattern.

UNIT -IV : Collection Frame Work In Java

Introduction to Java collections, Overview of Java collection Frame work, Generics, commonly used collection classes- Array list, linked list, vector, Hash table, Stack, Enumeration, Iterator, String, tokenizer, Random, Scanner, properties.

Files Streams-Byte streams, character streams, text I/O, binary I/O, random access fileoperations, file management using file class.

Connecting To Database JDBC type 1 to 4 drivers, connecting to a database, querying adatabase & processing the results.

UNIT - V:GUI Programming With Java

The AWT class hierarchy, introduction to swing, Swing Vs AWT, Hierarchy for swing components, Containers- JApplet, Jframe, Jdialog, Jpanel, Overview of some swing components-Jbutton, Jlabel, Jtextfield, jtextarea, simple swing applications, layout manager – layout manager types – border, grid & flow.

Event Handling

Events, Event sources, Event classes, Event Listeners, Relation B/W event sources & event listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

Applets

Inheritance hierarchy for applets, Concepts of Applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

Text Books :

1. Java; the complete reference, 7th editon, Herbert schildt, TMH
2. Introduction to Java programming , Y. Daniel Liang, pearson education.

Reference Books :

1. Thinking in Java,Bruce Eckel, pearson education.
2. Oop's through Java,P.Radha Krishna,Universities press

Course Outcomes:

The student will be able to:

1. Write java programs using arithmetic operators, control statements, type
2. Conversion, constructors and string handling
3. Write java programs for inheritance and polymorphism
4. Write java programs for creation of user defined packages and interfaces
5. Write java programs for exception handling and multithreading.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

(E2123) OPERATING SYSTEM LAB

(Common for CSE, IT, ECM)

Course Objectives

The student will

1. Be familiar the design aspects of operating system.
2. Master Internals of OS system call implementation.
3. Be competent with CPU scheduling and process management.
4. To design and apply the memory management concepts.
5. Be competent with internals of file systems.

Programs

1. Simulate the following CPU scheduling algorithms a) Round Robin b) SJF
2. Simulate the following CPU Scheduling algorithms a) FCFS b) Priority
3. Simulate all file allocation strategies a) Sequential b)Indexed c) Linked
4. Simulate MVT and MFT
5. Simulate the following File Organization Techniques
   a) Single level directory b) Two level
6. Simulate the following File Organization Techniques
   a) Hierarchical b) DAG
7. Simulate Disk scheduling algorithms
   a)FCFS b) SSTF c) SCAN d) C-SCAN e) LOOK
8. Simulate Bankers Algorithm for Dead Lock Avoidance
9. Simulate Bankers Algorithm for Dead Lock Prevention
10. Simulate all page replacement algorithms a) FIFO b) LRUc) LFU Etc. …
11. Simulate Paging Technique of memory management.
12. Simulate on Allocation of Frames.

Course Outcomes:

The student will be able to

1. Implement basic services and functionalities of the operating system using system calls.
2. Use modern operating system calls and synchronization libraries in software/ hardware interfaces.
3. Demonstrate the benefits of thread over process and implement synchronized programs using multithreading concepts.
4. Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority
5. Implement memory management schemes and page replacement schemes.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

(E2124) BASIC ELECTRONICS LAB

PART A: (Only for Viva-voce Examination) ELECTRONIC WORKSHOP

Course Objectives

The student will

1. Identify the basic electronic devices.
2. Observe the characteristics of diodes like PN, Zener diode.
3. Be familiar with rectifiers and filters.
4. Examine the characteristics of transistors, SCR & UJT.
5. Analyze transistor amplifiers and their frequency responses

PRACTICE (in 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers,
2. Relays, Bread Boards, PCB‟s
3. Identification, Specifications and Testing of Active Devices, Diodes, BJT‟s, Low power JFET‟s, MOSFET‟s, Power Transistors, LED‟s, LCD‟s, SCR, UJT.
4. Study and operation of
   1. Multimeters (Analog and Digital)
   2. Function Generator
   3. Regulated Power Supplies
   4. CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode
2. Zener diode characteristics and Zener as voltage Regulator
3. Input & Output Characteristics of Transistor in CB Configuration
4. Input & Output Characteristics of Transistor in CE Configuration
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier
12. SCR characteristics.
13. UJT Characteristics

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) - 0-30V
2. CRO‟s - 0-20 MHz
3. Function Generators - 0-1 MHz
4. Multimeters
5. Decade Resistance Boxes
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) - 0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes Ge & Si type, Transistors – npn, pnp type)

Course Outcomes:

The student will be able to

1. Analyze the diode and transistor characteristics.
2. Analyse the principles of rectifier circuits using diodes and implement them using hardware.
3. Design the biasing circuits like self biasing.
4. Design various amplifiers like CE, CC, common source FET amplifiers and implement them using hardware and also observe their frequency responses.
5. Learn the concepts of SCR and observe its characteristics.
6. Implement the concepts of unipolar junction transistor and observe its characteristics.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

(E2125) JAVA PROGRAMMING LAB

Course Objectives

The student will

1. Write java programs using arithmetic operators, control statements, type conversion, constructors and string handling
2. Explain how to write java programs using inheritance and polymorphism
3. Explain how to write java programs for creation of user defined packages and interfaces
4. Familiar with exception handling, multithreading and event handling**.**
5. Explain how to write java programs using applets.

EXPERIMENT: I

1. Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.
2. The Fibonacci sequence is defined by the following rule: The first two values n the sequence are 1 and 1. Every subsequent value is the sum of the two Values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value in the Fibonacci sequence.

EXPERIMENT: II

1. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
2. Write a Java program to multiply two given matrices.
3. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

EXPERIMENT: III

1. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
2. Write a Java program for sorting a given list of names in ascending order. c) Write a Java program to make frequency count of words in a given text.

EXPERIMENT: IV

1. Write a Java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
2. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

3. Write a Java program that displays the number of characters, lines and words in a text file.

EXPERIMENT: V

1. Write a Java program that: i) Implements stack ADT. ii) Converts infix expression into Postfix form
2. Evaluates the postfix expression

EXPERIMENT: VI

1. Develop an applet that displays a simple message.
2. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named“Compute” is clicked.

EXPERIMENT: VII

Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, ,*, % operations. Add a text field to display the result.

EXPERIMENT: VIII

Write a Java program for handling mouse and key events.

EXPERIMENT: IX

1. Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
2. Write a Java program that correctly implements producer consumer problemusing the concept of inter thread communication.

EXPERIMENT: X

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

EXPERIMENT: XI

1. Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green.When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
2. Write a Java program that allows the user to draw lines, rectangles and ovals.

EXPERIMENT: XII

1. Write a java program to create an abstract class named Shape that contains an empty method named number of Sides (). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the

classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

2. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines Correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

Text Books:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Programming with Java,M.P.Bhave and S.A.Patekar, Pearson Education
3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

Course Outcomes:

The student will be able to:

6. Write java programs using arithmetic operators, control statements, type
7. conversion, constructors and string handling
8. Write java programs for inheritance and polymorphism
9. Write java programs for creation of user defined packages and interfaces
10. Write java programs for exception handling and multithreading.
11. Write java programs for creation of applets.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**0**

(E2126) GENDER SENSITIZATION

(Common to all branches)

Course Objectives

The student will

1. understand Caste System
2. learn women's work its politics and economics
3. Them aware rebuilding lives.
4. Understand about relationships, responsibilities and gender identities
5. Reflect critically on gender violence.

Unit-I – Gender: Why should we study it?, Socialization: Making women, Making Men, Introduction, Preparing For Womanhood, Growing up male, First lessons in caste, Different masculinities.

Unit-II- Women's Work: Its Politics and Economics,

Fact and fiction, Unrecognized and unaccounted work, Further reading: Wages and conditions of work, Domestic Violence: Speaking Out, Is home a safe place?, When women unite [Film], Rebuilding lives, Further reading: New forums for justice.

Unit-III–Just Relationships: Being Together as Equals,

Mary kom and Onler, Love and acid just do not mix, Love letters, Mothers and fathers, Further Reading: Rosa Parks – The brave heart.

Text Books:

1. Towards a world of equals by A. Suneetha SusicTharu publication Telugu academy Hyderabad.

Course Outcomes:

The student will be able to:

1. Describes the basic structure of Caste system in India and the major four categories to which all castes could be
2. Come out of ignorance and archaic indoctrination to make the world a better place for both men and women.
3. Have learnt to keep them safe and alive in the face of domestic violence.
4. Learn to maintain equality in gender. The student should have understood the responsibility of being good Citizens overcoming social evils describes the basic structure of Caste system in India.
5. Develop a sense of appreciation of women in all walks of life.

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B.Tech. ECM	**L**	**T-P-D**	**C**
II Year - II Semester	**3**	**0-0-0**	**3**

(E220A) MANAGERIAL ECONOMICS FINANCIAL ANALYSIS

(Common to all Branches)

Course Objectives

The student will

1. Analyse financial decisions based on the tools of finance (e.g. Net Present Value).
2. Recognize decision that increase firm value (e.g., capital budgeting).
3. Apply the basic models of asset valuation.
4. Articulate the nature of the relationship between risk and return.
5. Gain knowledge of graduate-level microeconomic theory & macroeconomic theory.
6. Demonstrate knowledge of graduate-level econometrics & mathematical techniques.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function - Isoquants and Isocosts, MRTS, LeastCost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double - Entry Book Keeping, Journal, Ledger, and Trial Balance - Final Accounts (Trasing Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

Course Outcomes:

The student will be able to:

1. Understand the Importance of Micro Economics and demand analysis concepts in detail.
2. Get an idea about the production concepts and analysis of various types of costs.
3. Apply the various pricing strategies and understanding of competitive markets.
4. Application of fundamental concepts of financial accounting.
5. Analyse & interpretation of financial ratios for more financial accuracy.

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(E224B) PULSE AND DIGITAL CIRCUITS

Course Objectives

The student will

1. Explain the complete response of R-C and R-L- C circuits and clippers, clampers.
2. Construct various multi vibrators using transistors.
3. Analyze Time Base generators.
4. Familiarize with Design of Sweep Circuits.
5. Discuss and realize logic gates using diodes and transistors

Unit-I

Linear Wave Shaping: High pass and low pass RC circuits and their response for Sinusoidal,Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input, Ringing Circuit.

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Clamping Operation, clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of diode characteristics on clamping voltage.

Unit-II

Switching Characteristics of Devices: Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, break down voltages, Transistor in Saturation, Transistor-switching times.

Multivibrators: Analysis and Design of Bitable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Unit-III

Time Base Generators: General features of a Time base Signal, Methods of Generating TimeBase Waveform, Miller and Bootstrap Time base Generators-Basic Principles, Transistor Miller Time Base generator, UJT as relaxation oscillator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, Methods of Linearity improvement.

Unit-IV

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuit, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Unit-V

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits, Six Diode Gate, Application of Sampling Gates.

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

Text Books:

1. Millman‟s Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S.Prakash Rao, 2 ed., 2008, TMH.
2. Solid State Pulse circuits –David A. Bell, 4 ed., 2002 PHI.

References Books:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH. 4.Wave Generation and Shaping-L.Strau

Course Outcomes:

The student will be able to:

1. Demonstrate the applications of diode as integrator, differentiator, clippers, and clamper circuits.
2. Design multivibrators for various applications,
3. Elongate Time Base generators.
4. Differentiate synchronization techniques and sweep circuits.
5. Analyze logic gates using diodes and transistors.

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(E227A) COMPUTER ORGANIZATION

Course Objectives:

The student will

1. Understand basic components of computers.
2. Know the architecture of 8086 processor.
3. Learn the instruction sets, instruction formats and various addressing modes of 8086.
4. Analyze the representation of data at the machine level and how computations are performed at machine level.
5. Identify and analyze the memory organization and I/O organization.

UNIT - I: Basic Computer Organization

Functions of CPU, I/O units, Memory, Instructions: instruction formats- One Address, Two Addresses, Zero Addresses & Three Addresses & comparison, addressing modes with numeric examples: program control-status bit conditions, conditional branch instructions, Program interrupts: Types of interrupts.

UNIT - I: Basic Computer Organization
Functions of CPU, I/O units, Memory, Instructions: instruction formats- One Address, Two Addresses, Zero Addresses & Three Addresses & comparison, addressing modes with numeric examples: program control-status bit conditions, conditional branch instructions, Program interrupts: Types of interrupts.

UNIT -II: Input-Output Organization

Input-Output Interface, I/O bus & modules, I/O Vs memory bus, Isolated Vs memory mapped I/O, Asynchronous data transfer Modes of Transfer-Strobe control, Handshaking; Asynchronous serial transfer- Asynchronous communication interface, Modes of Transfer-Programmed I/O, Interrupt driven I/O, DMA, DMA controller, DMA transfer, IOP-CPU IOP, Communication, Intel 8089 IOP

UNIT -III: Memory Organizations

Memory hierarchy, memories, RAM, ROMchips, Memory Address map, Memory connection to CPU, Associate memory, Cache memory, data cache, instruction cache, miss & hit ratio, Access time, associative, set associative mapping, waiting into cache, introduction to virtual memory.

UNIT -IV:8086 CPU Pin Diagram

Special functions of general purpose registers, segment register, concept of pipelining,8086 flag register, Addressing modes of 8086.

UNIT - V: 8086 Instruction Formats

Assembly language programs involving branch & call instructions, sorting, evaluation of arithmetic expressions.

Text Books:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PH

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, Siva raama Dandamudi,SpringerInt.Edition

Course Outcomes:

The student will be able to:

1. Understand the basic components and the design of CPU, ALU and Control Unit.
2. Analyse memory hierarchy and its impact on computer cost/performance.
3. Identify the advantage of instruction level parallelism and pipelining for high performance Processor design.
4. Understand the instruction set, instruction formats and addressing modes of 8086.
5. Write assembly language programs to solve problems

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(E225A) DESIGN AND ANALYSIS OF ALGORITHMS

(Common for CSE, IT & ECM)

Course Objectives:

The student will

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

UNIT - I: Introduction

Algorithm, Pseudo Code for expressing Algorithms, Performance Analysis: Space Complexity, Time Complexity, Asymptotic Notations: Big-oh Notation, Omega Notation, Theta Notation, Little-oh Notation. Disjoint Sets: Disjoint Set Operations, Union and Find Algorithms, Spanning Trees, Connected Components and Biconnected Components.

UNIT - II: Divide and Conquer

General Method, Applications: Binary Search, Quick Sort, Merge Sort, Stassen's Matrix Multiplication. **Greedy Method**: General Method Applications: Job Sequencing with Deadlines, 0/1 Knapsack Problem, Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms, Single Source Shortest Path Problem, Huffman Codes.

UNIT-III: Dynamic Programming

General Method, Principle of Optimality, Applications: Multistage Graphs, Matrix Chain Multiplication, Optimal Binary Search Trees, 0/1 Knapsack Problem, All Pairs Shortest Path Problem, Travelling Sales Person Problem, Reliability Design.

UNIT - IV: Backtracking

General Method, Applications: N Queens Problem, Recursive Permutation Generator, Sum of Subsets Problem, Graph Coloring, Hamiltonian Cycles.

UNIT - V: Branch and Bound

General Method, Applications: Travelling Sales Person Problem, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution. NP-Hard and NP-Complete Problems: Basic Concepts, Non-Deterministic Algorithms, NP-Hard and NP-Complete Classes, Cook‟s Theorem

Text Books:

1. **Fundamentals of Computer Algorithms**-Ellis Horowitz, Satraj Sahni and Raja sekharam, Galgotia Publications Pvt. Ltd.
2. **Introduction to Algorithms**-T.H.Cormen, C.E.Leiserso, R.L.Rivest and C.Stein,2nd Edition, Pearson Education, PHI Pvt. Ltd.

Reference Books:

1. **Algorithm Design: Foundations**, Analysis and Internet Examples-M.T.Goodrich and R.Tomassia, John Wiley and Sons.
2. **Introduction to Design and Analysis** of Algorithms A strategic Approach-R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc-Graw Hill.
3. **Design and analysis of Algorithms**-S. Sridhar, Oxford Higher Education.

Course Outcomes:

The student will: be able to

1. Analyze worst-case running times of algorithms using asymptotic analysis.
2. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
3. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.
4. Describe the greedy paradigm and explain when an algorithmic design situation calls for it.
5. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems

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(E227B) WEB TECHNOLOGIES

Course Objectives:

The student will

1. Learn Client-side scripting with JavaScript and HTML.
2. Understand XML and processing of XML Data with Java.
3. Become familiar with Server-side programming with Java Servlets and JSP.
4. Understand MVC architecture of JSP applications and PHP language for server-side scripting
5. Understand with XML and web services Technologies.

UNIT – I:

Basic Tags of HTML, **I**ntroduction HTML5, and new HTML5 Form Input Types. Cascading Style Sheets.

Introduction to JavaScript: declaring variables, functions, event handlers (onClick , onsubmit etc). Form validation.

UNIT – II:

Introduction to XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX. Introduction to web service solution stacks XAMPP: Introduction to content Management Systems Joomla, word press.

UNIT – III:

Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlet, Deploying Servlet, Servlet API, Reading Servlet parameters, Reading initialization parameters, handling Http Request & Responses. Session tracking, cookies. Connecting to a database using JDBC.

UNIT – IV:

Introduction to JSP: The anatomy of a JSp page, JSP processing, Declarations, Directives, Expressions, code snippets, implicit objects. Using beans in JSP pages. Using cookies for session tracking. Connecting to database in JSP.

UNIT – V:

Introduction to PHP: Downloading, installing, configuring PHP, The anatomy of a PHP Page. Basic Security Guidelines, Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions; Switching Flow, Loops, Code Blocks and Browser Output, Objects, Strings Processing, Form processing, connecting to database, using cookies, dynamic contents.

Text books:

1. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book

2. Dietel and Dietel : "Internet and World Wide Web - How to Program", 5th Edition, PHI/Pearson Education, 2011

Reference books:

1. Chris Bates, "Web Programming, building internet applications", 2nd Edition, WILEY,Dreamtech, 2008.
2. Herbert Schildt, "The complete Reference Java 2", 8th Edition, TMH, 2011.
3. Hans Bergsten : "Java Server Pages", 3rdEdition, O"Reilly publication, 2008

Course Outcomes:

The student will: be able to

1. Outline the history of the web, and technologies to create a static website using HTML and publish them.
2. Develop the web pages more dynamic and interactive using Javascript.
3. Demonstrate to Install Tomcat Server and execution of programs on server side.
4. Identify the problems in Servlets and overcome those using Java Server Pages also develop JSP applications with Model View Control architecture.
5. Establish the Connection between Java Application and database to insert, retrieve and modify the data in tables using PHP.

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(E2214) ANALOG ELECTRONICS LAB

Course Objectives

The student will:

1. Become familiar with circuit realizations with components such as diodes, BJTs and FETs.
2. Understand various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
3. Acquaint with the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.
4. Generalize the power amplifiers.
5. To design single Tuned voltage amplifier

List of Experiments (Twelve experiments to be done):

Design (any six) and Simulation (any Ten) using Multisim or Pspice or Equivalent Simulation Software:

1) Common Emitter Amplifier
2) Common Base Amplifier
3) Common Source amplifier
4) Two Stage RC Coupled Amplifier
5) Current Shunt and Voltage Series Feedback Amplifier
6) Cascode Amplifier
7) Wien Bridge Oscillator using Transistors
8) RC Phase Shift Oscillator using Transistors
9) Class A Power Amplifier (Transformer less)
10) Class B Complementary Symmetry Amplifier
11) Hartley and Colpitt‟s Oscillator
12) Single Tuned Voltage Amplifier

Equipments required for Laboratories:

1) For software simulation of Electronic Circuits Computer Systems with latest specifications Connected in LAN (Optional)
Operating system (Windows XP)

Simulations software (Multisim / TINAPRO) Package
2) For Hardware simulations of Electronic Circuits RPSs CROs Functions Generators Multimeters Components.

Course Outcomes:

Student will be able to:

1. Identify the classification of amplifiers and analyze the CE & CC amplifiers.
2. Design and analyze Common Source amplifier.
3. Design and analyze Two stage RC coupled amplifier.
4. Understand Class A power amplifier.
5. Design and analyze single Tuned voltage amplifier.

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(E2222) PULSE AND DIGITAL CIRCUITS LAB

Course Objectives:

The student will:

1. Learn the complete response of R-C and R-L-C transient circuits.
2. Explain clippers, clampers, switching characteristics of transistors and sampling gates.
3. Design various multivibrators using transistors, design of sweep circuits and sampling gates.
4. Discuss and realize logic gates using diodes and transistors.
5. Design and analyse of UJT Relaxation Oscillator and Bootstrap Sweep Circuit.

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap Sweep Circuit.

Equipment required for Laboratories:

1.Regulated Power Supply - 0 – 30 V
2.CRO - 0 – 20 M Hz.
3.Function Generators - 0 – 1 M Hz
1.0 Components
1.1 Multi Meters

Course Outcomes:

Student will be able to:

1. Understand the applications of diode as integrator, differentiator, clippers, clamper circuits.
2. Learn various switching devices such as diode, transistor, SCR.
3. Demonstrate the Difference between logic gates and sampling gates.

4. Design multi-vibrators for various applications, synchronization techniques and sweep circuits.
5. Realize logic gates using diodes and transistors.
6. Understand time and frequency domain aspects.
7. Analyze the importance of clock pulse and its generating techniques.

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(E2223) WEB TECHNOLOGIES LAB

Course Objectives:

The student will:

1. Construct web pages that meet guidelines for efficient download and cater to the needs of an identified audience using HTML.
2. Evaluate the functionsof specific types of web pages in relationship to an entire web site using HTML and CSS.
3. Understand the use of JavaScript to access and web services for dynamic content.
4. Demonstrate Improve problem solving skills using arrays, stringsand functions in PHP.
5. Demonstrate the ability to retrieve data from a database and present it in a web page using PHP.

EXPERIMENT: I

Design the following static web pages required for an online book store web site.

1) HOMEPAGE:

The static home page must contain three frames. Top frame, left frame, right frame.

2) LOGIN PAGE:

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

EXPERIMENT: II

4) CART PAGE:

The cart page contains the details about the books whih are added to the cart.

1. REGISTRATION PAGE:

create a “registration form” with the following fields

1. Name(text fields)
2. Password(password field)
3. E-mail id(text field)
4. Phone number(text field

6) Sex(radiobutton)

7) Date of birth(3 select boxes)

8) Languages known(hek boxes-eglish,telugu,hindi,tamil)

9) Address(text area)

EXPERIMENT: III

VALIDATION

Write JavaScript to validate the following fields of the above registration page.

1. name
2. password
3. E-mail id
4. Phone number

EXPERIMENT: IV

Design a webpage using CSS(cascading style sheets)which includes the following:

1) Use different font,styles:
2) Set a background image for both the page and single elements on the page.
3) Control the repetition of the image with the background –repeat property.
4) Define styles for links as

A: link A:visited A:ative A:hover

5) Work with layers
6) Add a customized cursor

EXPERIMENT: V

Write an XML file which displays the book information which includes the following:

1. Title of the book
2. Author Name
3. ISBN number
1. Publisher name
2. Edition
3. Price

Write a document Type Definition (DTD) to validate the above XML file. Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in olor GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

EXPERIMENT: VI VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle,if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the “propertyWindow”.

EXPERIMENT: VII

1) Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed sati web pages for books web site,using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls: http://localhost:4040/rama/books.html (for tomcat)

EXPERIMENT: VIII

USER Authentication:

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servelet for doing the fol- lowing.

1. Create a Cookie and add these four user ids and passwords to thisCookie.

2. Read the user id and passwords entered in the Login form (week1)and authenticate with the values(user id and passwords) available in the cookies.If he is a valid user (ie.,user-name and password match) youshould welcome him by name(user-name) else you should display. "You are not an authenticated user".Useinit- parameters to do this. Store the user-names and passwords in he webinf.xml and access them in the servelet by using the getInitParameters() method.

EXPERIMENT: IX

Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields:name,password,email-id,phone number(these should hold the data from the registration form)

Practice„JDBC‟ connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL que- ries.

Insert the details of the users who register with the web site,whenever a new user clicks the sudmit button in the registration page(week 2).

EXPERIMENT: X

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database(similar to week8 instead of cookies)

EXPERIMENT: XI

Create tables in the database which contain the details of items(books in our case like book name, price, Quantity, Amount) of each category.Modify your catalogue page (week2) I such

a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

EXPERIMENT: XII

HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart page for the selecteditems. He can check the cart page for the selected items. He may visit the catalogue again and select some more items.Here our interest is the selected items should be added to the old cart rather than a new cart.

Multiple users can do the same thing at a time (ie.,from different systems in the LAN using the ip-address instead of localhost).This can be achieved through the use of sessions.Every user will have his own session which will have his own session which will be created after his useful login to the website.When the user logs out his session should get invalidated(by using the method session invalidate ()).

Modify your catalogue ad art JSP pages to achieve the above mentioned functionality using sessions.

Course Outcomes:

Student will be able to:

1. Implements static web pages using Hypertext Markup Language.
2. Understand markup languages for processing, identifying, and presentingof information in web pages.
3. Use scripting languages and web services to transfer data and add interactive components to web pages.
4. Understand basic concepts in PHP like arrays, strings and functions in PHP.
5. Create and communicate between client and server using PHPand create a good, effective and dynamic website

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(E315F) DATA STRUCTURES THROUGH C

Course Objectives:

The student will:

1. Develop the logical and analytical skills.
2. Learn to develop the programs which will help to solve real time problems and also to create the novel products.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structure algorithms.
5. To design and implement various data structure algorithms.

UNIT - I:

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II:

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation. Queues-operations, array and linked representations.CircularQueueoperations,Dequeue,applicationsofqueue

UNIT - III:

Trees – Definitions, Binary tree representation, Binary search tree, binary treetraversals, AVLtree–operations-tree–operations, B+trees, Red Blacktree.

UNIT - IV:

Graphs:Terminology,sequentialandlinkedrepresentation,graphtraversals:DepthFirstSearch& BreadthFirstSearchimplementation.Spanningtrees, Primsand Kruskalsmethod.

UNIT - V:

SearchingandSorting–BigONotation,Sorting-selectionsort,bubblesort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

Text Books:

1. Data Structures Using C Reema Thareja, Oxford University Press, 2011 Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

Reference Books:

1. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage
2. C& Data structures – P. Padmanabham, Third Edition, B. S. Publications.
3. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M. J. Augenstein, Pearson Education.

Course Outcomes:

The student will be able to:

1. Analyze the language.
2. Write programs in C to solve the problems.
3. Review data structures such as lists, stacks, queues.
4. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
5. Implement linear and Non-Linear data structures.

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(E314B) LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

Course Objectives:

The student will:

1. Understand the basic building blocks of linear integrated circuits.
2. Learn linear and non-linear applications of operational amplifier.
3. Analyze the theory and application of analog multipliers and PLL
4. Understand theory of ADC and DAC
5. Master the concept of waveform generation and introduce some special function ICs.
6. Design and analyze the working of basic digital circuits.

UNIT - I:

Operational Amplifier

Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics, 741 Op-Amp and its Features, Modes of operation-inverting, Non-inverting, differential. Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Multipliers & dividers, Differentiators and Integrators, Comparators, Schmitt Trigger, Multivibrators, Introduction to Voltage Regulators, Features of 723 Regulators.

UNIT - II:

Op-Amp, IC-555& IC 565 Applications:

Introduction to Active Filters, characteristics of Band pass, Band reject and all pass filters, Analysis of 1st Order LPF, HPF Butterworth Filters, wave form Generators – Triangular, sawtooth, Square Wave, IC555Timer-Functional Diagram, Monostable and Astable operations. Applications, PLL- Introduction, Block Schematic, Principles and Description of individual Blocks, Applications.

UNIT - III:

DATA CONVERTERS

Introduction, Basic DAC Techniques - Weighted Resistor DAC, R-2R Ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - Parallel Comparator Type ADC, Counter ADC, Successive Approximation Register ADC and Dual Slope Type DAC and ADC Specifications.

UNIT - IV:

DIGITAL INTEGRATED CIRCUITS

Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing - Standard TTL NAND Gate-Analysis & Characteristics, Driving CMOS&CMOS Driving TTL, Comparison of Various Logic Families, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL Design using TTL-74XX Series & CMOS 40XX Series ICs, TTL ICs - Code Converters, Decoders, Demultiplexers, Decoders & drives for LED & LCD display, Encoders, Priority Encoders, multiplexers & their applications, Priority Generators, Arithmetic Circuit ICs-Parallel Binary Adder/Subtractor Using 2's Complement System, Digital Comparator Circuits.

UNIT - V:

SEQUENTIAL

Logic IC's: familiarities with commonly available 74XX & CMOS 40XX Series of IC counter. Flip-Flops & their Conversions, Design of synchronous counters, Decade counters, Shift Registers & applications

Memories: ROM architecture, types & applications, RAM architecture, Static and Dynamic Rams, synchronous DRAM.

Text Books:

1. Linear Integrated Circuits -D. Roy Chowdhury, New Age International (p)Ltd, 3" Ed., 2008.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.

Reference Books:

1. Operational Amplifiers & Linear Integrated Circuits – R.F. Coughlin & Fredrick F. Driscoil, PHI, 1977.
2. Operational Amplifiers & Linear Integrated Circuit: Theory & Applications – Denton J. Daibey, TMH.
3. Design with Operational Amplifier & Analog Integrated circuits – Sergio Franco, McGraw Hill, 3rd Ed., 2002.

Course Outcomes:

Student will be able to:

1. Understand about operational amplifiers with linear integrated circuits
2. Analyze the different families of digital ICs and their characteristics.
3. Design circuits using Op-Amp for various applications
4. Generate the different waveforms using different ICs.
5. Design the digital ICs

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(E314D) MICROPROCESSORS AND MICROCONTROLLERS

Course Objectives:

The student will:

1. Learn the basics of 8, 16-bit microprocessor architecture and its functionalities.
2. Understand the programming model of microprocessor.
3. Develop the microprocessor/ microcontroller-based programs for various applications, DOS/BIOS programs.
4. Make the interfacing in between microprocessor and various peripherals.
5. Know basic feature of 8051 and AVR controller.

UNIT - I:

8086 Architecture: 8086 Architecture-Functional diagram, Register organization, memory segmentation, programming model, memory addresses, physical memory organization, architecture of 8086, signal descriptions of 8086-common function signals, Timing diagrams, interrupts of 8086.

UNIT - II:

Instruction set and assembly language programming of 8086: instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT - III:

I/O Interface: 8255 PPI, Various modes of operation and interfacing to 8086, interfacing keyboard, Display, D/A and A/D converter.

Interfacing with advanced devices: memory interfacing to 8086, interrupt structure of 8086, vector interrupt table, interrupt service routine.

Communication interface: serial communication standards, serial data transfer schemes, 8251 USART architecture and interfacing.

UNIT - IV:

Introduction to Microcontrollers: overview of 8051 microcontroller, architecture, I/O ports, memory organization, addressing modes and instruction set of 8051, simple programs.

UNIT - V:

8051 Real Time control: programming time interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 Timers and counters.

Text Books:

1. D.V.Hall, Microprocessors and interfacing , TMGH,2nd Edition 2006.
2. Kenneth.J.Ayala, The 8051 Microcontroler, 3rd Ed., Cengage Learning.

Reference Books:

1. Advanced Microprocessors and peripherals-A.K.Ray and K.M Bhurchandi, TMH, 2 nd Edition 2006.
2. The 8051 Microcontrollers. Architecture and programming and applications-K.Uma Rao, Andhe Pallavi, Pearson,2009.
3. Micro computer system 8086/8088 family architecture. Programming and design - Du and GA Gibson, PHI 2nd Edition.

Course Outcomes:

Student will be able to:

1. Compare 8085 and 8086 microprocessors architectures and its functionalities.
2. Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP
3. Interface external peripherals and I/O devices and program the 8086 microprocessors.
4. Write Interrupt Service Routine (ISR) to handle interrupts in 8086 microprocessors to transmit data serially in Multi-processor applications.
5. Interface Microprocessor and Microcontroller with other electronic devices

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III Year - I Semester	**3**	**0-0-0**	**3**

(E310B) MANAGEMENT SCIENCE

Course Objectives:

The student will:

1. Maximize Results with Minimum Efforts.
2. Increase the Efficiency of factors of Production.
3. Maximize Prosperity for Employer & Employees.
4. Provide Human betterment & Social Justice**.**
5. Be familiar with Contemporary management practices and strategic management.

UNIT - I:

Introduction to Management: Concepts of Management and Organization—Nature,Importance and Functions of Management, System Approach to Management--Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor. Theory of Motivation -- Leadership Styles, Social responsibilities of Management.

Designing Organizational structures: Basic concepts related to Organization—Departmentation and Decentralization, Types and Evaluation of Mechanistic and organic structures of organization and suitability.

UNIT - II:

Operations Management: Principles and Types of Plant Layout – Methods of production (Job, batch and Mass Production), Work study- Basic procedure involved in Method Study and Work measurement – Business Process Reengineering (BPR)-- Statistical Quality control: control charts of variables and attributes (Simple problems) and Acceptance sampling, Deming's contribution to quality. Objectives,

Need for inventory control, EOQ, ABC Analysis, purchase procedure, stores management and stores records- Supply chain management.

Objectives of inventory control, EOQ, ABC Analysis, purchase procedure, stores management and stores records- JIT system, Supply Chain Management. Functions of Marketing, Marketing mix, marketing strategies based on product life cycle, channels of distribution.

UNIT - III:

Human Resources management(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations(PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and development, Placement, Wage and salary Administration, Promotion, Transfer, Separation, performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity

Model (CMM) Levels – Performance Management System.

UNIT - IV:

(PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of completing the project within given time, Project Cost analysis, Project cost analysis, project crashing, (simple problems).

UNIT - V:

Strategic Management: Mission Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

Text Books:

1. Stoner, Freeman, Gilbert, Management, 6th Edition, Pearson Education, 2009.P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd., 2012.
2. Kotler Philip & Keller,Kevin Lane: Marketing Management PHI. 2009.

Reference Books:

1. Koontz. Weihrich, & Aryasri: Principles of Management, TMH, 2009.
2. Thomas N.Duening & John Mivancevich Management--Principles and Guidelines. Cengage, 2009.

Course Outcomes:

The student will be able to:

1. Plan an organizational structure for a given context in the organization.
2. Carry out production operations through Work study
3. Understand the markets, customers and competition better and price the given products appropriately.
4. Ensure quality for a given product or service.
5. Recognize the stages of different product life cycles.

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(E3119) DATA STRUCTURES LAB

Course Objectives:

The student will:

1. Implement linked list, stack, queue, tree
2. Develop programming skills using the fundamentals and basics of C language
3. Manipulate character strings in C programs.
4. Utilize pointers to efficiently solve problems
5. Learn functions from the portable C library and to describe the techniques for creating

Program modules using functions and recursive functions.

1. Write a C program that uses functions to perform the following operations on singly linked list:
   (I) Creation (II) Insertion (III) Deletion (IV) Traversal (V) merge two single linked lists
2. Write a C program that uses functions to perform the following operations on doubly linked list.
   (I) Creation (II) Insertion (III) Deletion (IV) Traversal
3. Write a C program that uses functions to perform the following operations on circular linked list:
   (I) Creation (II) Insertion (III) Deletion (IV) Traversal
4. Write a C program that implement stack operations using
   (I) Arrays (II) Linked Lists
5. (I) Write a C program to convert infix expression to postfix expression using stack
   (II) Write a C program to evaluate postfix expression
6. (I) Programs using recursion
   (II) Write a C program to convert infix expression to prefix expression using stack
7. Write a C program to implement Linear queue using
   (I) Arrays (II) Linked Lists
8. Write a C program to perform following operations on a circular Queue
   (I) Insertion (II) Deletion (III) search and count
9. Write a C program to perform following operations on a circular DeQueue
   (I) Insertion (II) Deletion (III) search and count
10. (I) Write a C program to implement Linear search
    (II) Write a C program to implement Binary Search
11. Write C programs that implement the following sorting methods to sort a given list

of integers in ascending order:
(I) Bubble sort (II) Selection sort (III) Insertion Sort

12. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
(I) Merge sort (II) Quick sort
13. (I) Write a C Program to implement binary tree traversals
(II) Write a C Program to implement AVL tree operations
14. (I) Implementation of a Graph representation using Adjacency Matrix
(II) Write a C program to implement graph traversals.

Course Outcomes:

The student will be able to:

1. Write, compile and debug programs using different programming constructs in C language.
2. Design programs using modular structures
3. Apply and practice logical ability to solve the problems using C
4. Document and present the algorithms flow charts and programs
5. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.

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(E3120) LINEAR INTEGRATED CIRCUITS AND APPLICATIONS LAB

Course Objectives:

The student will:

1. Understand the internal block diagram of operational amplifier and its characteristics both ideal and practical.
2. Illustrate some typical applications of operational amplifiers in linear and non linear modes of operation.
3. Construct various active filter circuits using operational amplifier for various frequency response characteristics.
4. Study the block diagrams of 555 timer and 565 phase locked loops ICs and use them to construct various applications.
5. Understand techniques of Analog to digital and digital to analog.

Note:- Minimum of 12 experiments to be conducted.

1. OP AMP Applications - Adder, Subtractor (using IC741)
2. Integrator and Differentiator Circuits using IC 741
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. IC 565 – PLL Applications
7. Voltage Regulator IC 723, Three terminal voltage regulators - 7805, 7812, 7912.
8. Linear wave shaping
9. Non-linear wave shaping
10. Op-amp as square wave generator
11. Bistable multivibrator
12. Monostable multivibrator
13. Astable multivibrator
14. Schmitt trigger
15. Voltage regulator
16. UJT relaxation oscillator
17. 555 timer as astable & monostable multivibrator
18. Op-amp as active integrator &differentiator
19. Boot strap time base generator

Equipment Required: CRO, Function generator, RPS, Breadboards

Course Outcomes:

Student will be able to:

1. Demonstrate the internal operation of Op-Amp and its specifications.
2. Analyze and design linear and non linear applications like adder, subtractor, multiplier, comparator, instrumentation amplifier and etc. using Op-Amp.
3. Classify various active filter configurations based on frequency response and construct using 741 Op-Amp.
4. Operate 555 timers in different modes like bistable, monostable and astable operations and study their applications.
5. Determine the lock range and capture range of PLL and use in various applications of communications.

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(E3121) MICROPROCESSORS AND MICROCONTROLLERS LAB

Course Objectives:

The student will:

1. Learn assembly language programming & embedded C.
2. Familiarize with programming and interfacing microcontrollers to various devices.
3. Design various applications using microcontrollers.
4. Understand designing of embedded systems.
5. Understand importance of programming peripheral devices.

List of Experiments:

Note: - Minimum of 12 experiments to be conducted.

The following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using various addressing Modes).
2. Program for sorting array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulation for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessors using kit 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART Operation in 8051.
14. Communication between 8051 kit and PC
15. Interfacing LCD to 8051.
16. Interfacing Matrix/keyboard to 8051.
17. Data transfer from peripheral to memory through DMA controller 8237/8257.

Course Outcomes:

Student will be able to:

1. Write assembly language programming & embedded C.
2. Interface microcontrollers to various devices.
3. Analyze and develop various applications using microcontrollers.
4. Design of embedded systems.
5. Programme peripheral devices.

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(E327A) DATA BASE MANAGEMENT SYSTEMS

Course Objectives

The student will:

1. Learn the basic concepts and the applications of database systems.
2. Master the basics of SQL and construct queries using SQL.
3. Understand the relational database design principles.
4. Become familiar with the basic issues of transaction processing and concurrency control.
5. Identify and analyzed at a base storage structures and access techniques.

UNIT - I:

Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor

ER diagrams –Beyond ER Design Entities, Attributes and Entity sets–Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model

UNIT - II:

Introduction to the Relational Model

Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra

Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT - III:

Form of Basic SQL Query

Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

Schema refinement

Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition - Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT - V:

Data on External Storage

File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Advanced Database Management System

Introduction to Distributed Database-Reference Architecture, fragmentation, Allocation, Joins

Text Books:

1. **Data base Management Systems,** Raghurama Krishnan, Johannes Gehrke, and TATA McGrawHill 3rd Edition.
2. **Data base System Concepts,** Silberschatz, Korth, McGraw hill, V edition.

Reference Books:

1. **Data base Systems design,** Implementation, and Management, Peter Rob &Carlos Coronel 7th Edition.
2. **Fundamentals of Database Systems,** Elmasri Navrate Pearson Education.
3. **Introduction to Database Systems,** C.J.Date Pearson Education.

Course Outcomes:

The student will: be able to

1. Demonstratethebasicelementsofarelationaldatabasemanagementsystem.
2. Identify the data models for relevant problems.
3. DesignentityrelationshipmodelandconvertentityrelationshipdiagramsintoRDBMSandformulateSQLqueriesonthedata.
4. Master in schema refinement and understanding normalization principles.
5. Apply normalization for the development of application software.

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(E3245) ANALOG COMMUNICATIONS

Course Objectives:

The student will: :

1. Analyze system requirements of analog communication systems.
2. Understand the need for modulation
3. Learn about the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
4. Acquire knowledge to analyze the noise performance of analog modulation techniques.
5. Know theoretical knowledge of each block in AM and FM receivers.

UNIT - I:

Amplitude Modulation: Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT - II:

SSB Modulation: Introduction to Hilbert Transform, Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT - III:

Angle Modulation: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

UNIT - IV:

Noise: Resistive Noise Source (Thermal), Arbitrary Noise Sources, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise, & its properties Noise in

Analog communication System, Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis.

UNIT - V:

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Division Multiplexing.

Text Books:

1. Communication Systems by Simon Haykins John Wiley & Sons, 4th Edition.
2. Electronics & Communication System – George Kennedy and Bernard Davis, McGraw Hill Education 2004.

Reference Books:

1. Communication theory, thomas,2ND Edition, McGraw-Hill Education
2. Communication Systems, 2E, R. P. Singh, S. D. Sapre, McGraw-Hill Education, 2008.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.
4. Electronics Communication Systems- Wayne Tomasi, 6th Edition, Person 2009.

Course Outcomes:

Student will be able to:

1. Differentiate various modulation and demodulation of analog systems.
2. Analyze the characteristics of noise present in analog systems.
3. Determine Signal to Noise Ratio (SNR) performance, of various Analog Communication systems.
4. Design the various Pulse Modulation Systems.
5. Design and implement low power AM and FM transmitters.

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(E327B) AUTOMATA AND COMPILER DESIGN

(PROFESSIONAL ELECTIVE-I)

Course Objectives:

The student will:

1. Understand the major concept areas of language translation and compiler design.
2. Enrich the knowledge in various phases of compiler ant its use, code Optimization techniques, machine code generation, and use of symbol table.
3. Extend the knowledge of parser by parsing LL parser and LR parser.
4. Implement the concepts of semantic analysis using semantic rules.
5. Apply the knowledge of Data flow analysis and object code generation.

UNIT - I:

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, Lex tools.

UNIT - II:

Context Free grammars and top down parsing: Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL (1) parsing.

Bottom up parsing: handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

UNIT - III:

Semantics: Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements.

Context Sensitive features –Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

UNIT - IV:

Run time storage: Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.

Code optimization: Principal sources of optimization, optimization of basic blocks, peep hole optimization, flow graphs, Data flow analysis of flow graphs.

UNIT - V:

Code generation: Machine dependent code generation, object code forms, generic code

generation algorithm, Register allocation and assignment. Using DAG representation of Block.

TEXT BOOKS:

1. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

REFERENCE BOOKS:

1. Modern Compiler Construction in C, Andrew W. Appel Cambridge University Press.
2. Compiler Construction, LOUDEN, Thomson.
3. Elements of Compiler Design, A. Meduna, Auerbach Publications, Taylor and Francis Group.

Course Outcomes:

Student will be able to:

1. Analyze design a compiler to implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler.
2. Apply the knowledge of lex tool & yacc tool to develop a scanner & parser.
3. Implement parsing technique using LL parser and LR parser.
4. Apply semantic rules into a parser that performs attribution while parsing.
5. Acquire the knowledge of Data flow analysis and object code generation.

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(E327C) COMPUTER FORENSICS

(PROFESSIONAL ELECTIVE-I)

Course Objectives:

The student will:

1. A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
2. In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
3. According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.
4. Learn the importance of evidence handling and storage for various devices
5. Develop an excellent understanding of current cyber security issues (Computer Security Incident) and analyzed the ways that exploits in securities.

UNIT - I:

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Military Computer Forensics Technology, Types of Law Enforcement - Computer Forensic Technology - Types of Business Computer Forensics Technology. Computer Forensics Evidence and Capture: Data Recovery Defined- Data Back-up and Recovery- The Role of Back-up in Data Recovery- The Data Recovery Solution.

UNIT - II:

Evidence Collection and Data Seizure: Why Collection Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence- Volatile Evidence- General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The chain of Custody.

Duplication and preservation of Digital Evidence: Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting Preserving Computer Forensics Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation.

UNIT - III:

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data – hiding techniques, performing remote acquisitions.

Network Forensics: Network Forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

UNIT - IV:

Processing crime and incident scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case.

Current computer forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software.

UNIT - V:

E-Mail investigations: Exploring the role of E-mail in investigation, exploring the role of the client and server in E-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools. Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Working with windows and DOS Systems: Understanding file systems, exploring Microsoft File Structures, Examining NTFS Disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS Startup tasks, virtual machines.

Text Books:

1. Computer forensics, computer crime investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer forensics and investigations by Nelson, Phillips Enfinger Steuart, CENGAGE Learning.

Reference Books:

1. Real Digital Forensics by Keith J. Jones, Rechard Bejtlich, Curtis W. Rose, Addison-Wesley Pearson Education.
2. Forensic compiling, A Tractitioneris Guide By Tony Sammes and Brain Jenkinson, Springer International Edition.
3. Computer Evidence Collection & Presentation by Christopher L.T.Brown, Firewall Media.

Course Outcomes:

Student will be able to:

1. Understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
2. Continue their zeal in research in computer forensics.
3. Define the concept of ethical hacking and its associated applications in Information Communication Technology (ICT) world.
4. Underline the need of digital forensic and role of digital evidences.
5. Apply the knowledge of IDS to secure network and performing router and network analysis.

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(E327D) INTRODUCTION TO NEURAL NETWORKS

(PROFESSIONAL ELECTIVE-I)

Course Objectives:

At the end of the course, The student will: learn:

1. Understand the differences and similarities neural network, human brain and feedback systems
2. Learn the different learning techniques
3. Familiar with the concept of single layer perceptron and its algorithms.
4. Familiar with the concept of multilayer perceptron and its algorithms
5. Know the self-organisation mapping techniques.

UNIT - I:

Introduction: What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks.

UNIT - II:

Learning Process: Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process.

UNIT - III:

Single layer perceptrons: Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception-convergence theorem, Relation between perception and Bayes classifier foe a Gaussian Environment.

UNIT - IV:

Multilayer Perceptrons: Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment, feature detection.

UNIT - V:

Self –Organization Maps: Two basic feature mapping models, Self-Organization maps, SOM algorithm.

Hopfield models: Hopfield models, computer experiment.

Text Books:

1. Neural networks A comprehensive foundation, Simon Haykin, PHI edition.
2. Artificial neural networks- B. Vegnanarayana Prentice Halll of India P Ltd 2005.

Reference Books:

1. Neural networks in Computer intelligence, Li Min Fu TMH 2003.
2. Neural networks James A Freeman David M S kapura. Pearson education 2004.

Course Outcomes:

Student will be able to:

1. Know differences and similarities between neural network, human brain and feedback systems
2. Get the knowledge of different learning techniques
3. Describe the concept of single layer perceptron and its algorithms.
4. Describe the concept of multilayer perceptron and its algorithms.
5. Analyse the self-organisation mapping techniques.

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B.Tech. ECM	**L**	**T-P-D**	**C**
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(E324K) EMBEDDED SYSTEMS

(PROFESSIONAL ELECTIVE-II)

Course Objectives:

The student will:

1. Understand the basic concepts of embedded systems and 8051 microcontroller.
2. Compare and contrast the basics of assembly programming language.
3. Identify the unique characteristics of real-time systems
4. Analyze the general structure of a real-time system and define the unique design problems and challenges of real-time systems.
5. Acquaint the embedded software development tools and various advanced architectures.

UNIT - I:

Embedded Computing: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

UNIT - II:

The 8051 Architecture: Introduction, 8051 micro controller hardware, input/output ports and circuits, external memory, counter and timers, serial data input/output, interrupts.

Basic Assembly Language Programming Concepts: The assembly language programming process, programming tools and techniques, programming the 8051. Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions.

UNIT - III:

Introduction to Real-Time Operating Systems: Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

Basic Design Using a Real-Time Operating System: Principles, semaphores and queues, hard real-time scheduling considerations, saving memory and power, an example RTOS like uC-OS (open source)

UNIT - IV:

Embedded Software Development Tools: Host and target machines, linker/locators for embedded software, getting embedded software into the target system.

Debugging Techniques: Testing on host machine, using laboratory tools, an example system.

UNIT - V:

Introduction to advanced Architectures: ARM and SHARC, processor and memory organization and instruction level parallelism; networked embedded systems: bus protocols, I^2C bus and CAN bus; internet-enabled systems, design example-elevator controller.

Text Books:

1. Wayne Wolf (2008), Computers as Components-principles of embedded computer system design, Elseveir, New Delhi, India.
2. Kenneth J. Ayala (2008), The 8051 Microcontroller, 3rd edition, Cengage Learning, India.

Reference Books:

1. David E. Simon (1999), An Embedded Software Primer, Pearson Education, India.
2. Jean J. Labrosse (2000), Embedding System Building Blocks, 2nd edition, CMP publishers, USA.
3. Raj Kamal (2004), Embedded Systems, Tata McGraw hill, India.

Course Outcomes:

Student will be able to:

1. Program an embedded system
2. Analyze Interfacing with keyboard, A/D & D/A conversions, serial data Communication, LCD and LED display.
3. Illustrate Tasks, Semaphores, Message queues, pipes, Timer functions.
4. Design embedded systems and real-time systems
5. Compare and contrast ARM, SHARC, internet enabled systems

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B.Tech. ECM	**L**	**T-P-D**	**C**
III Year - II Semester	**3**	**1-0-0**	**4**

(E327E) ELECTRONICS MEASUREMENT AND INSTRUMENTATION
(PROFESSIONAL ELECTIVE-II)

Course Objectives:

The student will:

1. It provides an understanding of various measuring systems functioning and metrics for performance analysis.
2. Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
3. Understand use of various measuring techniques for measurement of different physical parameters using different classes of transducers.
4. Define basic concepts and definitions in measurement.•Describe the bridge configurations and their applications.

UNIT - I:

Block Schematics of Measuring Systems: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT - II:

Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators.

Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video Signal Generators, and Specifications.

UNIT - III:

Oscilloscopes: CRT, Block Schemantic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Strorage Oscilloscopes, Digital Storage CROs.

UNIT - IV:

Transuducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperatue sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT - V:

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acqisition Systems.

Text Books:

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

Reference Books:

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education – 2010.
5. Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

Course Outcomes:

Student will be able to:

1. Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
2. Measure various physical parameters by appropriately selecting the transducers.
3. Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.
4. Recognize the evolution and history of units and standards in Measurements.
5. Identify the various parameters that are measurable in electronic instrumentation.

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III Year - II Semester	**3**	**1-0-0**	**4**

(E327F) TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(PROFESSIONAL ELECTIVE-II)

Course Objectives:

The student will:

1. To learn Switching, Signalling and traffic in the context of telecommunication network.
2. To expose through the evolution of switching systems from manual and electro mechanical systems to stored-program-controlled digital systems.
3. To study signalling, packet switching and networks.
4. Describe and apply fundamentals of telecommunication systems and associated technologies.
5. Apply the principles of queuing theory in evaluating the performance of congested telecommunication networks.

UNIT - I:

Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point TECHNOLOGY; Crossbar Exchange Organization; A General Trucking; Electronic Switching; Digital Switching Systems.

Telecommunications Traffic: Introduction; The Unit of Traffic; Congestion; Traffic Measurement; A Mathematical Model; Lost-Call Systems-Theory; Traffic Performance; Loss Systems in Tandem; Use of Traffic Tables; Queuing Systems-The Second Erlang Distribution; Probability of Delay; Finite Queue Capacity; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formula.

UNIT - II:

Switching Networks: Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks

Time Division Switching: Basic Time Division Space Switching; Basic Time Division Time Switching; Time Multiplexed Space Switching; Time Multiplexed Time Switching; Combination Switching; Three Stage Combination Switching. Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

UNIT - III:

Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems-Outband Signaling; in band (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCI I I Signaling System Number 6; CCI - I Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT - IV:

Packet Switching: Introduction; Statistical Multiplexing; Local Area And Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagram's and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT - V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing — General, Automatic Alternative Routing.

Text Books:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

Reference Books:

1. John C Bellamy, "Digital Telephony John Wiley International Student Edition,3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi, "Introduction to Data Communication and Networking," Pearson Education, 1st Edition, 2007

Course Outcomes:

Student will be able to:

1. Understand the main concepts of telecommunication network design
2. Analyze and evaluate fundamental telecommunication traffic models.
3. Understand basic modern signalling system.
4. Solve traditional interconnection switching system design problems.
5. Understand the concept of packet switching.

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III Year - II Semester	**0**	**0-3-0**	**2**

(E3219) DATA BASE MANAGEMENT SYSTEMS LAB

Course Objectives:

The student will –

1. Introduce ER data model, database design and normalization.
2. Learn SQL basics for data definition and data manipulation.
3. Understand concepts of basic SQL as a universal Database language.
4. Design of an efficient database using normalization concepts.
5. Create indexes for databases for efficient retrieval.

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Oracle" database. Roadway Travels "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations Reservations & Cancellation: Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family). Cancellations are also directly handed at the booking office. In the process of computerization of Roadway Travels, you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like

1. Analyzing the problem and identifying the Entities and Relationships
2. E-R Model
3. Relational Model
4. Normalization
5. Creating the database
6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels.

Examples are given at every experiment for guidance to students.

Experiment - I: E-R Model

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any

Example: Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus_NO(Bus Entity)

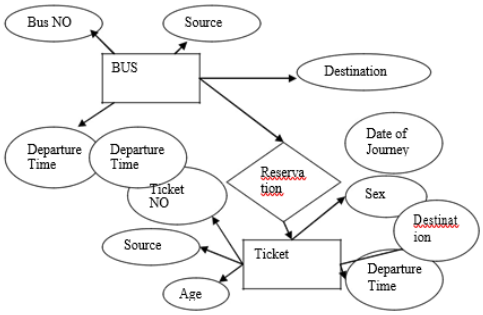
Apart from the above-mentioned entities you can identify more. The above mentioned are few.

Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher.

Experiment - II: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

Example: E-R diagram for bus



Note: The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

Experiment - III: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example:

The passenger tables look as below. This is an example. You can add more attributes based on your E-R model. This is not a normalized table.

Passenger Name	Age	Sex	Address	Ticket_id

Note:

The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.

Experiment - IV: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger name	Age	Sex	Address	Passport ID	Ticket ID

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

Experiment - V: Installation of Mysql and Practicing DDL and DML commands

Installation of MySql. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized "Passenger" table.

CREATE TABLE Passenger (Passport_id INTEGER PRIMARY KEY,
Name VARCHAR (50) Not NULL,
Age Integer Not NULL,
Sex Char,
Address VARCHAR (50) Not NULL);

Similarly create all other tables

Note: Detailed creation of tables is given at the end.

Insert data into the above tables.

DML commands are used to for managing data within schema objects. Someexamples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

Inserting values into "Bus" table

Insert into Bus values (1234,‟hyderabad‟, „tirupathi‟);
Insert into Bus values (2345,‟hyderabd‟,‟Banglore‟);
Insert into Bus values (23,‟hyderabd‟,‟Kolkata‟);
Insert into Bus values (45,‟Tirupathi,‟Banglore‟);
Insert into Bus values (34,‟hyderabd‟,‟Chennai‟);

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,‟ramesh‟, 45,‟M‟,‟abc123‟);
Insert into Passenger values (2, 78,‟geetha‟, 36,‟F‟,‟abc124‟);

Insert into Passenger values (45, 90,"ram", 30,"M","abc12");
Insert into Passenger values (67, 89,"ravi", 50,"M","abc14");
Insert into Passenger values (56, 22,"seetha", 32,"F","abc55");

Few more Examples of DML commands

Select * from Bus; (selects all the attributes and display)

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

Experiment VI: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

1. Display unique PNR_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with „r" and ends with „h".
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with „A"
7. Display the sorted list of passengers names

Experiment - VII: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN),

GROUP BY, HAVING and Creation and dropping of Views

1. Write a Query to display the Information present in the Passenger and cancellation tables. **Hint:** Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. **Hint:** Use GROUP BY on PNR_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. **Hint:** Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.
7. Display the details of passengers who travelled within the last 3 months.
8. Create a view for the details of passengers who cancelled their tickets.

Experiment - VIII:

Create tables for the following schema. Student (snum: integer, sname: string, major: string, level: string, age: integer) Class (name: string, meets at: time, room: string, fid: integer) Enrolled (snum: integer, cname: string) Faculty (fid: integer, fname: string, deptid: integer)

Experiment - IX: Querying

1. Find the names of all Juniors (Level = JR) who are enrolled in a class taught by I. Teacher.
2. Find the age of the oldest student who is either a History major or is enrolled in a coursetaught by I. Teacher.
3. Find the names of all classes that either meet in room R128 or have 5 or more studentsenrolled.
4. Find the names of all students who are enrolled in two classes that meet at the same time.
5. Find the names of faculty members who teach in every room in which some class is taught.
6. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than 5
7. Print the Level and the average age of students for that Level, for each Level.
8. Print the Level and the average age of students for that Level, for all Levels except JR. 9
9. Print the Level and the average age of students for that Level, whose average age is greater than 20.
10. Find the names of students who are enrolled in the maximum number of classes.
11. Find the names of students who are not enrolled in any class
12. Count the number of junior level students.
13. Display all the students whose names starts with the letter “p”.
14. Display all the teachers whose names contain letter „a‟ or „I‟ in their names.

Experiment - X: PL/SQL Programs

1. Program to find sum of first „n‟ natural no.s
2. Program to find reverse of a number
3. Insert the values of areas of a circle into a table called areas taking radius values from 2 to 8.

Experiment - XI: Cursors

In this week you need to do the following: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

Practice the following programs using cursors.

1. Write a cursor program to retrieve the details of all students using cursors (Use students table in experiment 9)
2. Write a PL/SQL block to update the level of students from JL to “junior Level” and SL to “senior Level” and insert a record in new level table.
3. Write a cursor program to display the details of Senior Level students.

Experiment - XII: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: CREATE PROCEDURE myProc()

BEGIN

SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;

Experiment - XIII: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: **CREATE TRIGGER updcheck BEFORE UPDATE ON passenger**

FOR EACH ROW

BEGIN

IF NEW.TickentNO > 60 THEN SET New.Tickent no = Ticket no; ELSESET New.Ticketno = 0;

END IF;

END;

Text Books:

1. **Introduction to SQL**,Rick F.Vander Lans,Pearson education.
2. **Oracle PL/SQL**, B.Rosenzweig and E.Silvestrova,Pearson education

Reference Books:

1. **Oracle PL/SQL Programming**,Steven Feuerstein,SPD.
2. **SQL & PL/SQL** for Oracle 10g, Black Book, Dr.P.S.Deshpande,DreamTech.
3. **Oracle Database ll** g PL/SQL Programming,M.Laughlin.TMH.

Course Outcomes:

Student will be able to:

1. Design and implement a database schema for given problem.
2. Apply the normalization techniques for development of application software to realistic problems.
3. Ability to formulate queries using SQL DML/DDL/DCL commands.
4. Design database schema for a given application and apply normalization
5. Acquire skills in using SQL commands for data definition and data manipulation.

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B.Tech. ECM	**L**	**T-P-D**	**C**
III Year - II Semester	**0**	**0-3-0**	**2**

(E3220) ANALOG COMMUNICATIONS LAB

Course Objectives:

The student will:

1. Learn fundamentals of basic analog modulation techniques.
2. Understand amplitude, frequency modulation and demodulation of analog signals.
3. Analyze the various techniques for generating and demodulating pulse modulated signals.
4. Explore to various concepts and techniques of modulated signal generation, filters to reconstruct the base band signal and Fourier analysis for frequency domain representation of signals using Matlab.
5. Study the Sampling theorem and Pulse Analog Modulation techniques.

Note:

- Minimum 12 experiments should be conducted:
- Experiments are to be simulated first either using MATLAB, Comsim or any other simulation software tools and then testing to be done in hardware.

LIST OF EXPERIMENTS:

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis & de-emphasis.
7. Time Division Multiplexing & De multiplexing
8. Frequency Division Multiplexing & De multiplexing
9. Verification of Sampling Theorem
10. Pulse Amplitude Modulation & Demodulation
11. Pulse Width Modulation & Demodulation
12. Pulse Position Modulation & Demodulation
13. Frequency Synthesizer.
14. AGC Characteristics.

15. PLL as FM Demodulator

Course Outcomes:

Student will be able to:

1. Emphasis on sampling, modulation techniques, signal constellations, and spectral efficiency analysis.
2. Implement advanced test and measurement equipment to make meaningful comparisons between measured and theoretical results.
3. Analyze the noise performance of analog modulation techniques.
4. Understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
5. Design low power AM and FM transmitters.

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B.Tech. ECM	**L**	**T-P-D**	**C**
III Year - II Semester	**0**	**0-3-0**	**1**

(E3221) EMPLOYABILITY SKILLS

LISTENING:

1. Listening Comprehension- exercises • Active Listening

READING:

2. Reading Comprehension – 4 Passages
3. Book Review-Any Novel among the list prescribed by the Department
4. Cloze Test

SPEAKING:

5. Extempore • Ad Making
6. One Act Plays • Poster presentation
7. Public Speaking • Mock Interviews
8. Group Discussions • Assertiveness
9. Interpersonal skills

WRITING:

10. Team building

Vocabulary:

11. Business Vocabulary

Creativity:

12. Short Films • Leadership

Text Book:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. Enhancing Employability @ Soft Skills by Shalini Verma –Pearson.

Reference Books:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-HillPublishing Company Ltd.
2. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.

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B.Tech. ECM	**L**	**T-P-D**	**C**
IV Year - I Semester	**4**	**0-0-0**	**4**

(E414B) VLSI DESIGN

Course Objectives:

The student will:

1. Understand the steps involved in IC fabrication.
2. Understand the fundamentals of IC Technology such as various MOS fabrication technologies.
3. Learn basic electrical properties of MOS &BICMOS circuits.
4. Understand VLSI circuit design processes representations of stick diagram &layout diagram.
5. Know the gate level design & delays.

UNIT–I:

Introduction: Introduction to IC Technology-MOS, PMOS, NMOS, CMOS andBiCMOS
Basic Electric Properties: Basic electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold voltage, gm, gds, Figure of merit, pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS inverters.

UNIT–II:

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rule and layout, 2µm CMOS design rules for wires, Contacts and Transistors layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS Circuits.

UNIT–III:

Gate Level Design: Logic Gates and Other complex gates, Switch logic, alternategate circuits, time delays, driving large capacitive loads, wiring capacitance, Fan-in, Fan-out, Choice of layers.

UNIT–IV:

Data path Subsystems: Subsystems Design, Shifters, Adders, ALUs, Multipliers,Parity generators, comparators, Zero/One Detectors, Counters
Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

UNIT-V:

Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells,Programmable Array Logic, design Approach, Parameters influencing low power design.
CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategiesfor test chip level Test Techniques.

Text Books:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A circuits and systems perspective, Neil H. E Weste, David Harris, Ayan Banerjee, pearson, 2009.
3. VLSI Design-M.Michael Vai,2001,CRC Press.

References:

1. Introduction to VLSI Systems: A Logic-Circuit and Systems Perspective-Ming _BO-Lin, CRC Press-2011.
2. MOS logic circuit Design - John.P. Uyemura, Springer, 2007.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.

Course Outcomes:

Student will be able to:

1. Write the electrical properties of MOS circuits.
2. Excel in the design of various gates, adders, Multipliers and Memories using stick diagrams, layouts.
3. Write the design rules to get Layout of IC.
4. Determine the IC design such as PLA's, PAL, FPGA, CPLDs.
5. Understand the design of various forms of memories.

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(E417A) LINUX PROGRAMMING

Course Objectives:

The student will:

1. Learn the basic concepts of utilities and functions of Linux.
2. Learn about control structures and shell scripting
3. Understand File systems and processes.
4. Extend the knowledge in signals and concept of Interprocess communication.
5. Acquire knowledge in concept of threads, API's, semaphores, sockets.

UNIT–I:

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

UNIT–II:

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT–III:

Files: File Concept, File System Structure, I-nodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls (File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs.

UNIT–IV:

Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions. Inter process Communication: Introduction to IPC, Pipes and FIFOs,

Introduction to three types of IPC-message queues, semaphores and shared memory.
Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example.
Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores. Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, semaphore and shared memory example.

UNIT-V:

Multithreaded Programming: Differences between threads and processes, Thread structure and uses, Threads and Lightweight Processes, POSIX Thread APIs, Creating Threads, Thread Attributes, Thread Synchronization with semaphores and with Mutexes, Example programs.
Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

Text Books:

1. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH
2. Unix System Programming using C++, T.Chan, PHI.(UNIT III to UNIT VIII)

Course Outcomes:

Student will be able to:

1. Diagnose basic concept of Linux and execute commands.
2. Identify and Implement shell scripting and Mastery of at least one Shell scripting language.
3. Design the basic UNIX process structure and the UNIX file system.
4. Implement the concepts of process, threads, and file structure.
5. Illustrate the IPC Queues, shared memory, signals messages

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(E417B) COMPUTER NETWORKS

(PROFESSIONAL ELECTIVE – III)

Course Objectives:

The student will:

1. Learn the fundamental concepts of computer networking.
2. Familiarize with the basic taxonomy and terminology of the computer networking area.
3. Understand the advanced networking concepts, preparing for entry to advanced courses in computer networking.
4. Allow to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
5. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.

UNIT–I:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

Data Link Layer - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol.

UNIT–II:

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet-Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT–III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT–IV:

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4,IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.

Transport Layer: Services provided to the upper layers elements of transportprotocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

UNIT-V:

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

Text Books:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

References:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Edication.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.

Course Outcomes:

Student will be able to:

1. Recognise the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
2. Design a network routing for IP networks and to identify main internal PC components and connections.
3. Recognise how a collision occurs and how to solve it.
4. Determine proper usage of the IP address, subnet mask and default gateway in a routed network.
5. Analyze internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP

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(E417C) ARTIFICIAL INTELLIGENCE

(PROFESSIONAL ELECTIVE – III)

Course Objectives:

The student will:

1. Learn the difference between optimal reasoning vs human like reasoning
2. Understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
3. Learn different knowledge representation techniques
4. Understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing.
5. Understand the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

UNIT–I:

I**NTRODUCTION**, History, Intelligent Systems, Foundations of AI, Sub Areas of AI, Applications.

PROBLEM SOLVING- State space search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques: Iterative Deepening A*, Constraint Satisfaction.

Game Playing, Bounded Lock-Ahead Strategy And Use Of Evaluation Functions, Alpha-Beta Pruning.

UNIT–II:

LOGIC CONCEPTS and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau, system in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

KNOWLEDGE REPRESENTATION: Introduction, Approaches to Knowledge Representation, knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT–III:

EXPERT SYSTEMS AND APPLICATIONS: Introduction, Phases in Building expert system, expert system architecture, expert systems Vs Traditional Systems, Truth Maintenance Systems, Applications of expert systems, List of Shells and Tools. UNCERTAINTY MEASURE: Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor theory, Dempster-Shafer Theory.

UNIT–IV:

MACHINE LEARNING PARADIGMS: Introduction, Machine Learning Systems, Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees, Deductive Learning, Clustering, Support Vector Machines.

ARITIFICIAL NEURAL NETWORKS: Introduction, Artificial Neural Networks, Single Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial – Basis Function Networks, Design issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V:

Advanced Knowledge Representation Techniques: Case grammars, Semantic Web. NATURAL LANGUAGE PROCESSING: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge. -lexical.

Text Books:

1. Saroj Kaushik. Artificial Intelligence, Cengage Learning, 2011.
2. Russell, Norvig: Artificial Intelligence, A Modern Approach, Pearson Education, 2nd Edition, 2004.

References:

1. Rich, Knight, Nair: Artificial Intelligence, Tata McGraw Hill, 3rd Edition, 2009.

Course Outcomes:

Student will be able to:

1. Formulate an efficient problem space for a problem expressed in English.
2. Select a search algorithm for a problem and characterize its time and space complexities.
3. Represent knowledge using the appropriate technique.
4. Apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.
5. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.

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(E417D) COMPUTER GRAPHICS

(PROFESSIONAL ELECTIVE – III)

Course Objectives:

The student will:

1. Understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
2. Present the content graphically.
3. Understand how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Map from a world coordinates to device coordinates, clipping, and projections.
5. Discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.

UNIT–I:

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

UNIT–II:

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT–III:

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT–IV:

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, **3-D viewing:** Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V:

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Text Books:

1. Computer Graphics C, version Donald Hearn and M. Pauline Baker, Pearson education.
2. Computer Graphics Principles & practice second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

References:

1. Computer Graphics Second edition‖, Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.
2. Procedural elements for Computer Graphics‖, David F Rogers, Tata Mc Graw hill, 2nd edition.
3. Principles of Interactive Computer Graphics‖, Neuman and Sproul, TMH.

Course Outcomes:

Student will be able to:

1. Animate scenes entertainment.
2. Work in computer aided design for content presentation.
3. Better analogy data with pictorial representation.
4. Define the fundamentals of animation, virtual reality and its related technologies.
5. Understand a typical graphics pipeline

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(E414F) OPTICAL COMMUNICATIONS

(PROFESSIONAL ELECTIVE – IV)

Course Objectives:

The student will:

1. Realize the significance of optical fibre communications.
2. Understand the construction and characteristics of optical fibre cable.
3. Develop the knowledge of optical signal sources and power launching.
4. Identify and understand the operation of various optical detectors
5. Understand the design of optical systems and WDM.

UNIT–I:

Overview of optical fiber communication: Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT–II:

Information capacity determination, Group delay, Types of Dispersion: Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss. Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints.

UNIT–III:

Optical sources: LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED and ILD.

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT–IV:

Optical detectors: Physical principles of PIN and APD, Detector responsetime, Temperature effect on Avalanche gain, Comparison of Photodetectors. Optical 124 receiver operations- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT-V:

Optical system design: Considerations, Component choice, Multiplexing.Point-to- point links, System considerations, Link power budget with examples, Overall fiber dispersion in Multimode and Single mode fibers, Rise time budget with examples.
Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

Text Books:

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

References:

1. Fiber Optic Communications – D.K. Mynbaev, S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal, John Wiley, 3rd Ediition, 2004.

Course Outcomes:

Student will be able to:

1. Analyze the constructional parameters of optical fibres.
2. Design an optical system.
3. Estimate the losses due to attenuation, absorption, scattering and bending.
4. Compare various optical detectors and choose suitable one for different applications.
5. Analyze various coupling losses.

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(E417E) CONTROL SYSTEMS

(PROFESSIONAL ELECTIVE – IV)

Course Objectives:

The student will

1. Understand the different ways of system representations such as Transfer function representation and states pace representations and to assess the system dynamic response.
2. Assess the system performance using time domain analysis and methods for improving it
3. Assess the system performance using frequency domain analysis and techniques for improving the performance.

UNIT - I: Mathematical Modeling of physical Control Systems-I

Basic elements of control system –Classification–Open and closed loop systems: Position Control Systems, Missile direction Control system – Transfer function– Mathematical Modeling of Electrical, Mechanical, electro mechanical Systems and Thermal Systems.

UNIT - II: Mathematical Modeling of physical Control Systems-II

Mathematical modeling of Synchros – AC and DC servomotors– Block diagram Algebra– Signal flow graphs, Mason‘s gain Formula.

State variables–State variable representation of continuous time system–state equations– transfer function from state variable representation–Solutions of the state equations–.

UNIT - III: Time Domain Analysis of Control Systems

Introduction–Typical test signals–Step response analysis of second order systems– Transient response specifications– steady state error constants– Generalized error series– Effect of P, PI & PID Controllers.

UNIT - IV: Stability & Root Locus Techniques

Concept of BIBO stability-absolute stability–Routh-Hurwitz criterion –Root Loci theory– Application

to systems stability studies–Illustration of the effect of addition of a zero and a pole.

UNIT - V: Frequency Domain Analysis & Design of Control Systems

Introduction– Polar plot –Nyquist stability criterion– Frequency domain indices (Gain margin, Phase margin and bandwidth) – Correlation between frequency and time response – Bode plot.

Need of Compensators–Design of lag and lead compensators using Bode plots–Applications

Text Books:

1. Control Systems Engineering', I.J. Nagrath and M. Gopal, New Age International Publishers, 2007.
2. Automatic Control systems, Pearson Education, Benjamin C. Kuo, New Delhi, 2003.

Reference Books:

1. K. Ogata, Modern Control Engineering', 4th edition, PHI, New Delhi, 2002.
2. Norman S. Nise, Control Systems Engineering, 4th Edition, John Wiley, New Delhi, 2007.SamarajitGhosh, Control systems, Pearson Education, New Delhi, 2004

Course Outcomes:

The student will be able to

1. Apply various time domain and frequency domain techniques to assess the system performance.
2. Apply various control strategies to different applications.
3. Test the system Control ability and Observability using state space representation and applications of state space representation to various systems

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(E417F) IMAGE PROCESSING AND PATTERN RECOGNITION

(PROFESSIONAL ELECTIVE – IV)

Course Objectives:

The student will

1. Emphasize general principles of image processing. Topics such as image enhancement, image restoration, image segmentation and image compression are covered.
2. Understand some concepts of pattern recognition are also introduced in this course.
3. Adequate background knowledge about image processing and pattern recognition.
4. Practical knowledge and skills about image processing and pattern recognition tools .
5. Necessary knowledge to design and implement a prototype of an image processing and pattern recognition application.

UNIT–I:

Fundamental steps of image processing, components of an image processing system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner. Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphism filtering, image filtering & restoration. Inverse and wiener filtering. FIR wiener filter. Filtering using image transforms, smoothing splines and interpolation.

UNIT–II:

Morphological and other area operations, basic morphological operations, opening and dosing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images. Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge inking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

UNIT–III:

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

UNIT–IV:

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors.

UNIT-V:

Pattern Recognition Fundamentals Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies. Example of automatic pattern recognition systems. a simple automatic pattern recognition model.

Pattern classification: Pattern classification by distance function: Measures of similarity. Clustering criteria. K.means algorithm. Pattern classification by like hood function: Pattern classification as a Statistical decision problem. Bayes classifier for normal patterns.

Text Books:

1. Digital Image Processing Third edition. Pearson Education. Rafael C. Gonzalez, Richard E. Woods.
2. Pattern recognition Principles: Jufus T. Tou, and Rafel C. Gonzalez, Addislon-Wesfy Publishing Company.
3. Digital Image Processing. M.Anji Reddy. Y.Hari Shankar, BS Publications.

References:

1. Image Processing. Analysis and Machine Vision, Second Edition, Milan Sonka. Vaciav Hlavac and Roger Boie. Thomson learning
2. Digital Image Processing – William k. Prati -John Wiley edition.
3. Fundamentals of digital image processing – by A.K. Jam, PHI.
4. Pattern classification. Richard Duda. Hart and David strok John Wiley publishers.
5. DigItal Image Processing, S.Jayaraman.S. Esakkirajan, T.Veerakumar. TMH.
6. Pattern Recognition. R.Shinghal. Oxford University Press.

Course Outcomes:

The student will be able to

1. Identify and describe operation of different smoothing and sharpening filters.
2. Analyze the different segmentation techniques
3. Apply different de-noising models to recover original image.
4. Identify different pattern recognition methods and apply them in problem areas.
5. Perform the classification of patterns.

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(E417G) CLOUD COMPUTING

(PROFESSIONAL ELECTIVE – V)

Course Objectives:

The student will

1. Learn Distributed Systems along with Concepts of Cluster Computing & Virtualization.
2. Understand cloud computing and its techniques, issues, and its services that will lead to design and development of a simple cloud service.
3. Familiar with the concepts of Infrastructure as a Service, Platform as a Service and Software as a Service of Cloud Service Models.
4. Learn Monitoring, Management and Applications of Cloud Architecture
5. Analyze the governance of Cloud Era with the help of case studies

UNIT–I:

Systems Modeling, Clustering and virtualization

Distributed system models and enabling Technologies, computer clusters for scalable parallel computing.

Virtual machines and virtualization of clusters and data centers.

UNIT–II:

Foundations

Introduction to cloud computing, migrating into a cloud, enriching the integration as a service paradigm for the cloud ERA, the enterprise cloud computing paradigm.

UNIT–III:

Infrastructure as a service (IAAS) & platform and software as a service (PAAS/SAAS)

Virtual machines provisioning and migration services, on the management of virtual machines for cloud infra structures enhancing cloud computing environments using a cluster as a service, secure distributed data storage in cloud computing Aneka, comet cloud, T-Systems, work flow Engine for clouds, understanding scientific applications for cloud environments.

UNIT–IV:

Monitoring, Management and Applications

An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best practices in Architecting cloud Applications AWS Cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT-V:

Governance and Case Studies

Organisation and Readiness and Change Management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud Computing, Achieving Production Readiness for Cloud Services.

Text Books:

1. Cloud Computing: Principles and paradigms by Rajkumar Buyya , james Borerg and Andrzej M.Goscinski,Wiley,2011
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox ,Jack J. Dongarrra, Elsevier,2012.

References:

1. Cloud Computing: A practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill,rb2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Ritting house, James F. Ratting house, Jamus F.Ransome, CRC Press.rp2012.

Course Outcomes:

The student will be able to

1. Elongate the key dimensions of the challenge of Cloud Computing.
2. Analyze the components of cloud computing and its business perspective.
3. Evaluate the various cloud development tools.
4. Examine real time cloud services.
5. Implement the case studies to derive the best practice model to apply when developing and deploying cloud based applications.

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(E416C) INTERNET OF THINGS
(PROFESSIONAL ELECTIVE – V)

Course Objectives:

At the end of the course, The student will: learn:

1. Explore the interconnection and integration of the physical world and the cyberspace.
2. Able to design and develop IOT Device.
3. Explore the terminology, technology and its applications
4. Understand the concept of M2M (machine to machine) with necessary protocols.
5. To introduce the Python Scripting Language which is used in many IoT devices

UNIT–I:

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoTenabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates.

UNIT–II:

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

IoT and M2M –Difference between IoT and M2M, SDN, NFV, Difference between SDN and NFV.

UNIT–III:

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

UNIT–IV:

Network & Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

UNIT-V:

Challenges in IoT

Design challenges, Development challenges, Security challenges, other challenges

Domain specific applications of IoT

Home automation, Industry applications, Surveillance applications, Other IoT applications

Text Books:

1. Internet of Things – A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Course Outcomes:

Student will be able to:

1. Understand the application areas of IOT
2. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
3. Building blocks of Internet of Things and characteristics.
4. Design and implementation/modification of methods involved in IoT.
5. Describe what IoT is and the skill sets needed to be a network analysis.

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(E417H) NETWORK SECURITY

(PROFESSIONAL ELECTIVE-V)

Course Objectives:

The student will

1. Learn about Information security, security attacks, threats, services, and mechanisms and Application of each of confidentiality, integrity, and availability.
2. Know the principles of public key encryption and private key encryption and the algorithms used for both.
3. Master in E-mail security understand the algorithms PGP, MIME and S/MIME
4. Analyze IP Security architecture and understand concepts of SSL (Secure socket layer), TLS (transport layer security) and SET(secure electronic transactions)
5. Become familiar with the basic categories of threats to computers and networks.

UNIT -I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security

Types of Security attacks, Security services, Security Mechanisms, A model for Network

UNIT – II

Symmetric key Ciphers: Block Cipher principles &Algorithms (DES, AES, Blowfish), Differential and Linear Crypt analysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption, function, Key distribution

Asymmetric key Ciphers: Principles of public key crypto systems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm

Authentication Applications: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication.

UNIT – IV

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.

UNIT – V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, virus and Firewalls: Intruders, Intrusion detection, password management, virus and related threats, Countermeasures, Firewall design principles, types of firewalls

Case Studies on Cryptography and security: Secure Inter-Branch Payment Transactions, Cross site Scripting Vulnerability, Virtual E lections

TEXT BOOKS

1. Cryptography and Network Security: William Stallings, Pearson Education,4"Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill Edition

REFERENCE BOOKS

1. Cryptography and Network Security: C K Shyamala, N Harin i, Dr T R Padmanabhan, Wiley India, 1" Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, MC Graw Hill, 2"" Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

Course Outcomes:

The student will be able to

1. Analyze theory of fundamental cryptography, what is an attack and threat different types of attacks, services and mechanisms.
2. Demonstrate how to encrypt "Plain Text" into "Cipher Text" and vice versa, using different encryption and decryption algorithms.
3. Label the need of e-mail security and the algorithms used
4. Identify the need of IP security architecture and concepts of SSL (Secure socket layer), TLS (transport layer security) and SET (secure electronic transactions).
5. Analyze what the Intruders, Viruses and related threats, are and how to design the Firewalls and Intrusion Detection Systems.

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B.Tech. ECM	**L**	**T-P-D**	**C**
IV Year - I Semester	**0**	**0-3-0**	**2**

(E4114) LINUX PROGRAMMING LAB

Course Objectives:

The student will

1. Familiarize with the Linux environment
2. Learn the fundamentals of shell scripting/programming
3. Aquatint with basic Linux administration.
4. To write shell scripts to solve problems.
5. To implement some standard Linux utilities such as Is,cp etc using system calls.

EXPERIMENTS:

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a c program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Unix commands using System calls A .catB. ls C. mv
12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
    A. File type. B. Number of links.
    C. Time of last access. D. Read, Write and Execute permissions.
13. Write a C program to emulate the Unix ls –l command.
14. Write a C program to list for every file in a directory, its inode number and file name.

15. Write a C program that demonstrates redirection of standard output to a file. Ex: ls > f1.
16. Write a C program to create a child process and allow the parent to display
17. —parent‖ and the child to display —child‖ on the screen.
18. Write a C program to create a Zombie process.
19. Write a C program that illustrates how an orphan is created.
20. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls –l | sort
21. Write C programs that illustrate communication between two unrelated processes using named pipe.
22. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
23. Write a C program that receives the messages (from the above message queue as specified in (21)) and displays them.
24. Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores b) flock or lockf system calls.
25. Write a C program that illustrates suspending and resuming processes using signals.
26. Write a C program that implements a producer-consumer system with two processes. (using Semaphores).
27. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.
28. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.
29. Write a C program that illustrates two processes communicating using shared memory.

Text Books:

1. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
2. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
4. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
5. Sed and Awk, O.Dougherty & A.Robbins,2nd edition, SPD.

Course Outcomes:

The student will be able to

1. Work confidently in Unix/Linux environment
2. Write shell scripts to automate various tasks
3. Master the basics of Linux administration
4. Understand the Linux environment.
5. Perform the file management and multiple tasks using shell scripts in Linux environment.

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B.Tech. ECM	L	T-P-D	C
IV Year - II Semester	3	1-0-0	4

(E427A) SOFTWARE ENGINEERING

Course Objectives:

1. To understanding of software process models such as waterfall and evolutionary models.
2. To understanding of software requirements and SRS document.
3. To understanding of different software architectural styles.
4. To understanding of software testing approaches such as unit testing and integration testing.
5. To understanding on quality control and how to ensure good quality software.

UNIT – I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

UNIT – II:

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT – III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

Modeling component-level design: Designing class-based components, conducting component-level design, object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis, and design, interface analysis, interface design steps, Design evaluation.

UNIT – IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT - V

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software Quality Assurance, Software reliability, The ISO 9000 quality standards.

Text Books:

1. Software engineering A Practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

Course Outcomes:

1. Ability to identify the minimum requirements for the development of application.
2. Ability to develop, maintain, efficient, reliable and cost effective software solutions.
3. Ability to critically thinking and evaluate assumptions and arguments.
4. Provide proper information briefly
5. Provide data security

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B.Tech. ECM	**L**	**T-P-D**	**C**
IV Year - II Semester	**0**	**0-3-0**	**2**

(E4219) SOFTWARE ENGINEERING LAB

Course objectives:

The student will:

1. Analyze problem statement and develop software requirement sheet for system.
2. Describe the functional oriented diagrams: Data flow diagram
3. Design test plan document and specification of a system
4. Describe the test cases for web application
5. Demonstrate the use of selenium with different browsers.

EXPERIMENTS

1. Write down the problem statement for a suggested system of relevance
2. Do requirement analysis and develop software requirement specification sheet for any system.
3. Draw the E-R diagram for the suggested system
4. To perform the function oriented diagram: Data Flow Diagram (DFD)
5. Create a test plan document for any application (e.g. Library Management System).
6. Study the specifications of ATM System and Write functional test cases
7. Study the specification of different type of insurance policies, write the functional test case.
8. Write the test cases for any Web application.
   a) Write the test cases for java program using relational operators.
   b) Write the test cases for java program using string compressions.
9. a) Write the test cases for java program using multi-dimensional array.
   b) Write the test cases for java program using method overloading.
10. Write a program to launch selenium tool with different browsers
    a) Firefox b) Google chrome C) IE Browser
11. Study any Web Application using Selenium ID.

Course Outcomes:

The student will be able to:

1. Apply software principles and techniques for software requirement specification.
2. Design data flow diagram
3. Apply different test plan cases.
4. Write programs for various testing scenarios.
5. Provide huge maintenance of records.

Open Elective - I

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B.Tech.	**L**	**T-P-D**	**C**
III Year - I Semester	**3**	**0-0-0**	**3**

DISASTER MANAGEMENT
(Open Elective – I)

Course Objectives:

The students will :

1. To provide basic conceptual understanding the difference between the hazard and a disaster.
2. To gain knowledge about the various disasters and their impacts.
3. To provide basic understanding about the hazard and vulnerability profile of India.
4. To have conceptual understanding about the disaster management phases.
5. To gain approaches of Disaster Risk Reduction (DRR) and the relationship between vulnerability, Disasters, disaster prevention and risk reduction.

UNIT - I:

Concept of Disaster, Different approaches, Concept of Risk, Levels of Disasters, Disaster Phenomena and Events (Global, national and regional) ,Hazards and Vulnerability, Natural and man-made hazards, response time, frequency and forewarning levels of different hazards, Characteristics and damage potential or natural hazards, hazard assessment ,Dimensions of vulnerability factors, vulnerability assessment Vulnerability and disaster risk ,Vulnerabilities to flood and earthquake hazards.

UNIT II:

Disaster Management Mechanism, Concepts of risk management and crisis managements. Disaster Management Cycle, Response and Recovery Development, Prevention, Mitigation and Preparedness ,Planning for Relief.

UNIT - III:

Capacity Building: Concept, Structural and Non-structural Measures ,Capacity Assessment; Strengthening Capacity for Risk reduction ,Counter-Disaster Resources and their utility in Disaster Management ,Legislative Support at the state and national levels.

UNIT - IV:

Coping with Disaster, Coping Strategies; alternative adjustment processes, Changing Concepts of disaster management ,Industrial Safety Plan; Safety norms and survival kits, Mass media and disaster management.

UNIT - V:

Planning for disaster management, Strategies for disaster management planning, Steps for formulating a disaster risk reduction plan, Disaster management Act and Policy in India. Organizational structure for disaster management in India, Preparation of state and district disaster management plans .

TEXT BOOKS:

1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

REFERENCES:

1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.

Course Outcomes:

The Students will be to

1. acquired knowledge on various types of disasters and hazards.
2. distinguish between the hazard and a disaster can be analyzed.
3. acquired knowledge on the various approaches of Disaster Risk Reduction (DRR)
4. ability to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
5. develop ability to respond to different disasters.

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B.Tech.	**L**	**T-P-D**	**C**
III Year - I Semester	**3**	**0-0-0**	**3**

Elements of Civil Engineering
(Open Elective-I)

Course Objectives:

The students will:

1. To understand different methods of surveying for various applications.
2. To familiarize with various types of building materials.
3. To understand transportation and traffic management.
4. The knowledge of water sources, supply& its treatment.
5. Study about Highway development in India, Necessity for Highway planning, different road development plans..

UNIT - I:

Introduction, history of the civil engineering, sub – disciplines of civil engineering.

UNIT II:

Surveying

Introduction, divisions of surveying, classification of surveying, principles of surveying. Linear measurements and errors–introduction, methods of linear measurements, chaining instruments, types of error and correction. Compass surveying – introduction, angular measurement using compass, whole circle bearing and reduced bearing, fore bearing and back bearing. Traverse surveying –introduction, chain and compass traversing, closing error and adjustments. Levelling– introduction, types of levelling instruments, dumpy level, adjustment of level, levelling staff.

UNIT - III:

Building Materials and Construction

Materials: Introduction to construction materials like ferrous and non ferrous metals, alloys, Stones, Bricks, Lime, Cement, Timber, Sand, Aggregates, Mortar, Concrete and bitumen. Construction: Types of building, different loads considered in building design, types of foundation in building, other developments and constructions of buildings.

UNIT - IV:

Fire and Earthquake Protection in Building Introduction, fire protection in building, structural and architectural safety requirements of resistive structures, fire resistive properties of building materials, fire exit requirements, force and acceleration on building due to earthquake, building response characteristics, building drift.

UNIT - V:

Water Supply, Sanitary and Electrical Works in Building

Introduction, water supply system, water supply layout of a building, house drainage, traps, electrical works in building.

Highway Engineering:

Introduction, historical background of road or highway, classification of roads, pavements and roads, traffic control mechanism.

TEXT BOOKS:

1. Elements of Civil Engineering Author: Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das Publisher: PHI Learning Private Limited New Delhi.
2. Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
3. Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain16th Edition Publisher: Laxmi Publication Delhi.
4. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.

Reference Books:

1. Surveying Theory and Practice (7th Edition) Author: James M Anderson and Edward M Mikhail Publisher: McGraw Hill Education, India Pvt. Ltd.
2. Surveying and Leveling Author: R. Subramanian Publisher: Oxford University.
3. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.
4. Civil Engg. Drawing Author: S. C. Rangwala Publisher: Charotar Pub. House Anand.

Course Outcomes:

Students will be able to

1. Carry out simple land survey and prepare maps showing the existing details.
2. Find out area of irregular shaped plane areas.
3. Understand building plan, elevation and section.
4. Get acquainted with construction materials and transportation systems.
5. Understand transportation and traffic problems.

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B.Tech.	**L**	**T-P-D**	**C**
III Year – I Semester	**3**	**0-0-0**	**3**

Network Analysis and Synthesis
(Open Elective - I)

UNIT I:
Concept of generalized frequency, circuit representation and their response in terms of generalized frequency.

UNIT II:
Fourier transforms and series, Laplace transform, its properties, and Z transforms, its properties and applications, Concept of one port, two-port networks, characteristics and parameters.

UNIT III:
Generalized network functions (Driving point and Transfer), concepts of poles and zeros, determination of free and forced response from poles and zeros, concept of minimum phase networks, analysis of ladder, lattice, T and bridged-T networks.

UNIT IV:
Introduction to state-space representation of networks and their analysis. Concept of filtering, filter types and characteristics, classical design of T and PI passive filters, frequency transformations. Introduction to active filters, active filter specifications, design of first and second order RC –active filters, maximally flat and equi-ripple filter characteristics, implementation using passive elements and op-amps.

UNIT V:
Network synthesis- Synthesis problem formulation, properties of positive real functions, Hurwitz polynomials, properties of RC, LC and RL driving point functions, Foster and Cauer synthesis of LC and RC circuits.

Text Books:

1. Temes & LaPatra – Introduction to circuit Synthesis & Design, McGraw Hill.
2. V. Valkenberg – Modern Network Synthesis, PHI.

Reference Books:

1. Weinberg – Network Analysis & Synthesis, McGraw Hill.
2. Peikari – Fundamentals of Network Analysis & Synthesis, Wiley.
3. V. Atre-- Network Theory and Filter design, TMH.

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III Year – I Semester	**3**	**0-0-0**	**3**

Measurements and Instruments

(Open Elective - I)

UNIT - I:

Philosophy Of Measurement- Methods of Measurement, Measurement System, Classification of instrument system, Characteristics of instruments & measurement system, Errors in measurement & its analysis, Standards.

Analog Measurement of Electrical Quantities –Electrodynamics , Thermocouple, Electrostatic & Rectifier type Ammeters & Voltmeters , Electrodynamics' Wattmeter, Three Phase Wattmeter, Power in three phase system , errors & remedies in wattmeter and energy meter. Instrument Transformer and their applications in the extension of instrument range, Introduction to measurement of speed , frequency and power factor.

UNIT - II:

Measurement of Parameters- Different methods of measuring low, medium and high resistances, measurement of inductance & capacitance with the help of AC Bridges, Q Meter.

AC Potentiometer- Polar type & Co-ordinate type AC potentiometers , application of AC Potentiometers in electrical measurement.

UNIT - III:

Magnetic Measurement- Ballistic Galvanometer, flux meter , determination of hysteresis loop, measurement of iron losses

UNIT - IV:

Digital Measurement of Electrical Quantities- Concept of digital measurement, block diagram Study of digital voltmeter, frequency meter Power Analyzer and Harmonics Analyzer; Electronic Multimeter.

UNIT - V:

Cathode Ray Oscilloscope - Basic CRO circuit (Block Diagram),Cathode ray tube (CRT) & its components , application of CRO in measurement ,Lissajous Pattern.; Dual Trace & Dua Beam Oscilloscopes.

Text Books:

1. E.W. Golding & F.C. Widdis, - Electrical Measurement &Measuring Instrument‖, A.H. Wheeler& Co. India.
2. A.K. Sawhney, -Electrical & Electronic Measurement & Instrument‖, Dhanpat Rai & Sons

Reference Books:

1. Forest K. Harries,—Electrical Measurement, Willey Eastern Pvt. Ltd. India .
2. M.B. Stout ,—Basic Electrical Measurement‖ Prentice hall of India.
3. W.D. Cooper,‖ Electronic Instrument & Measurement Technique — Prentice Hall International.
4. Rajendra Prashad ,—Electrical Measurement &Measuring Instrument‖ Khanna Publisher.
5. J.B. Gupta, -Electrical Measurements and Measuring Instruments‖, S.K. Kataria & Sons.

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B. Tech.	**L**	**T-P-D**	**C**
III Year - I Semester	**3**	**0-0-0**	**3**

AUTOMOBILE ENGINEERING
(OPEN ELECTIVE-I)

UNIT – I: Introduction : Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarburization, Nitriding of crank shaft. Emission from Automobiles – Pollution standards, National and international – Pollution Control – Techniques – Noise Pollution & control.

UNIT – II: Fuel System: S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pumps – carburetor – types – air filters – petrol injection. Electronic injection system
C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, Alternative fuels for Automobiles-injection, Classification, Properties, Hybrid vehicles injection timing, testing of fuel, pumps.

UNIT – III: Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.
Ignition System : Function of an ignition system, battery ignition system, constructional features of storage battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

UNIT – IV: Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc
Transmission System : Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – Gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box , over drive torque converter.Propeller shaft – Hoatch – Kiss drive, Torque tube drive universal joint, differential rear axles– types – wheels and tyres.

UNIT – V: Steering System : Steering geometry – camber, castor, king pin rake, combined angle toe in, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.
Suspension System : Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.
Braking System : Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder tandem master cylinder Requirement of brake fluid, Pneumatic and vacuum brakes.

TEXT BOOKS :

1. Automobile Engineering ,Vol. 1 & Vol. 2/ Kripal Singh
2. Automobile Engineering , Vol. 1 & Vol. 2 ,by K.M Gupta,Umesh publication
3. Automobile Engineering - K.K.Ramalingam –scitech lab

REFERENCE BOOKS :

1. A System approach to Automotive Technology by Jack Erjavec YesDee publishing pvt Ltd.
2. Automobile Engineering / William Crouse
3. Automotive Mechanics / Heitner
4. Alternative fuels of Automobiles by P.RamiReddy, Frontline publications.

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B.Tech.	**L**	**T-P-D**	**C**
III Year - I Semester	**3**	**0-0-0**	**3**

ENGINEERING MATERIALS AND FABRICATION PROCESSES

(OPEN ELECTIVE – I)

UNIT-I: FERROUS ALLOYS: Introduction, Designations and classifications for steels, Simple Heat Treatments, Effect of Alloying Elements.

NONFERROUS ALLOYS: Introduction, properties and applications, Aluminum Alloys, Magnesium Alloys, Copper Alloys and Titanium Alloys.

CERAMIC MATERIALS: Introduction, Properties and Applications of Ceramics, Glasses and Refractories

POLYMERS: Introduction, Classification of Polymers, Polymerization, Degree of Polymerization, Typical Thermoplastics and Thermosets.

COMPOSITES: Introduction, Classification, Properties and Applications of Polymer matrix, Metal Matrix Ceramic Matrix and Laminar composites.

UNIT-II: Casting : Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.

Methods of Melting - Crucible melting and cupola operation – Defects in castings;

Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT-III: Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.

Inert Gas Welding _ TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT-IV: Hot working, cold working, strain hardening, recovery, re-crystallization and grain growth. Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT-V: Extrusion of Metals : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

Forging Processes: Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXT BOOKS:

1. Donald R. Askland, Pradeep P. Phule, The Science and Engineering of Materials (4th Edition), Thomson Publishers, 2003.
2. William D. Callister Introduction to Material Science and Engineering, John Wiley and Sons, 2007.
3. W.F.Smith, Principles of Materials Science and Engineering, Mc Graw Hill, New York, 1994.

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B.Tech.	**L**	**T-P-D**	**C**
III Year - I Semester	**3**	**0-0-0**	**3**

Principles of Electronic Communications
(OPEN ELECTIVE – I)

Course objectives: The Student will

1. gain knowledge about modulation and various analog modulation schemes.
2. have a broad understanding of Pulse modulation schemes.
3. obtain knowledge on Digital modulation techniques.
4. illustrate the wireless networking concepts.
5. understand the principle of cellular mobile radio systems.

Unit I: Introduction
Block diagram of Electrical communication system, Radio communication, Types of communications: Analog, pulse and digital. Analog Modulation: Need for modulation, Types of Analog modulation, Amplitude Modulation.
Angle Modulation: Frequency & Phase modulations. Generation and Demodulation techniques. Advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

Unit II: Pulse Modulations
Sampling, Nyquist rate of sampling, sampling theorem for Band limited signals, PAM, regeneration of base band signal.
PWM and PPM, Time Divison Multiplexing, Frequency Divison Multiplexing, Asynchronous Multiplexing.

Unit III: Digital Communication
Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.
Digital Modulation: ASK, FSK, PSK, DPSK, QPSK demodulation, offset and non-offset QPSK, coherent and incoherent reception, Modems.

Unit IV: Introduction to Wireless Networking
Introduction, Difference between wireless and fixed telephone networks,
Development of wireless networks, Traffic routing in wireless networks.

Unit V: Cellular Mobile Radio Systems
Introduction to Cellular Mobile System, concept of frequency reuse, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, Cell splitting.
Handoffs and Dropped Calls Handoff, dropped calls and cell splitting, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assisted handoff, Intersystem

handoff, micro cells, vehicle locating methods, dropped call rates and their evaluation.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002,PHI.

REFERENCE BOOKS:

1. Wireless Communication and Networking – William Stallings, 2003, PHI.
2. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
3. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2ndEd. 2004.

Course outcomes: The Student will be able to

1. acquire knowledge about analog and angle modulation techniques.
2. illustrate the concepts of Pulse modulation schemes.
3. obtain knowledge on Digital modulation techniques.
4. describe the wireless networking concepts.
5. understand the basics of cellular mobile radio systems and types of handoff.

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B.Tech	**L**	**T-P-D**	**C**
III Year I Semester	**3**	**0-0-0**	**3**

MATLAB PROGRAMMING

(Open Elective-I)

Course objectives: The Student will

1. gain knowledge in exploring MATLAB software.
2. be able to find approach for solving Engineering problems using simulation tools.
3. be prepared to use MATLAB in their project works.
4. gain a foundation in use of this software for real time applications.
5. practice numerical methods, simulations and understand MATLAB programming.

UNIT-I: MATLAB basics, The MATLAB Environment, Basic computer programming, Variables and constants, operators and simple calculations, Formulas and functions, MATLAB toolboxes, Exercises.

UNIT-II: Matricers and vectors, Matrix and linear algebra review, vectors and matrices in MATLAB.

Matrix operations and function in MATLAB, Exercises**.**

UNIT-III: Computer programming, Algorithms and structures, MATLAB scripts and functions (m-files).

Simple sequential algorithms, control structures (if…then, loop), Exercises.

UNIT-IV: MATLAB programming, Reading and writing data, file handling, personalized functions.

Toolbox structure, MATLAB graphic functions, Exercises.

UNIT-V: Numerical simulations-Numerical methods and simulations, Random number generation, Montecarlo methods statistics Toolbox, User‘s Guide: Random Number and Generation Functions).

Hands-on session

Interactive hands-on-session where the whole class will develop one or more MATLAB scripts that solve an assigned problem.

TEXT BOOK:

1. MATLAB Programming by Y.Kirani Singh, B.B Chowdari , PHI publications, 2007 edition.
2. MATLAB And Its Applications In Engineering By Rajkumar Bansal , Ashok Kumar Goel, Manoj Kumar Sharma, Pearson Education Publications, version 7.5.

REFERENCE BOOKS:

1. Getting Started With MATLAB By Rudrapratap, Oxford Publication, 2002 Edition.

Course outcomes: The Student will be able to

1. develop programming and simulation for engineering problems.
2. estimate importance of software’s in research by simulation work.
3. prepare basic mathematical, electrical, electronic problems in MATLAB.
4. synthesis basic electronic circuits in simulink.
5. interpret programming files with GUI Simulink.

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DATA STRUCTURES THROUGH C
(Open Elective-I)

Course Objectives:

The Student will:

1. Review the basic concepts of data structures and algorithms.
2. Classify basic concepts of stacks, queues.
3. Understanding searching and sorting techniques.
4. Classify basic concepts about stacks, queues ,lists ,trees and graphs.
5. Know step by step approach in solving problems with the help of fundamental data structures.

UNIT - I:

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II:

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation. Queues-operations, array and linked representations. Circular Queue operations, Dequeue, applications of queue

UNIT - III:

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals, AVL tree – operations, B-tree – operations, B+ trees, Red Black tree.

UNIT - IV:

Graphs: Terminology, sequential and linked representation, graph traversals : Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

UNIT - V:

Searching and Sorting – Big O Notation, Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

Text Books:

1. **Data Structures Using C** Reema Thareja, Oxford University Press, 2011 Learning.
2. **Data Structures Using C** (Paperback) by Aaron M. Tenenbaum

Reference Books:

1. **C Programming & Data Structures**, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage
2. **C& Data structures** – P. Padmanabham, Third Edition, B.S. Publications.
3. **Data Structures using C** – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education

Course Outcomes:

The student will be able to:

1. Analyze algorithms and algorithm correctness.
2. Apply searching and sorting techniques.
3. Practice stack, queue and linked list operation.
4. Relate tree and graphs concepts.
5. Relates graphs concepts with traversals.

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PYTHON PROGRAMMING
(Open Elective-I)

Course objectives:
Student will:

1. Learn how to design and program Python applications.
2. Learn how to use lists, tuples, and dictionaries in Python programs.
3. Learn how to identify Python object types, Components ,decision statements, pass arguments in Python.
4. Learn how to build and package Python modules for reusability, design object oriented programs with Python classes,use class inheritance in Python for reusability.
5. Learn how to use exception handling in Python applications for error handling

UNIT - I:
Programming paradigms; Structured programming vs object oriented programming, OOPs fundamentals- class, object, abstraction, encapsulation, polymorphism, and inheritance; Introduction to Python Getting started to Python- an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements Values and types, Variables and keywords, statements, evaluating expressions, operators and operands, order of operations, composition. Functions function calls, type conversion, type coercion, pre-defined functions, composition, user define functions, flow of execution, passing parameters, function parameters and scope. Conditionals and recursion modulus operator, Boolean expression, logical operators, conditional execution, alternative execution, chained and nested conditionals, return statement; Recursion, infinite recursion.

UNIT - II:
Python data structures Strings Creating, initializing and accessing the elements; String operators, comparing strings using relational operators; String functions and methods. **Lists:** Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending, updating and deleting elements; List operations; List functions and Methods, list parameters, nested lists, Matrices.

Dictionaries
Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, dictionary operations traversing, appending, updating and deleting elements, Dictionary functions and methods.

Tuples
Mutability and tuples, Immutable concept, creating, initializing and accessing the elements in a tuple, Tuple functions.

UNIT - III:

Object oriented programming using Python: creating python classes, classes and objects: user defined compound types, attributes, instances as arguments, instances as return values, objects are mutable, copying; classes and functions: pure function, modifiers; Exceptions: raising exceptions, handling exceptions, exception hierarchy.

UNIT - IV:

Classes and methods: object oriented features, optional arguments, initialization method, operator overloading and polymorphism. Inheritance: Basic Inheritance: extending built-ins, overriding and super; Multiple inheritance: the diamond problem, different sets of arguments.

UNIT - V:

Files handling and Exceptions: Text files, writing variables, Directories, Pickling;
Database Programming in Python: Connection module, connect MySQL Data base, perform DDL, DML and DQL operations.

Text Books:

1. **Python 3 Object Oriented Programming,** Dusty Phillips, Packet Publishing, 2010.
2. **Programming in Python 3** - A complete Introduction to the Python Language- Second Edition, Mark Summerfiels, Addison-Wesley 2010.

Reference Books:

1. **Programming Python- 4th Edition**, Mark Lutz, O'Reilly, 2011.
2. **Object-Oriented Programming in Python**, Michael H, Goldwasser, David Letscher, Pearson Prentice Hall, 2008.

Course outcomes:

Students will abel to:

1. Describe to design and program Python applications.
2. Analyze and conversion of to use lists, tuples, and dictionaries in Python programs.
3. Explain the concept to identify Python object types, Components ,decision statements, pass arguments in Python.
4. Apply decision for building and package Python modules for reusability, design object-oriented programs with Python classes, use class inheritance in Python for reusability.

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E-DISASTER MANAGEMENT

(OPEN ELECTIVE-I**)**

Course Objectives

At the end of the course, students will :

1. Explain various disasters and their impacts.
2. Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archival solution – CAS.
3. Identify different storage virtualization technologies and their benefits.
4. Understand and articulate business continuity solutions including, backup technologies, and local and remote replication.
5. Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions.

UNIT-I:

Introduction to Disasters; Examples; Information Availability, Causes of Information Unavailability, Measuring Information Availability.

Consequences of Downtime; Failure Analysis, Single Point of Failure, Fault Tolerance, Multi pathing Software.

UNIT-II:

Backup and Recovery: Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations.

Backup Methods, Backup Process Backup and Restore Operations, Backup Topologies, Backup in NAS Environments, Backup Technologies.

UNIT-III:

Local Replication: Source and Target, Uses of Local Replica, Data Consistency, Local Replication Technologies, Restore and Restart Considerations Creating Multiple Replicas, Management. Interface.

Remote Replication: Modes of Remote Replication, Remote Replication Technologies Network Infrastructure.

UNIT-IV:

Securing the Storage Infrastructure, Storage Security Framework, Risk Triad, Assets, Threats, Vulnerability. Storage Security Domains, Securing the Application Access Domain. Securing the Management Access Domain, Securing Backup, Recovery, and Archive (BURA), Security Implementations in Storage Networking SAN , NAS, IP SAN.

UNIT-V:

Monitoring the Storage Infrastructure: Parameters Monitored, Components Monitored, Monitoring Examples, Alerts, Storage Management Activities, Availability management, Capacity management, Performance management, Security Management.

Reporting, Storage Management Examples, Storage Infrastructure Management Challenges, Developing an Ideal, Solution, Storage Management Initiative, Enterprise Management Platforms.

TEXT BOOK:

1. Information Storage and Management: Storing, Managing, and Protecting Digital Information**,** Ganesh Rajaratnam**,** EMC Education Services. Wiley Publications.
2. Executive Guide to Preventing Information Technology Disasters By Richard Ennals. Springer.

REFERENCE BOOKS:

1. Information Management & Computer Security, Port Elizabeth Technikon, Port Elizabeth, MCB UPLtd.
2. Information Security Management Systems, GodesbergerAllee,BSI.

Course Outcomes

At the end of the course , students will be able to:

1. Apply important storage technologies and their features such as availability,replication, scalability andperformance.
2. Show employs project teams to install, administer and upgrade popularstorage solutions.
3. Illustrate virtual servers and storage between remotelocations.
4. Use the knowledge of Disaster ManagementPhases.

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HUMAN COMPUTER INTERACTION

(OPEN ELECTIVE-I)

Course Objectives

At the end of the course , students will :

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to include human diversity.
3. Select an effective style for a specific application.
4. Design mock ups and carry out user and expert evaluation of interfaces

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT III

Screen Designing: - Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls Components – text and messages, Icons and increases – Multimedia,
colors, uses problems, choosing colors.

UNIT V

Software tools – Specification methods, interface – Building Tools. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOK:

1. The essential guide to user interface design, Wilbert O Galitz, WileyDreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson EducationAsia

REFERENCE BOOKS:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, RussellBealg,PearsonEducation
2. Interaction Design Prece, Rogers, Sharps. WileyDreamtech.
3. User Interface Design, Soren Lauesen , PearsonEducation.
4. Human –Computer Interaction,D.R.Olsen,Cengage Learning.

Course Outcomes

At the end of the course , students will be able to:

1. Explain the human, Computer components functions regarding interaction with computer
2. Demonstrate Understanding of Interaction between the human and computer Components.
3. Use Paradigms, HCI in the software process.
4. Implement Interaction design basics**.**

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INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS

(OPEN ELECTIVE-I)

Course Objectives:
At the end of the course, students will learn:

1. Study the Architecture of 8085&8086 microprocessor
2. Learn the design aspects of I/O and Memory Interfacing circuits.
3. Study the Architecture of 8051 microcontroller
4. Make the interfacing in between microprocessor and various peripherals.
5. Know basic feature of 8051 and AVR controller.

UNIT–I:

8086 Architecture:8086 Architecture Functional diagrams, Register organization, memory segmentation, programming model, memory addresses, physical memory organization, architecture of 8086,signal descriptions of 8086-common function signals, Timing diagrams, interrupts of 8086.

UNIT–II:

Instruction set and assembly language programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT–III:

I/O Interface: 8255 PPI, Various modes of operation and interfacing to 8086, interfacing keyboard, Display, D/A and A/D converter.
Interfacing with advanced devices: memory interfacing to 8086, interrupt structure of 8086, vector interrupt table, interrupt service routine.
Communication interface: serial communication standards, serial data transfer schemes, 8251 USART architecture and interfacing.

UNIT–IV:

Introduction to Microcontrollers: overview of 8051 microcontroller, architecture, I/O ports, memory organization, addressing modes and instruction set of 8051, simple programs.

UNIT-V:

8051 Real Time control: programming time interrupts, programming external hardware interrupts, Programming the serial communication interrupts, programming 8051 Timers and counters.

Text Books:

1. D.V.Hall, Microprocessors and interfacing,TMGH,2nd Edition 2006.
2. Kenneth.J.Ayala, The8051Microcontroler,3rdEd., C engage Learning.

References:

1. Advanced Microprocessors and Peripherals-A. K. Rayand K.M Bhurchandi, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers.Architecture and programming and applications-K.Uma Rao, Andhe Pallavi,Pearson, 2009.
3. Microcomputer system 8086/8088 family architecture. Programming and design-Du and GA Gibson, PHI 2nd Edition.

Course Outcomes:

At the end of the course, students will be able to:

1. Design and implement programs on 8085 microprocessors.
2. Design and implement programs on 8086 microprocessors.
3. Design interfacing circuits with 8086.
4. Design and implement 8051 microcontroller based systems
5. Understand the concepts related to I/O and memory interfacing

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INTERNET OF THINGS
(OPEN ELECTIVE – I)

Course Objectives:

At the end of the course, students will learn:

1. Explore the interconnection and integration of the physical world and the cyberspace.
2. Able to design and develop IOT Device.
3. Explore the terminology, technology and its applications
4. Understand the concept of M2M (machine to machine) with necessary protocols.
5. To introduce the Python Scripting Language which is used in many IoT devices

UNIT–I:

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates.

UNIT–II:

Domain Specific IoT – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

IoT and M2M –Difference between IoT and M2M, SDN, NFV, Difference between SDN and NFV.

UNIT–III:

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

UNIT–IV:

Network & Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

UNIT-V:

Challenges in IoT

Design challenges, Development challenges, Security challenges, other challenges

Domain specific applications of IoT

Home automation, Industry applications, Surveillance applications, Other IoT applications

Text Books:

1. Internet of Things – A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

Course Outcomes:

At the end of the course, students will be able to:

1. Understand the application areas of IOT
2. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
3. Building blocks of Internet of Things and characteristics.
4. Design and implementation/modification of methods involved in IoT.
5. Describe what IoT is and the skill sets needed to be a network analysis.

Open Elective - II

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ESTIMATION, QUANTITY SURVEY & VALUATION
(Open Elective-II)

Course Objective

The main objective of the course is to

1. Understand how to estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
2. Estimate the detailed quantities of various items of work and their rates in building projects.
3. Estimate the quantities of works and evaluate cost of project.
4. Understand and apply the concept of Valuation for Properties
5. Understand, Apply and Create the Tender and Contract document.

UNIT - I:

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating

UNIT II:

Detailed Estimates of Buildings - Reinforcement bar bending and bar requirement schedules

UNIT - III:

Earthwork for roads and canals.

UNIT - IV:

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT - V:

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation - Standard specifications for different items of building construction.

Text Books:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

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WASTE MANAGEMENT
(Open Elective-II)

Course Objectives:

1. To learn about Solid Waste management
2. To describe the collection, treatment and disposal methods of Solid waste

UNIT - I:

Introduction

Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes Municipal waste, industrial waste, plastic waste, electronic waste, bio-medical waste and hazardous waste - Characteristics of Solid Wastes: Physical, chemical and biological characteristics-Problems due to improper disposal of solid waste.

UNIT II:

Functional Elements of Solid Waste Management

Waste generation and handling at source-onsite storage-Collection of solid wastes Collection methods and services-storage of solid waste- guidelines for collection route layout.

UNIT - III: Transfer and Transport of Wastes

Transfer station-types of vehicles used for transportation of solid Waste-Processing and segregation of the solid waste- various methods of material segregation.

Processing and Transformation of Solid Wastes

Recycling and recovery principles of waste management- Composting: definition methods of composting-advantages of composting- Incineration: definition methods of incineration advantages and disadvantages of incineration.

UNIT - IV: Treatment and Disposal of Solid Waste

Volume reduction, Open dumping, land filling techniques, Landfills: classification Design and Operation of landfills, Land Farming, Deep well injection.

UNIT - V: Waste Minimization

Introduction to waste minimization, waste minimization techniques-5R (refuse, reduce, reuse, recover, recycle), municipal waste minimization, industrial waste minimization.

Text Books:

1. Solid and hazardous waste management by M.N.Rao and Razia sultana, BS publications
2. Environmental Engineering by Howard S.Peavy, Donald R.Rowe and George Tchobanognous

Reference Books:

1. Integrated Solid Waste Management by Tchobanognous.
2. Environmental engineering by Y.Anjaneyulu, B.S publication.
3. Environmental Pollution Control Engineering by C.S. Rao; Wiley Eastern Ltd., New Delhi.
4. Environmental engineering by Gerad Kiley, Tata Mc Graw Hill

Course Outcomes:

Students will be able to

1. Identify the types and sources of solid waste, and its characteristics.
2. Employ the treatment and disposal methods of solid waste.
3. Apply the concepts of solid waste management.

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NON-CONVENTIONAL ENERGY SOURCES AND APPLICATIONS

(Open Elective - II)

UNIT-I:

Introduction: Limitations of conventional energy sources, need and growth of alternate energy sources, basic schemes and applications of direct energy conversion.

MHD Generators: Basic principles and Hall Effect, generator and motor effect, different types of MHD generators, conversion effectiveness. Practical MHD generators, applications and economic aspects.

UNIT-II:

Solar Energy: Photovoltaic effect, characteristics of photovoltaic cells, conversion efficiency, solar batteries and applications. Solar energy in India, solar collectors, solar furnaces & applications.

UNIT-III:

Thermo-electric Generators: See back effect, peltier effect, Thomson effect, thermoelectric convertors, brief description of the construction of thermoelectric generators, applications and economic aspects.

Fuel Cells: Principle of action, gibbs free energy, general description of fuel cells, types, construction, operational characteristics and applications.

UNIT-IV:

Miscellaneous Sources: Geothermal system, characteristics of geothermal resources, choice of generators, electric equipment and precautions. Low head hydro plants, definition of lowhead hydro power, choice of site and turbines. Tidal energy, idea of tidal energy, tidal electric generator, limitations.

UNIT-V:

8051 Real Time control:

Programming time interrupts, programming external hardware interrupts, and programming the serial communication interrupts, programming 8051 Timers and counters.

Text Books:

1 D.S.Chauhan, „Non Conventional Energy Resources" New Age Publication

2. G.D. Rai, „Non-conventional energy sources", Khanna Publishers

Reference Books:

1. B.H.Khan, „Non Conventional Energy Resources" TMH.
2. H.P.Garg and Jai Prakash, „Solar Energy Fundamentals and Applications", TMH

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Electrical Technology
(Open Elective - II)

UNIT - I:
D.C Generators and DC Motors:
Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators, DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT - II:
Transformers & Performance:
Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit, Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT - III:
Three Phase Induction Motor:
Principle of operation of three-phase induction motors –Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

UNIT - IV:
Alternators:
Alternators – Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Predetermination of regulation by Synchronous Impedance Method – OC and SC tests.

UNIT - V:
Special Motors & Electrical Instruments:
Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics, Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters).

Text Books:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Basic Electrical Engineering - T.K. Nagasarkar and M. S. Sukhija, Oxford University Press, 2005

Reference Books:

1. Principles of Electrical Engineering - V.K Mehta, S. Chand Publications.
2. Theory and Problems of basic electrical engineering - I.J. Nagarath and D.P Kothari, PHI Publications
3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin

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OPERATIONS RESEARCH
(Open Elective-II)

UNIT I: Introduction - Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.
ALLOCATION: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle.

UNIT II: TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.
Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem.

UNIT III: SEQUENCING – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines
REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely-Group Replacement.
UNIT IV: THEORY OF GAMES: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.
INVENTORY: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks – inventory models with and without shortage cost. Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost.

UNIT V: WAITING LINES: Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.
DYNAMIC PROGRAMMING:
Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.
SIMULATION:- Definition – types of simulation models- applications ,advantages and disadvantage. Brief introduction of simulation languages – inventory and queuing problems using random numbers

TEXT BOOKS :

1. Operation Research /J.K.Sharma/MacMilan.
2. Operations Research / ACS Kumar/ Yesdee

REFERENCES:

1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
2. Operations Research /A.M.Natarajan, P. Balasubramaniam, A. Tamilarasi/Pearson Education
3. Operations Research / Wagner/ PHI Publications.
4. Introduction to O.R/Hillier & Libermann (TMH).

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NANOTECHNOLOGY

(Open Elective **–II)**

UNIT I: Introduction to nanotechnology: Importance of nano scale, Nanostructure types, electronic, magnetic, optical Properties of Nano materials, top-down and bottom- up approach to nanostructures.

Quantum Mechanical phenomenon in nanostructures: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

UNIT II: Carbon Nano Structures: Carbon nano tubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Fabrication of Nano materials: Physical Methods: Inert gas condensation, Arc discharge, RF plasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

UNIT III: Nano scale characterization techniques: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Nano devices and Nano medicine: Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

UNIT IV: Nano and molecular electronics: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

UNIT V: Nanolithography and Nano manipulation: e-beam lithography and SEM based nanolithography and nano manipulation, Ion beam lithography, oxidation and metallization. Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS :

1. Introduction to Nanotechnology: Charles.P.Pode, Springer Publications, 2008.
2. Springer Handbook of Nanotechnology: Bharat Bhusan, Springer Publications, 2010.

REFERENCES:

1. Principles of Nanotechnology: Phani Kumar, Scitech Publications.
2. Transport in Nano structures: David Ferry, Cambridge University Press 2000
3. Nano-biotechnology; C.M. Niemeyer, C.A. Mirkin, Wiley Publications, 2006.

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UGC AUTONOMOUS

B.Tech	**L**	**T-P-D**	**C**
III Year II Semester	**3**	**0-0-0**	**3**

APPLICATIONS OF MICROPROCESSORS AND CONTROLLERS

(Open elective-II)

Course Objectives: The Student will

1. understand the control systems and types of control systems
2. understand the basic 16-bit microprocessor architecture and its functionalities and develop microprocessor basic programs for various applications.
3. develop the microcontroller based programs for various applications.
4. understand basic feature of 8051 controller.
5. understand the basics of PLC and SCADA and their functionalities.

Unit I: Introduction: Control Systems Components Role of control system in instrumentation, Open and close loop control system, types and Block diagram, Servomechanism and regulators with suitable examples, Basic control actions - On-off, Proportional, Derivative, Integral control, Proportional derivative (PD).

Proportional integral (PI), P Proportional integral and Derivative (PID) control, Basic control system components –AC/ DC Servo motor, AC/ DC Tacho generator, Stepper motor and Synchronous motor.

Unit II: Basics of Microprocessor

Introduction to microprocessor, Advantages and disadvantages of microprocessor control, Structure of microprocessor, Generalized architecture of microprocessor, Functions of each block, Functional block diagram of 8085 microprocessors with pin diagram, logical block diagram of 8085 Microprocessor-Registers.

ALU, memory organization, decoder, serial control section, interrupt section, timing and control section, Assembly language Programming of 8085, Addressing Modes, Instruction classification, Instruction formats, Basic Assembly Language programming (only simple arithmetic operations-addition, subtraction).

Unit III: Basics of Microcontroller 8051

Micro controllers and microprocessors, Pin diagram of 8051 microcontrollers, Internal RAM, ROM and Special function registers in 8051chip, I/O ports.

Counters and Timers, interfacing with external memory I/O ports, Counters and Timers, Interfacing with external memory.

Unit IV: Microprocessor and Microcontroller Applications

Different types of memories: ROM, RAM, PROM, EPROM, EEPROM, Schematic diagram of memory chips decoder, memory interfacing., Memory I/O data transfer scheme for 8255.

Interfacing of switches and LEDs, Simple application ns of microprocessor and Microcontroller for temperature control of furnace, Traffic light control and SCR firing angle control using microprocessor, Data acquisition system.

Unit V: Programmable Logic Controller and SCADA

PLC: CPU, I/O modules, bus system, power supplies and remote I/Os, counter, timer, Different PLC's available in market, Selection of a PLC, SCADA- Concept and Application.

TEXT BOOKS:

1. Control Systems Engineering, Nagarath I. J., Gopal M., New Age Publishers, New Delhi.
2. Microprocessor Architecture, Programming and Applications with 8085, Gaonkar, Ramesh S., Penram International Publishing (India) Pvt. Ltd.
3. The 8051 Microcontroller Architecture, Programming and Applications, Ayala, Kenneth J., Penram International Publishing (I) Pvt. Ltd.
4. Programmable Logic Controllers And Applications, Webb, John W Ronald Reis. A., Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Fundamentals of Microprocessors and Microcontrollers, Ram, B., Dhanpat Rai Publications, New Delhi.
2. Microprocessors and Interfacing Programming and Hardware, Hall, Douglass V., TMH publication, New Delhi.
3. The 8051 Microcontroller and Embedded Systems using Assembly and C, Ali, Muhamad Mazidi, Janice Mazidi Gillispie, Roli, PHI Learning, New Delhi.

Course Outcomes: The Student will be able to

1. design the different types of control systems and to full fill the desired specifications.
2. analyze 8085 microprocessors architectures and its functionalities and real time applications using programming languages like Assembly Language and MASM.
3. explain the basics of 8051 microcontroller's architecture and its functionalities.
4. design microcontroller based projects for real time applications.
5. analyze PLC and SCADA and their functionalities.

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B.Tech	**L**	**T-P-D**	**C**
III Year II Semester	**3**	**0-0-0**	**3**

FUNDAMENTALS OF HDL

(Open Elective-II)

Course Objectives: Students will

1. learn the fundamental of HDL language.
2. get the Knowledge about different levels of abstract.
3. construct Procedures, Tasks, and Functions using language.
4. write the programs in Mixed –Language Descriptions
5. define Synthesis and mapping of digital design

Unit I: Introduction: Why HDL?, A Brief History of HDL, Structure of HDL Module, Operators, Data types, Types of Descriptions, simulation and synthesis, Brief comparison of VHDL and Verilog.
Data –Flow Descriptions: Highlights of Data-Flow Descriptions, Structure of Data-Flow Description, Data Type – Vectors.

Unit II: Behavioral Descriptions
Behavioral Description highlights, structure of HDL behavioral Description, The VHDL variable –Assignment Statement, sequential statements.
Structural Descriptions: Highlights of structural Description, Organization of the structural Descriptions, Binding, state Machines, Generate, Generic, and Parameter statements.

Unit III: Procedures, Tasks, and Functions
Highlights of Procedures, tasks, and Functions, Procedures and tasks, Functions. Advanced HDL Descriptions: File Processing, Examples of File Processing.
Mixed –Type Descriptions: Why Mixed-Type Description? VHDL User-Defined Types, VHDL Packages, Mixed-Type Description examples.

Unit IV: Mixed –Language Descriptions
Highlights of Mixed-Language Description, How to invoke One language from the Other.
Mixed-language Description Examples, Limitations of Mixed-Language Description.

Unit V: Synthesis Basics
Highlights of Synthesis, Synthesis information from Entity and Module.
Mapping Process and Always in the Hardware Domain.

TEXT BOOKS:
1. HDL Programming (VHDL and Verilog)- Nazeih M.Botros- John Weily India Pvt. Ltd. 2008.

REFERENCE BOOKS:
1. Fundamentals of HDL – Cyril P.R. Pearson/Sanguin 2010.
2. VHDL -Douglas perry-Tata McGraw-Hill.

3. A Verilog HDL Primer- J.Bhaskar – BS Publications.
4. Circuit Design with VHDL-Volnei A.Pedroni-PHI.

Course Outcomes: Students will be able to

1. understand the fundamental of HDL language.
2. analyze different levels of abstract.
3. create Procedures, Tasks, and Functions.
4. implement tasks in Mixed –Language Descriptions.
5. evaluate Synthesis and mapping of digital design.

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B.Tech	**L**	**T-P-D**	**C**
III Year II Semester	**3**	**0-0-0**	**3**

DATABASE MANAGEMENT SYSTEMS
(Open Elective-II)

Course Objectives:
The Student will:

1. Understanding of the architecture and functioning of database management systems as well as associated tools and techniques.
2. Understand and apply the principles of data modeling using entity relationship and develop a good database design.
3. Understand the use of structured query language (SQL) and its syntax.
4. Apply normalization techniques to normalize a database.
5. Understand the need of database processing and learn techniques for controlling the consequences of concurrent data access.

UNIT - I:

Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor

ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model

UNIT - II:

Introduction to the Relational Model

-Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra

-Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT - III:

Form of Basic SQL Query

-Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity‟s – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

Schema refinement

-Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT - IV:

Transaction Concept

-Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability– Implementation of Isolation – Testing for serializability- Lock – Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

Recovery and Atomicity

-Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT - V:

Data on External Storage

-File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Advanced Database Management System

Introduction to Distributed Database-Reference Architecture, fragmentation, Allocation, Joins

Text Books:

1. **Data Base Management Systems**, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. **Data base System Concepts**, Silberschatz, Korth, McGraw hill, V edition.

Reference Books:

1. **Data base Systems design,** Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. **Fundamentals of Database Systems,** Elmasri Navrate Pearson Education
3. **Introduction to Database Systems,** C.J.Date Pearson Education

Course Outcomes:

The student will be able to:

1. Describe basic concepts of database system.
2. Design a data model and schemas in RDBMS.
3. Use RDBMS for developing industry applications.
4. Be competent in use of structured query language sql.
5. Analyze functional dependencies for designing a robust database

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III Year II Semester	**3**	**0-0-0**	**3**

CLOUD COMPUTING
(Open Elective-II)

Course Objectives:
Student will:

1. Learn about the cloud environment, services and hadoop
2. Classify cloud platforms and virtualization concepts
3. Identify cloud computing applications and enterprise cloud computing paradigms
4. Demonstrate cloud application development using python
5. Explain security concepts in the cloud

UNIT-I:

Principles of Parallel and Distributed Computing, Introduction to cloud computing, Cloud computing Architecture, cloud concepts and technologies, cloud services and platforms, Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and Mapreduce.

UNIT-II:

Cloud Platforms for Industry, Healthcare and education, Cloud Platforms in the Industry, cloud applications. Virtualization, cloud virtualization technology, deep dive: cloud virtualization,

Migrating in to cloud computing, Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems

UNIT-III:

Cloud computing Applications: Industry, Health, Education, Scientific Applications, Business and Consumer Applications, Understanding Scientific Applications for Cloud Environments, Impact of Cloud computing on the role of corporate IT.

Enterprise cloud computing Paradigm, Federated cloud computing Architecture, SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

UNIT-IV:

Python Basics, Python for cloud, cloud application development in python, Cloud Application Development in Python.

Programming Google App Engine with Python: A first real cloud Application, Managing Data in the cloud, Google app engine Services for Login Authentication, Optimizing UI and Logic, Making the UI Pretty: Templates and CSS, Getting Interactive. Map Reduce Programming Model and Implementations.

UNIT-V:

Cloud management, Organizational Readiness and change management in the cloud age , Cloud Security, Data security in the cloud, Legal Issues in the Cloud , Achieving Production Readiness for the cloud Services

TEXT BOOKS:

1. Cloud Computing: Raj Kumar Buyya , James Broberg, andrzej Goscinski, 2013 Wiley
2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola,selvi-2013.

REFERENCE BOOKS:

1. Cloud Computing: Arshdeep Bahga, Vijay Madisetti, 2014, University Press.
2. Cloud computing: Dr Kumar Saurab Wiley India 2011.
3. Code in the Cloud: Mark C.Chu-Carroll 2011, SPD.(Second part of IV UNIT)

Course Outcomes:

Student will able to:

1. Understand about the cloud environment, services and hadoop
2. Differentiate cloud platforms and virtualization concepts
3. Describe cloud computing applications and enterprise cloud computing paradigms
4. Implement cloud application development using python
5. Apply security concepts in the cloud

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III Year - II Semester	**3**	**0-0-0**	**3**

E-WASTE MANAGEMENT

(OPEN ELECTIVE-II)

Course Objectives

At the end of the course , students will :

1. Know regarding E-Waste Management in India Global E-Waste Growth
2. Analyze the overview of WEEE.
3. Understanding scenarios for E-Waste management.
4. Visualize the basic concepts of E-Waste Regulation
5. Understand the basic concepts of Recycling technologies.

UNIT – I:

Introduction to e-Waste Management in India Global e-waste growth, Dark shadows of digitization on Indian horizon, e-waste generation, migration, Present practice and systems, disposal methods, Present processing practices, Initiatives to manage e-waste, Strengths and weaknesses of the current system.

UNIT – II:

WEEE (waste electrical and electronic equipment) - toxicity and healthHazardous substances in waste electrical and electronic equipment-toxicity and release, Occupational and environmental health perspectives of e-waste recycling.

UNIT – III:

Options and Scenarios for e-Waste Management Actions to be considered to achieve goals of e- waste management, Collection/ take back system, Closing the Plastic loop: Turning the supplychain into a supply cycle by mining plastics from end-of-life electronics and other durable
goods.

UNIT – IV:

E-waste regulation: E-waste legislation in the European Union and the Basel Convention. Regulating e-waste: a review of the international and national legal framework on e-waste Extended producer responsibility: a key tool for international rules and regulations on e-waste

UNIT – V:

Recycling technologies for e-waste Recycling of e-scrap in a global environment opportunities and challenges. Technologies for recovery of resources from e-waste. Reuse:A Bridge from Unsustainable e-waste to sustainable e-resources.

TEXT BOOKS:

1. Rakesh Johri, E-waste: Implications, regulations, and management inIndia and current global best practices.

2. Klaus Hieronymi, RamzyKahhat, Eric Williams, E-Waste Management: from Waste toResource

REFERENCE BOOKS:

1. Satish Sinha, PritiMahesh,Waste Electrical and Electronic Equipment The EU andIndia.
2. By Ronald E. Hester, Roy M. Harrison , Electronic WasteManagement.

Course Outcomes

At the end of the course , students will be able to:

1. Demonstrate knowledge of E-Waste management.
2. Implementing environmental health perspectives of E-Waste recycling.
3. Achieve goals of E-Waste management.
4. Develop the skills in E-Waste extended producer responsibility.
5. Describe the technologies for recovery of resources from E-Waste.

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B.Tech.	**L**	**T-P-D**	**C**
III Year - II Semester	**3**	**0-0-0**	**3**

INTRODUCTION TO WEB DESIGN

(OPEN ELECTIVE-II**)**

Course Objectives

At the end of the course , students will :

1. Know regarding internet related technologies.
2. Understanding of the current industry support for web technologies.
3. Explain the basic concepts of CSS.
4. Visualize the basic concepts of PHP.
5. Understanding PHP functions and Methods

UNIT-I

Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Audience requirement.

Web Design Principles: Basic principles involved in developing a web site, Planning process , Five Golden rules of web designing, Designing navigation bar ,Page design, Home Page Layout, Design Concept.

UNIT-II

Introduction to HTML : What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags, HTML Tables, HTML Forms.

Elements of HTML: Introduction to elements of HTML, Working with Text Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT-III

Introduction to Cascading Style Sheets: Concept of CSS, Creating Style Sheet and types of CSS, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties).

CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Colors, Creating page Layout and Site Designs.

UNIT-IV

Introduction to PHP: Downloading, installing, configuring PHP, The anatomy of a PHP Page. Basic Security Guidelines, Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions; Switching Flow, Loops.

Code Blocks and Browser Output, Objects, Strings Processing, Form processing, Connecting to database, using cookies, dynamic contents.

UNIT-V

Introduction to Web Publishing or Hosting : Creating the Web Site, Saving the site, Working on the web site, Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites.

TEXT BOOK:

1. Dietel and Dietel : —Internet and World Wide Web - How to Program‖, 5th Edition, PHI/Pearson Education,2011
2. Web Technologies: HTML,CSS, XML,Php BlackBook.

REFERENCE BOOKS:

1. Chris Bates, —Web Programming, building internet applications‖, 2ndEdition, WILEY, Dreamtech,2008.
2. HTML 5 in simple steps Kogent Learning Solutions Inc, DreamtechPress
3. Beginning CSS: Cascading Style Sheets for Web Design Ian Pouncey, ichard York Wiley India.

Course Outcomes:

At the end of the course , students will be able to:

1. Develop the application of the HTML for documentstructure.
2. Develop the skills in analyzing the usable of awebsite.
3. Create dynamic webpage, usingPHP.
4. Using PHP to manipulateFiles.
5. Develop the concept of webpublishing

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B.Tech.	L	T-P-D	C
III Year - II Semester	3	0-0-0	3

INTRODUCTION TO EMBEDDED SYSTEMS

(OPEN ELECTIVE-II)

Course Objectives:
At the end of the course, students will learn:

1. Understand the basic concepts of embedded systems and 8051 microcontrollers.
2. Compare and contrast the basics of assembly programming language.
3. Identify the unique characteristics of real-time systems
4. Analyze the general structure of a real-time system and define the unique design problems and challenges of real-time systems.
5. Acquaint the embedded software development tools and various advanced architectures.

UNIT–I:

Embedded Computing: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

UNIT–II:

The 8051 Architecture: Introduction, 8051 micro controller hardware, input/output ports and circuits, external memory, counter and timers, serial data input/output, interrupts.

Basic Assembly Language Programming Concepts: The assembly language programming process, programming tools and techniques, programming the 8051. Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions.

UNIT–III:

Introduction to Real-Time Operating Systems: Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

Basic Design Using a Real-Time Operating System: Principles, semaphores and queues, hard real-time scheduling considerations, saving memory and power, an example RTOS like uC-OS (open source).

UNIT–IV:

Embedded Software Development Tools: Host and target machines, linker/locators for embedded software, getting embedded software into the target system

Debugging Techniques: Testing on host machine, using laboratory tools, an example system.

UNIT-V:

Introduction to advanced Architectures: ARM and SHARC, processor and memory organization and instruction level parallelism; networked embedded systems: bus protocols, I^2C bus and CAN bus; internet-enabled systems, design example-elevator controller.

Text Books:

1. Wayne Wolf (2008), Computers as Components-principles of embedded computer system design, Elseveir, New Delhi, India.
2. Kenneth J. Ayala (2008), The 8051 Microcontroller, 3rd edition, Cengage Learning, India.

References:

1. David E. Simon (1999), An Embedded Software Primer, Pearson Education, India.
2. Jean J. Labrosse (2000), Embedding System Building Blocks, 2nd edition, CMP publishers, USA.
3. Raj Kamal (2004), Embedded Systems, Tata McGraw hill, India.

Course Outcomes:

At the end of the course, students will be able to:

1. Program an embedded system
2. Analyze Interfacing with keyboard, A/D & D/A conversions, serial data Communication, LCD and LED display.
3. Illustrate Tasks, Semaphores, Message queues, pipes, Timer functions.
4. Design embedded systems and real-time systems
5. Compare and contrast ARM, SHARC, internet enabled systems.

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B.Tech.	**L**	**T-P-D**	**C**
III Year - II Semester	**3**	**0-0-0**	**3**

FUNDAMENTALS OF E-COMMERCE

(OPEN ELECTIVE-II)

Course Objectives:

At the end of the course, students will learn:

1. Identify the major categories and trends of e-commerce applications.
2. Identify the essential processes of an e-commerce system.
3. Identify several factors and web store requirements needed to succeed in e-commerce.
4. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
5. Understand the main technologies behind e-commerce systems and how these technologies interact.

UNIT–I:

Introduction: Electronic Commerce Framework, The Anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT–II:

Consumer Oriented Applications: Mercantile process models, mercantile models from the consumer's perspective, Mercantile from the merchant's perspective.

Types of Electronic Payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards & Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk & Electronic Payment Systems, Designing Electronic Payment Systems.

UNIT–III:

Electronic Data Interchange: EDI Applications in Business, EDI implementation, MIME, and value added networks.

Intra organizational E-Commerce, Macro forces and Internal Commerce, Work flow automation and Coordination, Customization and Internal Commerce, Supply Chain Management(SCM).

UNIT–IV:

Making a business case for a Document Library, Digital document types, Corporate Data warehouses, Advertising and Marketing, the new age of Information Based Marketing, advertising on Internet, charting the Online marketing process, Market Research.

UNIT-V:

Consumer Search and Resource Discovery, information search and Retrieval, Electronic commerce catalogs or directories, Information Filtering.

Multimedia and Digital video, Key Multimedia concepts, Digital Video & Electronic Commerce, Desktop Video Processing, Desktop Video Conferencing.

Text Books:

1. "Frontiers of electronic commerce" – Kalakota, Whinston, Pearson
2. "E-Commerce", S.Jaiswal – Galgotia

References

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce",Addison-Wesley.
2. Goel, Ritendra "E-commerce", New Age International Laudon, "E-Commerce: Business, Technology, Society", Pearson Education

Course Outcomes:

At the end of the course, students will be able to:

1. Identify the business relationships between the organizations and their customers
2. Perform various transactions like payment, data transfer and etc.
3. Examine some typical distributed applications.
4. Detail some of the problems that are encountered when developing distributed applications.
5. Analyze the technologies that are used to support distributed applications.

Open Elective - III

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B.Tech.	**L**	**T-P-D**	**C**
IV Year - II Semester	**3**	**0-0-0**	**3**

ENVIRONMENTAL IMPACT ASSESSMENT
(Open Elective-III)

Course Objectives: The Course objectives of this course are

1. To impart knowledge on Environmental management and environmental impact assessment.
2. To provide a basic understanding of the EIA process as it is used for research, planning, project or program evaluation, monitoring and regulatory enforcement.
3. To outline the impacts on soil, wetlands, flora, fauna, historical structures and the other socioeconomic environment.
4. To introduce students to the legal, economic, social, administrative and technical process preparing and evaluating environmental impact documents.
5. To assess the air and water quality parameters; predict the impacts and their mitigation measures.

UNIT - I:

Basics concepts of EIA: Initial environmental examination, elements of EIA, factors affecting EIA, impact evaluation and analysis, preparation of environmental base map, classification of environmental parameters.

EIA Methodologies: Introduction, Criteria for the selection of EIA methodology, EIA methods, Ad-hoc methods, matrix methods, network method, Environmental Media Quality Index Method (EMQI), Environmental media quality index method, overlay methods, cost/benefit analysis.

UNIT - II:

Impact of developmental activities and land use: Introduction and methodology for the assessment of soil and groundwater, delineation of study area, identification of of activities. Assessment of impact of developmental activities on vegetation and wildlife, environmental impact of deforestation- causes and effects of deforestation.

UNIT - III:

Procurement of relevant soil quality, impact prediction, assessment of impact significance, identification and incorporation of mitigation measures.

EIA of surface water, air and biological environment: Methodology for the assessment of impacts on surface water environment, air pollution sources, generalized approach for assessment of air pollution impact.

UNIT - IV:

Environmental audit and environmental legislation, objectives of environmental audit, types of environmental audit, audit protocel, stages of environmental audit onsite activities, evaluation of audit data and preparation of audit report, post audit activities.

UNIT - V:

Environmental protection Act, The water Act, The air Act (prevention and control of pollution Act), motor act, wild life act. Case studies of preparation of EIAs for various industries.

Text Books:

1. Environmental impact assessment methodologies, by Y.Anjaneyulu, B.S.Publication, Sultan bazaar Hyderabad.
2. Environmental impact assessment, by Alan Gilpin, Cambridge University Press

Reference Books:

1. Environmental pollution Control by Dr. H S Bhatia – Galgotia Publications Pvt Ltd, Delhi.
2. Environmental Impact Assessment and Management Publisher, Daya Author: B Hoisetti, A Kumar

Course Outcomes:

The Students will be able to

1. Explain different methodologies for environmental impact prediction and assessment.
2. Understand the elements of environmental impact assessments and processes by which they apply.
3. Carry out scoping and screening of developmental projects for environmental and social assessments.
4. Evaluate EIA reports.
5. Plan EIAs and environmental management plans

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B.Tech.	**L**	**T-P-D**	**C**
IV Year - II Semester	**3**	**0-0-0**	**3**

GREEN BUILDING TECHNOLOGY
(Open Elective-III)

COURSE OBJECTIVES: The objective of this course is to

1. Create awareness about the principles of green building technology and to have insight about the criteria for rating systems along with the established Indian codes and guidelines.
2. Establish a clear understanding of various renewable and non-renewable sources of energy along with their carbon foot prints and enumerates the process of performance testing including building modeling and energy analysis.
3. Discuss about the energy efficient green building materials and to have understanding on the cost-effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
4. Give details on the principles of sustainable development in green building design.
5. Describe the best green building practices adopted along with cost/benefit and life-cycle analysis of green buildings.

UNIT-I

Concept of Green Buildings: Green building - Definition, Features, Necessity, Initiatives, Green buildings in India, Green building Assessment – Green Building Rating Systems (BREEAM, USGBC, LEED, IGBC, TERI-GRIHA, GREEN STAR), Criteria for rating, Energy efficient criteria, environmental benefits economic benefits, health and social benefits, Major energy efficiency areas for building, Contribution of buildings towards Global Warming. Life cycle cost of buildings, Codes and Certification Programs.

UNIT-II

Sources of Energy:

Renewable and Non-renewable sources of energy - Coal, Petroleum, Nuclear, Wind, Solar, Hydro, Geothermal sources, potential of these sources, hazards, pollution with reference to Global scenario, demand and supply in India, Global efforts to reduce carbon emissions, Performance testing. Building modeling- Energy analysis, Metering, Monitoring.

Carbon emission: Forecasting, Control of carbon emission, Air quality and its monitoring carbon foot print, Environmental issues, Minimizing carbon emission, Energy retrofits and Green Remodels.

UNIT-III

Green Building Materials: Sustainable Materials, Depletion of natural resources for preparation of building materials, renewable and recyclable resources, energy efficient materials, Embodied Energy of Materials. Green cement, Biodegradable materials, Smart materials, Manufactured Materials, Volatile Organic Compounds (Voc's), Natural Non-Petroleum Based Materials, Recycled materials, Renewable and Indigenous Building Materials, Engineering evaluation of these materials.

Green Building Planning and Specifications: Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures, Green Strategies for Building Systems, Alternative Construction Methods, Energy Conservation Measures in Buildings, Waste and Water management and Recycling by Sustainable Facilities, Heating, Ventilation and Air Conditioning, Passive Solar and Daylight, Plumbing and its Effect on Energy Consumption

UNIT-IV

Design of Green Buildings; Sustainable sites, Impact of construction on environment, Life cycle assessment, Principles of sustainable development in Building Design, Design on Bioclimatic and solar passive architecture, Considerations of energy consumption, water use, and system reliability, indoor air quality, noise level, comfort, cost efficiency in building design, Advanced Green building technologies and innovations.

UNIT-V

Construction of Green Buildings: Energy efficient construction, Practices for thermal efficiency and natural lighting. Ecofriendly water proofing; Energy conservation building codes building rating, Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking, Green Project Management Methods and Best Practices, Cost/benefit analysis of green buildings, Life-cycle analysis of green buildings, Case studies of rated buildings (new and existing)

TEXT BOOKS:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkata Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPONPress
3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
4. Green Buildings (McGraw hill publication): by Gevorkian

REFERENCE BOOKS:

1. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
2. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider, W. W. Norton & Company Publisher.
3. Understanding Green Building Materials, Traci Rose Rider, W. W. Norton & Company Publisher.

List of free reference guides/resources available on the net:

1. IGBC reference guide
2. Free abridged versions of LEED reference guides
3. ECBC latest version
4. US GBC's Reference Material

COURSE OUTCOMES:

After completion of the course the student will be able to

1. Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.
2. Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.
3. Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
4. Identify and compare cost and performance of building materials with recycled components, non-petroleum-based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.
5. Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.

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Materials in Electrical Systems

(Open Elective - III)

UNIT - I:

Materials- Conductors-free electron theory and electron scattering Di electrics Polarization, solid, liquid and gas dielectrics Insulators-Classification, Application in electric devices.

UNIT - II:

Magnetic materials-classification based on orientation of magnetic dipoles, Optoelectronic materials, Semiconductors-simple and compound, Refractory Materials. Solders and contacts, Super conductivity and super conducting materials.

UNIT - III:

Components- Resistors and Capacitors. Display units:-LED, LCD and Monitors. Effect of environment on components.

UNIT - IV:

Processes- Basic processes used in the manufacture of integrated circuits such as Epitaxy, masking, photolithography, diffusion, oxidation, Etching, metallization, Scribing, wire bonding and Encapsulation. Induction and Dielectric heating. Electron beam welding and cutting.

UNIT - V:

Cables- Calculations of capacity of cables, charging current, stress, grading, heating of cables, Construction and characteristics of HV & EHV cable

Text Books:

1. S.O. Kasap, Principles of Electrical Engineering Materials," MGH.
2. Mahajan, Principles of growth and processing of semiconductors," MGH.

References Books:

1. Dhir, Electronic components and Materials Principles manufacturing and Maintenance," TMH.
2. Allison, „Electronic Engineering Materials and Devices," TMH.
3. Ruska N Scot, Microelectronic processing – an introduction to the manufacture of integrated circuits," MGH.
4. Decker, Electrical Engineering Materials," PHI.

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Field Theory and Circuits
(Open Elective - III)

UNIT - I: Field Theory:
Review of Vector Analysis- Coordinate Systems, Vectors, gradient, divergence, curl, Laplacian, divergence theorem, Stoke‟s theorem.

UNIT - II:
Electric and Magnetic fields- Electric fields due to distributed charges configurations line(s) of charges, uniform plane surface and spherical volume charge distributions; behavior of conductors and dielectrics in electrostatic fields, boundary conditions, applications of ampere‟s law and Biot- Savart‟s law; capacitance and inductance calculations for simple configurations; time varying fields – displacement current, Maxwell‟s equations; Laplace‟s and Poisson‟s equations.

UNIT - III: Circuit Theory:
Classification of circuits, sources and signals, standard signals, source transformations. Network topology, graph matrices, formulation and solution of circuit equations based on graph theory using different analysis techniques- circuit, cut set and mixed. Concept of duality.

UNIT - IV:
Network theorems and their applications-Superposition, reciprocity, Thevenin, Norton, Maximum power transfer, Millman, Substitution, Compensation and Tellegan‟s theorem. Analysis of circuits subject to periodic and non-periodic excitations using Fourier series and Laplace transforms.

UNIT - V:
Concept of free and forced response of circuits. Time constants and Transient response under d.c. and a. c. excitation. Analysis of magnetically coupled circuits. Analysis of circuits with dependent sources.

Text Books:

1. N.N. Rao, „Basic Electromagnetic with applications‟, PHI
2. Desoer & Kuh, — Basic Circuit theory‖, McGraw Hill.

References Books:

1. E.C. Jordan and K.G. Balmain, „Electromagnetic waves and radiating systems‟, PHI
2. D.J. Griffith, „Introduction to Electrodynamics‟, PHI .
3. Guru & Hiziroglu, „ Electromagnetic field theory fundamentals‟, Vikas Publishing House
4. Van Valkenberg , —Network Analysis‖, PHI.
5. Valkenberg & Kinariwala , —Linear Circuits‖, PHI.
6. Trick , —Introduction to circuit Analysis‖, Wiley.
7. Roy Choudhary , —Networks & systems‖, Wiley.

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RELIABILITY ENGINEERING

(OPEN ELECTIVE-III)

Course Objectives:

The student will

1 Know the micro systems and its manufacturing techniques.

2 Understand the working of micro sensors and actuators.

3 Design Microsystems

Course Outcomes:

The student will be able to

1 Overview of micro systems and explain the micro manufacturing techniques.

2 Discuss the principles and types of micro sensors and actuators.

3 Understand the fundamentals of micro fluidics and design Microsystems.

UNIT - I

Basics concepts of reliability: Introduction, Reliability and quality, Failures and failure modes, Causes of failures and reliability, Maintainability and availability, History of reliability, reliability literature.

Reliability mathematics: Introduction, Random experiment , Probability , Random variables, Distribution functions, Discrete distribution ,Continuous distribution, Numerical characteristics of random variables , Laplace transform.

UNIT- II

Component reliability and hazard models: Introduction, Component reliability from test data, Mean time to failure, Time – dependent hazard models, Stress- Dependent hazard models, Derivation of reliability function using Markov, Treatment of field data.

System reliability models: Introduction - Systems with component within series - Systems with parallel components - k-out – of- m systems - Non series parallel systems - Systems with - mixed – mode failures - Fault- tree technique

UNIT- III

Maintainability and availability concepts: Introduction - Maintainability function - Availability function - Frequency of failures - Two-unit parallel systems with repair - k-out- of-m systems - Preventive maintenance.

Reliability improvement: Introduction - Improvement components - Redundancy - Element redundancy - Unit redundancy - Stand by redundancy - Optimization - Reliability – cost trade – off.

UNIT- IV

Economics of reliability engineering: Economic issues - Manufacture's cost - Customer's cost - Reliability achievement cost - models - Reliability utility cost models - Depreciation cost models - Availability – cost – model of parallel systems

UNIT- V

Reliability management: Reliability programming - Management policies and decision - Reliability management by objectives - Reliability group - Reliability data: Acquisition and analysis - Managing people for reliability.

TEXT BOOKS;

1. Reliability Engineering: Balaguruswamy, Tata McGrawHill
2. Reliability Engineering: L.B.Srinath, East West Publications.

REFERENCE BOOKS:

1. Reliability Engineering: Patrick DTO, Wiley Conor-India
2. Reliability Engineering and life testing, Naikan-PHI Publications.

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SPECIAL MANUFACTURING PROCESS
(OPEN ELECTIVE-III)

Course Objectives:
The Student will :

1. To expose the students to a variety of manufacturing processes including their typical use and capabilities.
2. To teach the important effects that manufacturing processes may have on the material properties of the processed part with a focus on the most common processes.
3. To teach the thermal and mechanical aspects, such as force, stress, strain, and temperature, of the most common processes.
4. To provide a technical understanding of common processes to aid in appropriate process selection for the material and required tolerances
5. To provide a technical understanding of common processes to aid in appropriate material selection for a predetermined process

UNIT I: Casting: Steps involved in making a casting – Advantage of casting and its applications; Patterns – Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands. Methods of Melting – Crucible melting and cupola operation – Defects in castings; Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design. Solidification of casting – Solidification of pure metal – Nucleation and grain growth, casting design considerations.

UNIT II: Welding: Classification – Types of welds and welded joints; Gas welding – Types, oxy-fuel gas cutting – standard time and cost calculations. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.

UNIT III: Inert Gas Welding _ TIG Welding, MIG welding, Friction welding, induction welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT IV: Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth. Rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT V: Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion – Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion Forging Processes: Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXT BOOKS :

1. Manufacturing Technology / P.N. Rao Vol.1 & 2 / Mc Graw Hill
2. Manufacturing Engineering & Technology / Serope Kalpakjian / Steven R. Schmid /Pearson

REFERENCES:

1. Metal Casting / T.V Ramana Rao / New Age
2. Production Technology / G. Thirupathi Reddy / Scitech

Course outcomes:

The student will be able to:

1. Understand the idea for selecting materials for patterns. Types and allowances of patterns used in casting and analyze the components of moulds.
2. Design core, core print and gating system in metal casting processes
3. Understand arc, gas, solid state and resistance welding processes.
4. Develop process-maps for metal forming processes using plasticity principles.
5. Identify the effect of process variables to manufacture defect free products

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PRINCIPLES OF COMPUTER COMMUNICATION AND NETWORKS

(Open Elective-III)

Course Objectives:

1. To understand the Analog and Digital Communication concepts.
2. To understand the concept of computer communication.
3. To learn about the networking concept, layered protocols.
4. To understand various communications concepts.
5. To get the knowledge of various networking equipments.

UNIT-I

Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction, Digital Carrier Systems.

UNIT II

Overview of Computer Communications and Networking: Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT III

Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications, Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT IV

Physical and data link layer Concepts: The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer, the logical link control and medium access control sub-layers.

UNIT V

Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks / Cole.
2. Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition MC GRAW HILL EDUCATION, 2006.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M. Barry Dumas, Morris Schwartz, Pearson.
2. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

Course Outcomes: The student will be able to

1. explain the networking of computers and data transmission between computers.
2. exposure about the various communication concepts.
3. get awareness about the structure and equipment of computer network structures.
4. illustrate the Physical and data link layer concepts.
5. get knowledge about network hardware components.

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SPEECH PROCESSING
(Open Elective-III)

Course Objectives:

1. To introduce speech production and related parameters of speech.
2. To show the computation and use of techniques such as short time Fourier transform, linear predictive coefficients and other coefficients in the analysis of speech.
3. To understand different speech modeling procedures such as Markov and their implementation issues.
4. To understand the basic concepts of speech recognition.
5. To gain knowledge on speech synthesis.

UNIT- I :BASIC CONCEPTS:
Speech Fundamentals: Articulatory Phonetics – Production and Classification of Speech Sounds; Acoustic Phonetics – acoustics of speech production; Review of Digital Signal Processing concepts; Short-Time Fourier Transform, Filter-Bank and LPC Methods.

UNIT- II: SPEECH ANALYSIS:
Features, Feature Extraction and Pattern Comparison Techniques: Speech distortion measures – mathematical and perceptual – Log Spectral Distance, Cepstral Distances, Weighted Cepstral Distances and Filtering, Likelihood Distortions, Spectral Distortion using a Warped Frequency Scale, LPC, PLP and MFCC Coefficients, Time Alignment and Normalization – Dynamic Time Warping, Multiple Time – Alignment Paths.

UNIT- III: SPEECH MODELING:
Hidden Markov Models: Markov Processes, HMMs – Evaluation, Optimal State Sequence – Viterbi Search, Baum-Welch Parameter Re-estimation, and Implementation issues. Speech Recognition: Large Vocabulary Continuous.

UNIT- IV: SPEECH RECOGNITION:
Architecture of a large vocabulary continuous speech recognition system – acoustics and language models – ngrams, context dependent sub-word units; Applications and present status.

UNIT –V: SPEECH SYNTHESIS:
Text-to-Speech Synthesis: Concatenative and waveform synthesis methods, sub word units for TTS, intelligibility and naturalness – role of prosody, Applications and present status.

Text Books:

1. Lawrence Rabiner and Biing-Hwang Juang, “Fundamentals of Speech Recognition”, Pearson education, 2003.
2. Daniel Jurafsky and James H Martin, “Speech and Language Processing – An Introduction to Natural language Processing, Computational Linguistics, and Speech Recognition”, Pearson Education, 2002.

References:

1. Steven W. Smith, “The Scientist and Engineer‟s Guide to Digital Signal Processing”, California Technical Publishing, 1997.
2. Thomas F Quatieri, “Discrete-Time Speech Signal Processing – Principles and Practice”, Pearson Education, 2004.

Course Outcomes:

Upon completion of the course, students will be able to:

1. model speech production system and describe the fundamentals of speech.
2. extract and compare different speech parameters.
3. choose an appropriate statistical speech model for a given application.
4. design a speech recognition system.
5. use different speech synthesis techniques.

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SOFT COMPUTING
(Open Elective-III)

Course Objectives:
Student will:

1. Classify the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications
2. Develop the understanding concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.
3. To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering.
4. Decribe fuzzy systems with membership functions
5. Determine the genetic algorithms, its applications and advances.

UNIT-I:
Introduction: Neural Networks, Fuzzy Logic, Genetic Algorithms, Hybrid Systems, Soft Computing, Soft Computing Constituents, Soft Computing Characteristics. Artificial Neural Networks: Introduction, Fundamental Concept, Evolution of Neural Networks, Basic models of ANN, Important Terminologies.

UNIT-II:
Supervised Learning Networks : Introduction, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks : Introduction, Training Algorithms for pattern association and Hopfield Networks.

UNIT-III:
Unsupervised Learning Network : Introduction, Fixed Weight Competitive Nets, Kohonen Self-Organizing Feature Maps, Counter Propagation Networks.
Fuzzy Sets : Introduction, Classical Sets, Fuzzy Sets, Classical Relations, Fuzzy Relations

UNIT-IV:
Membership functions- Features, Fuzzification, Membership value assignments, Defuzzification Methods, Fuzzy Arithmetic, Fuzzy Measures, Fuzzy Inference Systems, Fuzzy Logic Control Systems

UNIT-V:
Genetic Algorithms- Introduction, Basic operators and terminology, Traditional Algorithm vs Genetic Algorithm, Simple GA, General GA, Classification of GA, Genetic Programming, Applications of GA.
Applications of Soft Computing : Internet Search Technique, Hybrid Fuzzy Controllers.

TEXT BOOKS:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007
2. Neuro-Fuzzy and Soft Computing A Computational Approach to Learning and Machine Intelligence – J.S.R.Jang, C.T.Sun, E.Mizutani, PHI 177

REFERENCE BOOKS:

1. Artificial Intelligence and Soft Computing- Behavioral and Cognitive Modeling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.

Course Outcomes:

Student will able to:

1. Learn about soft computing techniques and their applications
2. Analyze various neural network architectures
3. Apply perceptrons and counter propagation networks.
4. Define the fuzzy systems
5. Analyze the genetic algorithms and their applications

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IV Year – II Semester	**3**	**0-0-0**	**3**

E-COMMERCE
(Open Elective-III)

Course objectives:

1. Gain knowledge about the main objective and at the same time need is transaction on your web store. Of, course if you are selling products online what you require are customers. If you are getting good reach ability then your business will definitely grow. Therefore one of the objectives is high reachability.
2. Solve conversions i.e., if people are coming on your web store and purchasing something then it will calculate as conversions and from the number of people who are buying stuff from your web store we can calculate the conversion rate.
3. Provide customer satisfaction i.e., customer is the main part of any e-commerce business so it's very important to make your customer happy and satisfied by providing quality and desirable products, on time delivery, 24*7 customer support, and timely sale & best deal offers you can make your customer happy. It is one of the main objectives of e-commerce.
4. Receive social popularity i.e., unless and until you are not famous and popular among people you cannot establish your brand. Social presence with omni channel and digital marketing is essential for any e-commerce business.
5. Know about Consumer Search and Resource Discovery.

UNIT-I:
Introduction, Electronic Commerce Framework, The Anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT-II:
Consumer Oriented Applications, mercantile process models, mercantile models from the consumer's perspective, Mercantile from the merchant's perspective.
Types of Electronic Payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards & Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk & Electronic Payment Systems, Designing Electronic Payment Systems.

UNIT-III:
Electronic Data Interchange, EDI Applications in Business, EDI implementation, MIME, and value added networks.
Intra organizational E-Commerce, Macro forces and Internal Commerce, Work flow automation and Coordination, Customization and Internal Commerce, Supply Chain Management(SCM).

UNIT-IV:
Making a business case for a Document Library, Digital document types, Corporate Data warehouses, Advertising and Marketing, the new age of Information Based Marketing, advertising on Internet, charting the Online marketing process, Market Research.

UNIT-V:

Consumer Search and Resource Discovery, information search and Retrieval, Electronic commerce catalogs or directories, Information Filtering.

Multimedia and Digital video, Key Multimedia concepts, Digital Video & Electronic Commerce, Desktop Video Processing, Desktop Video Conferencing.

Text Books

1. "Frontiers of electronic commerce" – Kalakota, Whinston, Pearson
2. "E-Commerce", S.Jaiswal – Galgotia

References

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison-Wesley.
2. Goel, Ritendra "E-commerce", New Age International
3. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education

Course outcomes:

1. Demonstrate an understanding of the foundations and importance of e-commerce.
2. Demonstrate an understanding of retailing in e-commerce by:
    a. Analyzing branding and pricing strategies,
    b. Using and determining the effectiveness of market research.
    c. Assessing the effects of disintermediation.
3. Analyze the impact of e-commerce on business models and strategy.
4. Describe internet trading relationships including business-to-business, intraorganizational.
5. Describe the infrastructure for E-Commerce.

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IV Year – II Semester	**3**	**0-0-0**	**3**

INTERNET OF THINGS
(Open Elective-III)

Course Objectives

1. Understand the current vision of the Internet of Things and its impact on the world
2. Classify basic concepts of IoT and M2M &IoT system management
3. Describe concepts of python language and different python packages.
4. Explain how to design IoT Physical devices with built-ins of python Programs
5. Identify the advanced concepts of IoT physical servers, cloud offerings.

UNIT-I:

Introduction to Internet of Things –Introduction, Definition and Characteristics of IoT,
Physical Design of IoT – Things inIoT, IoT Protocols, Logical Design of IOT- IoT Functional Blocks,IoTCommunication Models, IoT Communication APIs
IoT Enabling Technologies – Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems
Domain Specific IoTs – Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

UNIT-II:

IoT and M2M – Introduction,M2M,Difference between IOT and M2M,**SDN and NFV for IoT**-Software Defined Networking, Network Function Virtualization,
IoT System Management with NETCONF-YANG- Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Network Operator Requirements,NETCONF, YANG, NETOPEER.

UNIT-III:

IoT Systems-Logical Design Using Python-Introduction, Installing Python, Data types and Data Structures, Control Flow, Functions, Modules, Packages, File handling, Date/Time Operations, Classes.
Python Packages of Interest for IoT- JSON, XML, HTTPLib, URLLib, SMTPLib.

UNIT-IV:

IoT Physical Devices and Endpoints – What is an IoTDevice,Exemplary Device: Raspberry Pi,About the Board,Linux on Raspberry Pi, Raspberry PI-Interfaces (Serial, SPI, I2C),Programming
Raspberry Pi with Python-Controlling LED, interfacing an LED and Switch and interfacing a light sensor with Raspberry Pi,

UNIT-V:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage Models and communication APIs.
WAMP-AutoBahn for IoT,Xively Cloud for IoT, Python web application framework
Designing a RESTful web API,

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Course Outcomes

1. Analyze current vision of the Internet of Things and its impact on the world.
2. Demonstrate basic concepts of IoT and M2M &IoT system management
3. Practice the concepts of python language using different python packages
4. Design IoT Physical devices using python Programming.
5. Categorize advanced concepts of IoT physical servers, cloud offerings.

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IV Year II- Semester	**3**	**0-0-0**	**3**

SEMANTIC WEB AND SOCIAL NETWORKS

(Open Elective-III)

Course Objectives

1. Explain the fundamentals of Semantic Web technologies.
2. Explain the Implementation of semantic web applications and the architectures of social networking
3. Discuss which brings together forward looking research and technology that will shape our world more intimately than ever before as computing becomes an extension of human experience;
4. Discuss that covers all aspects of computing that is very closely tied to human perception, understanding and experience;
5. Discuss which brings together computing that deal with semantics, perception and experience and serves as the Plat form for exchange of both practical technologies and far reaching research.

UNIT I

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee, www, Semantic Web Road Map, Logic on the semantic Web.

UNIT II

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web - Resource Description Framework (RDF) / RDF Schema. Ontology Web Language (OWL), UML, XML and XML Schema.

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping,

UNIT III

Logic, Rule and Inference Engines. Semantic Web applications and services. Semantic Search,e-learning, Semantic Bioinformatics, Knowledge Base

UNIT IV

XML Based Web Services, Creating an OWL-S Ontology for Web Services. Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT V

What is social Networks analysis, development of the social networks analysis.Electronic Sources for Network Analysis - Electronic Discussion networks.

Blogs and Online Communities. Web Based Networks. Building Semantic Web Applications with social network features.

TEXTBOOKS:

1. Thinking on the Web - Berners Lee.Godel and Turing,Wiley interscience,20()8.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies,Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer. Paul \Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web – Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.

Course Outcomes

1. Demonstrate knowledge and be able to explain the three different “named” generations of the web
2. Demonstrate the ability to participate materially in projects that develop Programmes relating to **Web** applications and the analysis of Web data.
3. Analyze key Web applications including search engines and social networking sites.
4. Illustrate the key aspects of Web architecture and why these are important to the continued functioning of the World Wide Web.
5. Analyze and explain how technical changes affect the social aspects of Web-based computing.

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FUNDAMENTALS OF INTELLIGENCE SYSTEMS

(OPENELECTIVE-III)

Course Objectives:

1. Understand In-depth of specialist bodies of knowledge within the engineering discipline.
2. Establish engineering methods to complex engineering problem solving.
3. Be Fluent application of engineering techniques, tools and resources .
4. Learn the difference between optimal reasoning vs human like reasoning.
5. Understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities

UNIT–I:

Introduction to Artificial Intelligence: Introduction to AI-Problem formulation, Problem Definition -Production systems

Control strategies, Search strategies. Problem, characteristics, Production system characteristics -Specialized production system

UNIT–II:

Representation of Knowledge: Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution

Use of predicate calculus, Knowledge representation using other logic Structured representation of knowledge.

UNIT–III:

Knowledge Inference: Knowledge representation Production based system, Frame based system

UNIT–IV:

Inference - Backward chaining, forward chaining, Rule value approach Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT-V:

Expert Systems: Expert systems - Architecture of expert systems

Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics.

Text Books:

1. Kevin Night, Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, Tata McGraw-Hill Education Private Limited, 3rd edition, 2009, ISBN: 978-0070678163.
2. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2nd edition, 2007.ISBN, 0132097680.

Course Outcomes:

1. Gain basic understanding of the underlying principles and philosophy of computational intelligence systems Technologies.
2. Be capable of constructing intelligent systems (in software) that perform useful engineering tasks.
3. Possess the ability to formulate an efficient problem space for a problem expressed in English.
4. Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
5. Possess the skill for representing knowledge using the appropriate technique.

J. B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

B.Tech.	**L**	**T-P-D**	**C**
IV Year - II Semester	**3**	**0-0-0**	**3**

INTRODUCTION TO NEURAL NETWORKS

(OPEN ELECTIVE-III)

Course Objectives:

1. Understand the differences and similarities neural network, human brain and feedback systems
2. Learn the different learning techniques
3. Familiar with the concept of single layer perceptron and its algorithms.
4. Familiar with the concept of multilayer perceptron and its algorithms
5. Know the self-organisation mapping techniques.

UNIT–I:

Introduction: What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs

Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks.

UNIT–II:

Learning Process: Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning

Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process.

UNIT–III:

Single layer perceptrons: Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves

Learning rate annealing techniques, perception-convergence theorem, Relation between perception and Bayes classifier foe a Gaussian Environment.

UNIT–IV:

Multilayer Perceptrons: Back propagation algorithm XOR problem

Heuristics, Output representation and decision rule, computer experiment, feature detection.

UNIT-V:

Self –Organization Maps: Two basic feature mapping models, Self-Organization maps, SOM algorithm.

Hopfield models: Hopfield models, computer experiment.

Text Books:

1. Neural networks A comprehensive foundation, Simon Haykin, PHI edition.
2. Artificial neural networks- B. Vegnanarayana Prentice Halll of India P Ltd 2005.

Reference Books:

1. Neural networks in Computer intelligence, Li Min Fu TMH 2003.
2. Neural networks James A Freeman David M S kapura. Pearson education 2004.

Course Outcomes:

1. Know differences and similarities between neural network, human brain and feedback systems
2. Get the knowledge of different learning techniques
3. Describe the concept of single layer perceptron and its algorithms.
4. Describe the concept of multilayer perceptron and its algorithms.
5. Analyse the self-organisation mapping techniques.