

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

COMPUTER SCIENCE AND ENGINEERING

**FOR
CHOICE BASED CREDIT SYSTEM (CBCS) BASED
B.TECH FOUR YEAR DEGREE PROGRAM
(Applicable for the batches admitted from the AY 2016-17)**



Geethanjali College of Engineering and Technology

(Autonomous)

Cheeryal (V), Keesara (M), Medchal Dist., Telangana – 501 301.

ACADEMIC REGULATIONS 2016
For CBCS Based B.Tech. PROGRAMMES

(Effective for the students admitted into I year from the
Academic Year 2016-17 and onwards)

1.0 Under-Graduate Degree Programme (B.Tech.) in Engineering

Geethanjali College of Engineering and Technology (GCET) offers 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 onwards, in the following Branches of Engineering

<i>S. No.</i>	<i>Branch</i>
I.	Civil Engineering
II.	Computer Science and Engineering
III.	Electrical and Electronics Engineering
IV.	Electronics and Communication Engineering
V.	Mechanical Engineering

2.0 Eligibility for Admission

2.1 Admission to the B.Tech. Programme shall be made either on the basis of the merit rank obtained by the qualifying candidate at an Entrance Test conducted by the Telangana State Government (EAMCET), OR the JNTUH, OR on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government of Telangana from time to time.

2.2 The medium of instruction for all the B.Tech. programmes shall be ENGLISH only.

3.0 B.Tech. Programme Structure

3.1 The B.Tech. Programmes of GCET are of semester pattern, with 8 semesters constituting 4 academic years, each academic year having TWO semesters (first/odd and second/even semesters). Each semester shall be of 21 weeks duration (inclusive of examinations), with a minimum of 90 working days per semester.

3.2 UGC/ AICTE specified definitions/ descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are as listed below.

3.2.1 Semester Scheme:

Each B.Tech. program is of 4 (Four) academic years (8 semesters), with each academic year being divided into two semesters of 21 weeks (minimum of 90 working days) each, which includes instruction period, preparation and examinations period; each semester having - ‘**Continuous Internal Evaluation (CIE)**’ and ‘**Semester End Examination (SEE)**’. **Choice Based Credit System (CBCS)** and **Credit Based Semester System (CBSS)** as denoted by UGC, and curriculum/ programme structure as suggested by AICTE are followed.

3.2.2 Credit Courses:

All courses are to be registered by a student in a semester to earn credits. Credits shall be assigned to each course in a L: T: P/D: C (Lecture periods: Tutorial periods: Practicals / Drawing periods: Credits) Structure, based on the following general pattern ..

- One credit - for one hour/ week/ semester for Theory/ Lecture (L) courses;
- One credit - for two hours/ week/ semester for Laboratory/Practical (P) Courses or Drawing Periods (D).

- Two credits for three hours/ week/ semester for Laboratory/Practical (P) Courses or Drawing Periods (D).
- One credit for two hours / week /semester for activity oriented course “Logical reasoning”.
- Other student activities (co-curricular and extra-curricular), namely, NCC, NSS, NSO, Study Tour, Guest Lecture etc. and identified Mandatory Courses, if any, shall not carry credits.

3.2.3 Course Classification:

All courses offered for the B.Tech. programme are broadly classified as: (a) Foundation Courses (FnC), (b) Core Courses (CoC), and (c) Elective Courses (ElC).

- Foundation Courses (FnC) are further categorized as : (i) HS (Humanities and Social Sciences), (ii) BS (Basic Sciences), and (iii) ES (Engineering Sciences);
- Core Courses (CoC) and Elective Courses (ElC) are categorized as PS (Professional Courses), which are further subdivided as – (i) PC (Professional/ Departmental Core) Courses, (ii) SC (Soft Core Courses - professional courses which can be opted from the given list along with the associated lab component) (iii) PE (Professional/ Departmental Electives) , (iv) OE (Open Electives); and (v) Project Works (PW);
- Minor Courses (1 or 2 Credit Courses, belonging to HS/ BS/ ES/ PC as per relevance).
- Mandatory course(s) (MC – Non credit oriented)

4.0 Course Work for B.Tech. Programme

- 4.1** A student, after securing admission, shall pursue the B.Tech. programme in a minimum period of 4 academic years, and a maximum period of 8 academic years (starting from the date of commencement of I Year).
- 4.2** Each student shall register for and secure the specified number of credits required for the completion of the B.Tech. programme and award of the B.Tech. degree in respective branch of Engineering.
- 4.3** Each semester is structured to provide typically 24 Credits (24 C), totaling to 192 credits (192 C) for the entire B.Tech. programme.

5.0 Course Registration

- 5.1** A ‘Faculty Advisor or Counselor’ shall be assigned to each student, who shall advise him about the B.Tech. programme, its structure along with curriculum, choice/option for courses, based on his competence, progress, pre-requisites and interest.
- 5.2** A Student may be permitted to Register for Course of his CHOICE with a typical total of 24 Credits per Semester (Minimum being 20 C and Maximum being 28 C, permitted deviation being $\pm 17\%$), based on his PROGRESS and SGPA/ CGPA, and study of the ‘PRE-REQUISITES’ as indicated for various 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.
- 5.3** Choice for ‘additional 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 signature of the Faculty Advisor/ Counselor.
- 5.4** Academic section of the college invites ‘Registration Forms’ from students a priori (before the beginning of the semester). Registration requests for any ‘CURRENT SEMESTER’ shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the ‘PRECEDING SEMESTER’.

- 5.5 A student can apply for registration, ONLY AFTER obtaining the 'WRITTEN APPROVAL' from his faculty advisor, which should be submitted to the College Academic Committee through the Head of the Department (a copy of the same being retained with Head of the Department, Faculty Advisor and the student).
- 5.6 If the student submits ambiguous choices or multiple options or erroneous entries - during registration for the course(s) under a given/ specified course Group/ Category, namely, core elective with lab, professional elective and open elective as listed in the programme structure, Faculty Advisor shall rectify such errors and advise the student accordingly.
- 5.7 Course options exercised and approved by Faculty Advisor are final and CAN NOT be changed, and CANNOT be inter-changed; further, alternate choices shall also not be considered. However, if the course that has already been listed for registration (by 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 course (subject to offering of such a course), or for another existing course offered, which may be considered. Such alternate arrangements shall be made by the department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of class-work for that semester.
- 5.8 For **Mandatory Courses** like NCC/ NSS/ NSO etc., a '**Satisfactory Participation Certificate**' from the concerned authorities for the relevant semester is essential. No Marks or Grades or Credits shall be awarded for these activities.
- 6.0 Courses to be offered**
- 6.1 A typical section (or class) strength for each semester shall be 60.
- 6.2 An Elective Course may be offered to the students, ONLY IF a Minimum of 20 students (1/3 of the Section Strength) opt for the same. The maximum strength of a section is limited to 80 (60 + 1/3 of the section strength).
- 6.3 More than ONE INSTRUCTOR may offer the SAME COURSE (Lab./Practicals may be included with the corresponding Theory course in the same semester) in any semester.
- 6.4 If more entries for registration of a course come into picture then the Head of the Department concerned shall decide whether or not to offer such a course for two or multiple sections.
- 6.5 In case of options coming from students of other departments/ branches/ disciplines (not considering OPEN ELECTIVES), PRIORITY shall be given to the student of the 'Parent Department'.

7 Attendance Requirements

- 7.1 A student shall be eligible to appear for the Semester End Examinations, if he acquires a minimum of 75% of attendance in lectures/tutorials/practicals/drawing/projects/seminars in aggregate of all the courses for that semester.
- 7.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on valid medical grounds, or participation in sports, games, NCC, NSS, other co-curricular and extra-curricular activities, recognized for the purpose, and the participation having prior approval of the competent authority. Such condonation shall be based on the student's representation with supporting evidence.
- 7.3 A stipulated fee shall be payable towards condoning of shortage of attendance.
- 7.4 Shortage of attendance below 65% in aggregate shall in "**NO**" case be condoned.

- 7.5 Students, whose shortage of attendance is not condoned in any semester, are not eligible to take their Semester End Examinations and they get detained and their registration for that semester shall stand cancelled. They shall not be promoted to the next semester. They may seek re-registration for all those courses registered in that semester in which they were detained, by seeking re-admission into that semester as and when offered. In the case of elective courses, namely, professional elective(s), soft-core with associated lab and / or open elective(s), the same may also be re-registered, if offered. However, if those elective(s) are not offered in later semesters, then alternate elective(s) may be chosen from the SAME set of elective course(s) offered under that specific category.
- 7.6 A student fulfilling the attendance requirements in the present semester shall not be eligible for readmission into the same class.

8 Academic Requirements

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in Section No.7.

- 8.1** A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course, if he secures not less than 35% marks (for e.g. 25 out of 70 marks in theory course) 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 Pass (C) Grade or above in that course.
- 8.2** A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Industry oriented Mini-Project/ Seminar, if he secures not less than 40% of the total marks to be awarded for each. The student would be treated as failed, if he - (i) does not submit a report on his Industry Oriented Mini-Project, or does not make a presentation of the same before the Departmental Evaluation Committee as per schedule, or (ii) does not present the Project Seminar as required in the IV year I Semester, or (iii) does not present the Technical Seminar as required in the IV year II Semester or (iv) secures less than 40% of marks in Industry oriented Mini-Project/ Seminar evaluations.

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

8.3 Promotion Rules

- 8.3.1** Case (i): A student registers for 24 credits or more in each semester as per the provision in section 5.2
- 8.3.1.1 A student shall not be promoted from I Year to II Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 24 credits out of 48 credits or more the student has registered in first year, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 8.3.1.2 A student shall not be promoted from II Year to III Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 58 credits out of 96 credits or more the student has registered up to and including II Year II Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

- 8.3.1.3 A student shall not be promoted from III Year to IV Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 86 credits out of 144 credits or more the student has registered up to and including III Year II Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 8.3.2 Case (ii): A student registers for NOT less than 20 credits and less than 24 credits in each semester
- 8.3.2.1 A student shall not be promoted from I Year to II Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 50% of the credits registered in first year, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 8.3.2.2 A student shall not be promoted from II Year to III Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 60% of the credits registered up to and including II year II semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 8.3.2.3 A student shall not be promoted from III Year to IV Year, unless he fulfils the attendance and Academic Requirements and secures a minimum of 60% of the credits registered up to and including III year II semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 8.4** A Student shall register for all courses covering 192 credits as specified and listed (with the relevant courses as mentioned) in the Programme Structure, put up all the Attendance and Academic requirements for 192 Credits securing a minimum of C Grade (Pass Grade) or above in each course, and 'earn ALL 192 Credits securing SGPA ≥ 5.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0 , to successfully complete the B.Tech. Programme.
- 8.5** A student must secure the necessary 192 credits as specified for the successful completion of the entire B.Tech. programme (see section 12.1); however, only 186 credits shall be considered for evaluating his overall performance for the award of class as provided for under section 12.0. These 186 credits shall be arrived at by leaving out two courses (one from open elective courses and one from professional elective courses) carrying a total of 6 credits, which have the least Grade point scores.
- 8.6** Students who fail to earn 192 credits as per the Programme Structure, and as indicated above, within 8 academic years from the date of commencement of their I Year shall forfeit their seats in B.Tech. Programme and their admissions shall stand cancelled.
- 8.7** A student detained due to shortage of attendance in any semester, may be re-admitted into that semester, as and when offered, with the Academic Regulations of the batch into which he gets readmitted. However, no grade allotments or SGPA/ CGPA calculations shall be done for the corresponding semester in which he got detained.
- 8.8** A student detained due to lack of credits in any year, may be readmitted in the next year, after fulfillment of the Academic Requirements, with the Academic Regulations of the batch into which he gets readmitted.
- 8.9** A student eligible to appear in the Semester End Examination in any course, but absent at it or failed (thereby failing to secure C Grade or above), may reappear for that course at the supplementary examination as and when conducted. In such cases, his Internal Marks (CIE) assessed earlier for that course shall be carried over, and added to the marks obtained in the supplementary examination, for evaluating his performance in that course.

9 Evaluation - Distribution and Weightage of Marks

9.1 The performance of a student in each semester shall be evaluated course-wise (irrespective of credits assigned) with a maximum of 100 marks for all types of courses, namely, theory, drawing, practicals, seminar (Project, Technical), Major project, Industry Oriented Mini-Project, Comprehensive Viva-Voce, Minor Courses etc.

The evaluations are as follows:

- Theory, practical, drawing and major project courses shall be evaluated based on 30% CIE (Continuous Internal Evaluation) and 70% SEE (Semester End Examination),
- Technical seminar and Major project seminar shall be evaluated based on 100% CIE (Continuous Internal Evaluation)
- Industry Oriented mini-project and comprehensive Viva-Voce shall be evaluated based on 100% SEE (Semester End Examination)

A letter grade corresponding to the % marks obtained shall be given for all courses.

9.2 a)

- i. For theory courses (inclusive of Minor Courses), during the semester, there shall be TWO (2) mid-term examinations for 25 marks each. Each mid-term examination consists of one objective paper for TEN (10) marks, plus one subjective paper for 15 marks, with a duration of 120 minutes (20 minutes for objective and 100 minutes for subjective papers). Further, there shall be an allocation of 5 marks for assignment. The objective paper is set with multiple choice questions, True/ False, fill-in the blanks, matching type questions and short answer questions. Subjective paper shall contain 3 questions with internal choice, each for 5 marks. All three questions are to be answered.
 - ii. For “Logical Reasoning”, a minor course, which is activity oriented, there shall be a continuous internal evaluation (CIE) during the semester for a total of 30 marks.
- b) The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.
 - c) The first assignment should be submitted before the conduct of the first mid-term examinations, and the second assignment should be submitted before the conduct of the second mid-term examinations. The assignments shall be as specified by the course instructor concerned.
 - d) The first mid-term examination marks and first assignment marks shall make one set of CIE marks , and the second mid-term examination marks and second assignment marks shall make second set of CIE Marks; and the average of these two sets of marks shall be taken as the final marks secured by the student in the Continuous Internal Evaluation in that theory course.
 - e) The details of the question paper pattern for Semester End Examination shall be as follows:
 - The examination shall be conducted for 70 marks. The question paper consists of two parts:
 - Part – A for 20 marks (Compulsory);
 - Part – B for 50 marks (Questions with Internal Choice);
 - Part – A: The question (numbered 01) under Part A consists of ten sub questions, two from each unit of the prescribed syllabus of the course. Each sub question carries 2 marks. All sub questions are compulsory.
 - Part – B consists of five questions (numbered from 02 to 06), one each from the five units of the prescribed syllabus of the course. Each question carries 10 marks and may contain sub questions. For each question, there shall be an internal choice (it means, there shall be two questions from each unit, and the student should answer any one question). The student must answer all the questions of Part B.

Absence in mid-term examination(s):

- If any student is absent in one mid-term examination for any course on health grounds / any valid reasons approved by the College Academic Committee, only one test shall be conducted on all units by the college in each course at the end of each semester.
- If any student is absent in both mid-term examinations for any course on health grounds / any valid reasons approved by the College Academic Committee, only one test for 25 marks shall be conducted on all units and the marks secured out of 25 shall be divided by two, which shall be awarded against the said mid-term examination(s) after the student pays the prescribed fee.

9.3 For practical courses, there shall be a Continuous Internal Evaluation (CIE) during the semester for 30 marks, and 70 marks are assigned for lab/practical Semester End Examination (SEE). Out of the 30 marks for CIE, day-to-day work in the laboratory shall be evaluated for 15 marks; and for the remaining 15 marks - two internal practical tests (each of 15 marks) that include viva-voce shall be conducted by the concerned laboratory instructor and the average of these two tests is taken into account. The SEE for practicals shall be conducted at the end of the semester by two examiners, namely, an external examiner and laboratory faculty as internal examiner. The external examiner shall be appointed by the Chief Superintendent of Examinations of the college as per the recommendation of the Chairperson, Board of Studies of the department concerned. The panel of the external examiners shall be provided by the Chairperson, BoS at the commencement of the semester during the meeting of the BoS.

Absence in laboratory internal examinations:

- If any student is absent in one laboratory internal examination for any laboratory course on health grounds / for any valid reasons approved by the College Academic Committee, only one test shall be conducted for 15 marks on all experiments of that laboratory course, by the college at the end of the semester.
- If any student is absent in both the laboratory internal examinations on health grounds / for any valid reasons approved by the College Academic Committee, only one test shall be conducted on all experiments and the marks secured out of 15 marks shall be divided by two, which shall be awarded against the said laboratory internal examinations.

9.4 For the courses having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation), the distribution shall be 30 marks for CIE (20 marks for day-to-day work, and 10 marks for internal tests) and 70 marks for SEE. 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.

9.5 **Open Electives:** Students are to choose Open Elective(s) as per their programme structure.

9.6 a) There shall be an Industry Oriented Mini-Project, in collaboration with an industry of the relevant specialization, to be registered immediately after III Year II semester examinations, and taken up during the summer vacation for four weeks duration.

b) The industry oriented mini-project shall be submitted in a report form, and a presentation of the same shall be made before a committee, which evaluates it for 100 marks. The committee shall consist of Head of the Department, the supervisor of Mini-Project, and two Professors /Assoc-Professors faculty members of the department. There shall be no internal marks for industry oriented Mini-Project. The mini-project shall be evaluated at the end of IV Year I Semester.

9.7 There shall be a project seminar presentation in IV Year I semester. For the project Seminar, the student shall collect the information/ literature on the project, prepare a report, submit the same, and present as a seminar, which shall be evaluated as CIE for 100 marks by the project seminar review committee. The committee shall consist of Head of the Department, the supervisor of project, and two Professors/Associate professors of the department.

9.8

9.8.1 There shall be a technical seminar presentation in IV year II Semester. For the technical seminar a student shall collect information on a specialized technical topic, prepare a technical report and submit to the department at the time of Technical Seminar presentation. The Technical Seminar presentation (along with the Technical Report) shall be evaluated by Two Professors /Assoc-Professors and Head of the Department, for 100 marks. There shall be no SEE for seminar.

9.8.2 For courses, namely, “Gender Sensitization” and “Human Values and Professional Ethics”, which are activity oriented minor courses of two credits, there shall be a SEE for Seventy (70) marks which shall be conducted with internal examiner(s) only.

9.8.3. For “Logical Reasoning” an activity oriented course, there shall be a SEE for Seventy (70) marks which shall be conducted with internal examiner(s) only.

9.9 There shall be a comprehensive viva-voce examination (SEE) for 100 marks in IV year II semester. It shall be conducted by an external examiner, Head of the department and two Professors / Assoc-Professors of the department.

9.10 Each student shall start the major project work during the IV Year I Semester, as per the instructions of the project guide/ project supervisor assigned by the Head of Department. Out of a total 100 marks allotted for the major project work, which shall be evaluated in IV year II semester, 30 marks shall be for CIE (Continuous Internal Evaluation) and 70 marks for the SEE (End Semester Viva-voce Examination). The project viva-voce shall be conducted by a committee comprising an external examiner, Head of the Department and project supervisor. Out of 30 marks allocated for CIE, 15 marks shall be awarded by the project supervisor (based on the continuous evaluation of student’s performance throughout the Project Work period), and the other 15 marks shall be awarded by a Departmental Committee consisting of Head of the Department and Project Supervisor, and two Professors/Assoc-Professors, based on the work carried out and the presentation made by the student during internal reviews (at least two internal reviews shall be conducted).

10.0 Grading Procedure

10.1 Marks shall be awarded to indicate the performance of each student in each theory course, or lab/practicals, or project seminar, technical seminar, or major project, or mini-project based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in section 9 above, and a corresponding letter grade shall be given.

10.2 As a measure of the student’s performance, a 10-point absolute grading system using the following letter grades (UGC Guidelines) and corresponding percentage of marks shall be followed as mentioned in the table 10.2. Please also refer to section 8.

Table 10.2: Absolute grading system

<i>% of Marks Secured in a course</i>	<i>Letter Grade (UGC Guidelines)</i>	<i>Grade Points</i>
More 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

10.3 A student obtaining F Grade in any course shall be considered 'FAILED' and shall be required to reappear as 'supplementary candidate' in the Semester End Examination (SEE), as and when offered. In such cases, his internal marks (CIE Marks) in those course(s) shall remain the same as those obtained earlier.

10.4 A letter grade does not imply any specific % of Marks.

10.5 In general, a student shall not be permitted to repeat any course(s) only for the sake of 'grade improvement' or 'SGPA/ CGPA improvement', However, he has to repeat all the courses pertaining to that semester, when he is detained due to shortage of attendance as listed in section 8.7.

10.6 A student earns Grade Point (GP) in each Course, on the basis of the letter grade obtained by him in that course. Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Course.

Credit Points (CP) = Grade Point (GP) x Credits for a course

10.7 The Student passes the course only when he gets $GP \geq 5$ (C grade or above).

10.8 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of Credit Points (ΣCP) secured from ALL Subjects/ Courses registered in a semester, by the Total Number of Credits registered during that semester. SGPA is rounded off to TWO decimal places. SGPA is thus computed as

$$SGPA = \left\{ \sum_{i=1}^N C_i G_i \right\} / \left\{ \sum_{i=1}^N C_i \right\} \dots \text{For each Semester,}$$

where 'i' is the course indicator index (takes into account all courses in a semester), 'N' is the no. of courses 'REGISTERED' for the semester (as specifically required and listed under the Program Structure of the parent department), 'C_i' is the no. of credits allotted to the ith course, and 'G_i' represents the Grade Points (GP) corresponding to the letter grade awarded for that ith course.

10.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in ALL registered courses in ALL semesters, and the total number of credits registered in ALL the semesters. CGPA is rounded off to TWO decimal places. CGPA is thus computed from the I Year second semester onwards, at the end of each semester, as per the formula

$$CGPA = \left\{ \sum_{j=1}^M C_j G_j \right\} / \left\{ \sum_{j=1}^M C_j \right\} \dots \text{for all S Semesters registered}$$

(ie., upto and inclusive of S Semesters, $S \geq 2$),

where 'M' is the TOTAL no. of courses (as specifically required and listed under the Course Structure of the parent department) the Student has 'REGISTERED' from the 1st semester onwards up to and inclusive of the semester S (obviously $M > N$), 'j' is the course indicator index (takes into account all Courses from 1 to S Semesters), 'C_j' is the no. of credits allotted to the jth course, and 'G_j' represents the Grade Points (GP) corresponding to the letter grade awarded for that jth Course. After registration and completion of I Year I semester however, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

10.10 For merit ranking or comparison purposes, or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs shall be used.

10.11 For calculations listed in sections 10.6 through 10.10, performance in FAILED courses (securing F Grade) shall also be taken into account, and the credits of such courses shall also be included in the multiplications and summations.

10.12 Passing Standards:

10.12.1 A student shall be declared 'SUCCESSFUL' or 'PASSED' in a semester, only when he gets a SGPA ≥ 5.00 (at the end of that particular Semester); and a student shall be declared 'SUCCESSFUL' or 'PASSED' in the entire B.Tech. programme, only when he gets a CGPA ≥ 5.00 , subject to the condition that he secures a GP ≥ 5 (C Grade or above) in every registered course in each semester (during the entire B.Tech. Programme) for award of the degree.

10.12.2 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 shall show the details of the courses registered (course code, title, no. of credits, grade earned etc.), credits earned, SGPA, and CGPA.

11. Declaration of Results

11.1 Computation of SGPA and CGPA are done using the procedure listed in sections 10.6 through 10.10.

11.2 For final % of marks equivalent to the computed final CGPA, the following formula is to be used:

$$\% \text{ of Marks} = (\text{final CGPA} - 0.5) \times 10$$

12.0 Award of Degree

12.1 A student who registers for all the specified courses as listed in the programme structure, satisfies all the programme requirements, and passes all the examinations prescribed in the entire B.Tech. programme, 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 branch of Engineering studied.

12.2 A student who qualifies for the award of the degree as listed in section 12.1, shall be placed in the following classes based on evaluation as per section 8.5:

12.2.1 Students with final CGPA (at the end of the B. Tech Programme) ≥ 8.00 , and fulfilling the following conditions shall be placed in 'FIRST CLASS with DISTINCTION' -

- 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 his first academic year,

- ii. should have secured a CGPA ≥ 8.00 , at the end of each of the 8 sequential semesters, starting from the I Year I semester onwards,
- iii. should not have been detained or prevented from writing the Semester End Examinations in any semester due to shortage of attendance or any other reason,.

12.2.2 Students having final CGPA (at the end of B.Tech. Programme) ≥ 8.00 , but not fulfilling the above conditions shall be placed in 'FIRST CLASS'.

12.2.3 Students with final CGPA (at the end of the B.TECH. Programme) ≥ 6.50 but < 8.00 , shall be placed in 'FIRST CLASS'.

12.2.4 Students with final CGPA (at the end of the B.TECH. Programme) ≥ 5.50 but < 6.50 , shall be placed in 'SECOND CLASS'.

12.2.5 All other Students who qualify for the award of the degree (as per Section 12.1), with final CGPA (at the end of the B.Tech. Programme) ≥ 5.00 but < 5.50 , shall be placed in 'PASS CLASS'.

12.3 A student with final CGPA (at the end of the B.Tech. Programme) < 5.00 shall not be eligible for the award of the degree.

12.4 Students fulfilling the conditions listed under section (iii) of 12.2.1 alone shall be eligible for the award of 'college rank' and / or 'gold medal'.

13.0 Withholding of Results

13.1 If the student has not paid fees to College at any stage, or has pending dues against his name due to any reason whatsoever, or if any case of indiscipline is pending against him, the result of the student may be withheld, and he shall 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 General

14.1.1 A Student who has discontinued for any reason, or has been detained for want of attendance or NOT promoted due to lack of required credits as specified, may be considered eligible for readmission to the same semester in which he got detained for want of attendance or promotion to the next year of study after securing the required number of credits, as detailed in 14.2 -14.4 as the case may be.

14.2 For students detained due to shortage of attendance:

14.2.1 A Student who has been detained in I year of R09/R13/R15 Regulations of JNTUH due to lack of attendance, shall be permitted to join I year I Semester of AR16 Regulations of GCET and he is required to complete the study of B.Tech. programme within the stipulated period of eight academic years from the date of first admission in I Year.

14.2.2 A student who has been detained in any semester of II, III and IV years of R09/R13/R15 regulations of JNTUH for want of attendance shall be permitted to join the corresponding semester of AR16 regulations of GCET and is required to complete the study of B.Tech. within the stipulated period of eight academic years from the date of first admission in I Year.

The AR16 Academic Regulations of GCET under which a student has been readmitted shall be applicable to that student from that semester which shall include section 14.5

14.3 For students NOT promoted due to shortage of credits:

14.3.1 A student of R09/R13/R15 Regulations of JNTUH who has been detained due to lack of credits, shall be promoted to the next semester of AR16 Regulations of GCET only after acquiring the required credits as

per the corresponding regulations of his/her first admission. For subsequent promotions the rule specified in section 14.5 shall be applicable. The student is required to complete the study of B.Tech within the stipulated period of eight academic years from the year of first admission. The AR16 Academic Regulations of GCET are applicable to a student from the year of readmission onwards.

14.4 For all students readmitted under AR16 Regulations of GCET:

14.4.1 A student who has failed in any course under any regulation has to pass those courses in the same regulations.

14.4.2 A student shall acquire a total of 192 credits for the award of degree. These 192 credits shall be the sum of all the credits secured in all the other regulations of his study (subsequent to normalization as per section 14.5) and those secured under AR16 Regulations of GCET.

14.4.3 If a student readmitted to AR16 Regulations of GCET, has any course with about 80% of syllabus in common with his previous regulations, that particular course in AR16 Regulations of GCET shall be substituted by another course to be suggested by GCET.

14.4.4 If a student readmitted to AR16 Regulations of GCET, has not studied any course/topics in his earlier regulations of study which is a prerequisite for further courses in AR16 Regulations of GCET, the College shall arrange to conduct remedial classes to cover those course/topics for the benefit of the students.

14.5 Promotion Rule

Where the credits allotted to a semester/year under the regulations studied in are different from that under AR16 regulations for the corresponding semester/year, the promotion rules of AR16 vide section 8.3 shall be applied after normalization. Normalization is done by scaling down or up the number of credits of a semester/year under the previous regulations to equal the number of credits of the corresponding semester/year under AR16 regulations and revising the secured credits also in the same proportion.

15.0 Student transfers

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

15.2 The student seeking transfer from various other universities/institutions has to pass the failed courses which are equivalent to the courses of GCET, and also pass the courses of GCET which the student has not studied at the earlier institution. Further, even if the student had passed some of the courses at the earlier institutions, if the same courses are prescribed in different semesters of GCET, the student has to study those courses in GCET in spite of fact that those courses are repeated.

15.3 The transferred students from other universities/institutions shall be provided one chance to write the internal examinations in the failed courses and/or courses not studied as per the clearance (equivalence) letter issued by JNTUH.

16.0 Scope

- i) Where the words “he”, “him”, “his”, occur in the write-up of regulations, they include “she”, “her”, “hers”.
- ii) Where the words “Subject” or “Subjects”, occur in these regulations, they also imply “Course” or “Courses”.
- iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.
- iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.
- v) The college may change or amend the Academic Regulations, Program Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the dates notified by the College Authorities.
- vi) B.Tech (Regular) program is B.Tech 4 year degree program to which students are admitted to I year
- vii) B.Tech LE Scheme refers to the system under which students are admitted to II year of the B.Tech 4 year degree program.

* * * * *

PUNISHMENT FOR MALPRACTICE

	Nature of Malpractices	Punishment
	If the candidate:	
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 course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
1 (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he shall 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 course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he shall be handed over to the police and a case is registered against him.
4	Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course.
6	Refuses to obey the orders of the Chief Superintendent / Assistant –Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the 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 engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they shall be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is course 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 the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College shall be handed over to police and, a police case shall be registered against them.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY HYDERABAD

(Autonomous)

Cheeryal (V), Keesara (M), Medchal Dist., - 501 301

ACADEMIC REGULATIONS 2016
For CBCS Based B.Tech. (Lateral Entry (LE) Scheme)

(Effective for the students admitted into II year from the
Academic Year **2017-18** and onwards)

1.0 Eligibility for Admission

- 1.1** Admission to the B.Tech. Programme shall be made either on the basis of the merit rank obtained by the qualifying candidate at an entrance test conducted by the Telangana State Government (ECET), or the JNTUH, or on the basis of any other order of merit approved by JNTUH, subject to reservations as prescribed by the Government of Telangana from time to time.

Admissions under the Lateral Entry Scheme are made into the Second (II) year of the Four (4) – year degree program

2.0 Course Work:

- 2.1** A student, after securing admission, shall pursue the B.Tech. programme in a minimum period of 3 academic years, and a maximum period of 6 academic years (starting from the date of commencement of II Year).
- 2.2** Each student shall register for and secure the specified number of credits required for the completion of the B.Tech. programme and award of the B.Tech. degree in respective branch of Engineering.
- 2.3** Each semester is structured to provide typically 24 Credits, totaling to 144 credits for the entire B.Tech. (LE) programme.

3.0 Promotion rules

- 3.1** Case (i): A student registers for 24 credits or more in each semester as per the provision in section 5.2 of AR16 regulations of B.Tech (Regular) four year degree program.
- 3.1.1** A student shall not be promoted from II Year to III Year, unless he fulfills the attendance and Academic Requirements and secures a minimum of 29 credits out of 48 credits or more the student has registered up to and including II Year II Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

- 3.1.2 A student shall not be promoted from III Year to IV Year, unless he fulfills the attendance and Academic Requirements and secures a minimum of 58 credits out of 96 credits or more the student has registered up to and including III Year II Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 3.2 Case (ii): A student registers for NOT less than 20 credits and less than 24 credits in each semester.
- 3.2.1 A student shall not be promoted from II Year to III Year, unless he fulfills the attendance and Academic Requirements and secures a minimum of 60% of the credits registered up to and including II year II semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 3.2.2 A student shall not be promoted from III Year to IV Year, unless he fulfills the attendance and Academic Requirements and secures a minimum of 60% of the credits registered up to and including III year II semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.
- 4.0 A Student shall register for all courses covering 144 credits as specified and listed (with the relevant courses as mentioned) in the Programme Structure, put up all the Attendance and Academic requirements for 144 Credits securing a minimum of C Grade (Pass Grade) or above in each course, and earn ALL 144 Credits securing SGPA ≥ 5.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0 , to successfully complete the B.Tech. programme.
- 4.1 A student must secure the necessary 144 credits as specified for the successful completion of the entire B.Tech. programme (see section 5.1); however, only 138 credits shall be considered for evaluating his overall performance for the award of class as provided for under section 5.0. These 138 credits shall be arrived at by leaving out two courses (one from open elective courses and one from professional elective courses) carrying a total of 6 credits, which have the least Grade point scores.
- 4.2 Students who fail to earn 144 credits as per the Programme Structure, and as indicated above, within 6 academic years from the date of commencement of their II Year shall forfeit their seats in B.Tech. Programme and their admissions shall stand cancelled.
- 5.0 Award of Degree**
- 5.1 A student who registers for all the specified courses as listed in the programme structure, satisfies all the programme requirements, and passes all the examinations prescribed in the entire B.Tech. programme, and secures the required number of 144 credits (with CGPA ≥ 5.0), within 6 academic years from the date of commencement of the second academic Year, shall be declared to have **'QUALIFIED'** for the award of the B.Tech. degree in the chosen branch of Engineering.

- 5.2** A student who qualifies for the award of the degree as listed in section 5.1, shall be placed in the appropriate class as follows based on evaluation as per section 4.1:
- 5.2.1** Students with final CGPA (at the end of the B. Tech Programme) ≥ 8.00 , and fulfilling the following conditions shall be placed in 'FIRST CLASS with DISTINCTION'.
- i. should have passed all the subjects/courses in 'FIRST APPEARANCE' within the first 3 academic years (or 6 sequential semesters) from the date of commencement of his first academic year,
 - ii. should have secured a CGPA ≥ 8.00 , at the end of each of the 6 sequential semesters, starting from the II Year I semester onwards,
 - iii. should not have been detained or prevented from writing the Semester End Examinations in any semester due to shortage of attendance or any other reason, thereof.
- 5.2.2** Students having final CGPA (at the end of B.Tech. Programme) ≥ 8.00 , but not fulfilling the above conditions shall be placed in 'FIRST CLASS'.
- 5.2.3** Students with final CGPA (at the end of the B.TECH. Programme) ≥ 6.50 but < 8.00 , shall be placed in 'FIRST CLASS'.
- 5.2.4** Students with final CGPA (at the end of the B.TECH. Programme) ≥ 5.50 but < 6.50 , shall be placed in 'SECOND CLASS'.
- 5.2.6** All other Students who qualify for the award of the degree (as per section 5.1), with final CGPA (at the end of the B.Tech. Programme) ≥ 5.00 but < 5.50 , shall be placed in 'PASS CLASS'.
- 5.3** A student with final CGPA (at the end of the B.Tech. Programme) < 5.00 shall not be eligible for the award of the degree.
- 5.4** Students fulfilling the conditions listed under Item (iii) of 5.2.1 alone shall be eligible for the award of 'college rank' and / or 'gold medal'.

6.0 Transitory Regulations

6.1 General

- 6.1.1** A Student who has discontinued for any reason, or has been detained for want of attendance or NOT promoted due to lack of required credits as specified, may be considered eligible for readmission to the same semester in which he got detained for want of attendance or promotion to the next year of study after securing the required number of credits, as detailed in sections 6.2 through 6.4 as the case may be.

6.2 For students detained due to shortage of attendance:

6.2.1 A student who has been detained in any semester of II, III and IV years of R09/R13/R15 regulations of JNTUH for want of attendance shall be permitted to join the corresponding semester of AR16 regulations of GCET and is required to complete the study of B.Tech. within the stipulated period of six academic years from the date of first admission in II Year.

The AR16 Academic Regulations of GCET under which a student has been readmitted shall be applicable to the student from that semester which shall include section 6.5.

6.3 For students NOT promoted due to shortage of credits:

6.3.1 A student of R09/R13/R15 Regulations of JNTUH who has NOT been promoted due to lack of credits, shall be promoted to the next semester under AR16 Regulations of GCET only after acquiring the required credits as per the corresponding regulations of his/her first admission. For subsequent promotions, the rule specified in section 6.5 shall be applicable. The student is required to complete the study of B.Tech within the stipulated period of SIX academic years from the year of first admission. The AR16 Academic Regulations of GCET are applicable to a student from the year of readmission onwards.

6.4 For all students readmitted under AR16 Regulations of GCET:

6.4.1 A student who has failed in any course under any regulation has to pass those courses in the same regulations.

6.4.2 A student shall acquire a total of 144 credits for the award of degree. These 144 credits shall be the sum of all the credits secured in all the other regulations of his study (subsequent to normalization as per section 6.5) and those secured under AR16 Regulations of GCET.

6.4.3 If a student readmitted to AR16 Regulations of GCET, has any course with about 80% of syllabus in common with his previous regulations, that particular course in AR16 Regulations of GCET shall be substituted by another course to be suggested by GCET.

6.4.4 If a student readmitted to AR16 Regulations of GCET, has not studied any course/topics in his earlier regulations of study which is a prerequisite for further courses in AR16 Regulations of GCET, the College shall arrange to conduct remedial classes to cover those course/topics for the benefit of the students.

6.5 Promotion Rule

Where the credits allotted to a semester/year under the regulations studied in are different from that under AR16 regulations for the corresponding semester/year, the promotion rules of AR16 vide section 3.0 shall be applied after normalization. Normalization is done by scaling down or up the number of credits of a semester/year under the previous regulations to equal the number of credits of the corresponding semester/year under AR16 regulations and revising the secured credits also in the same proportion.

7.0 All the other regulations as applicable to B.Tech 4 – year degree program (Regular) shall hold good for B.Tech LE Scheme.

PUNISHMENT FOR MALPRACTICE

	Nature of Malpractices	Punishment
	If the candidate:	
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 course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
1 (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that course only of all the candidates involved. In case of an outsider, he shall 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 course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the

		candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he shall be handed over to the police and a case is registered against him.
4	Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that course.
6	Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the 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 engages in any other act which in the opinion of the officer on duty amounts to use of unfair	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they shall be handed over to the police and a police case is registered against them.

	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 part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is course 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 the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College shall be handed over to police and, a police case shall be registered against them.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Cheeryal (V), Keesara (M), Medchal Dist., - 501 301

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. Program in Computer Science and Engineering

VISION

To produce globally competent and socially responsible computer science engineers contributing to the advancement of engineering and technology which involves creativity and innovation by providing excellent learning environment with world class facilities.

MISSION

1. To be a center of excellence in instruction, innovation in research and scholarship and service to the stake holders, the profession, and the public.
2. To prepare graduates to enter rapidly changing field as a competent computer science engineer.
3. To prepare graduates capable in all phases of software development, possess a firm understanding of hardware technologies, have the strong mathematical background necessary for scientific computing, be sufficiently well versed in general theory and practice to allow growth within the discipline as it advances.
4. To prepare graduates to assume leadership roles by possessing good communication skills, ability to work effectively as team members, appreciation for their social and ethical responsibility in a global setting.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Program Educational Objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years of graduation. The PEOs for Computer Science and Engineering graduates are:

PEO-I: To provide graduates with a good foundation in mathematics, sciences and engineering fundamentals required to solve engineering problems that will facilitate them to find employment in industry and/or to pursue postgraduate studies with an appreciation for lifelong learning.

PEO-II: To provide graduates with analytical and problem solving skills to design algorithms, other hardware/ software systems, and inculcate professional ethics, interpersonal skills to work in a multi-cultural team.

PEO-III: To facilitate graduates get familiarized with state of the art software/hardware tools, imbibing creativity and innovation that would enable them to develop cutting-edge technologies of multi-disciplinary nature for societal development.

PROGRAM OUTCOMES (POs):

Program Outcomes (POs) describe what students are expected to know and be able to do by the time of graduation to accomplish Program Educational Objectives (PEOs). The Program Outcomes for Computer Science and Engineering graduates are:

Engineering Graduates would be able to:

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO 1: To identify and define the computing requirements appropriate for its solution under given constraints.

PSO 2: To follow the best practices, namely, SEI-CMM levels and 6-sigma which varies from time to time for software development projects using open-ended programming environments to produce software deliverables as per customer needs.

**GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)**

**SCHEME OF INSTRUCTION AND EXAMINATION
B.Tech. COMPUTER SCIENCE AND ENGINEERING**

Academic Regulations: AR-16

Academic Year 2016-17

PROGRAM STRUCTURE

FIRST YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits	
				L	T	P/D	CIE	SEE	Tot		C
1	16EN1101	English-I	HS	2	-	-	30	70	100	2	
2	16PH1101	Engineering Physics	BS	3	1	-	30	70	100	3	
3	16MA1101	Mathematics – I	BS	4	1	-	30	70	100	4	
4	16CH1101	Engineering Chemistry	BS	3	-	-	30	70	100	3	
5	16CS1101	Computer Programming-I	ES	3	-	-	30	70	100	3	
6	16ME1101	Engineering Drawing	ES	2	-	3	30	70	100	4	
7	16EN11L1	English - I Lab	HS	-	-	2	30	70	100	1	
8	16CH11L1	Engineering Chemistry Lab	BS	-	-	3	30	70	100	2	
9	16CS11L1	Computer Programming - I Lab	ES	-	-	3	30	70	100	2	
Total				17	2	11	270	630	900	24	
Total Periods Per Week				30							

Abbreviation	Description
HS	Humanities and Social Sciences
BS	Basic Sciences
ES	Engineering Sciences
PC	Professional Core
SC	Soft Core
CC	Core Course
PE	Professional Elective
OE	Open Elective

Abbreviation	Description
L	Lecture
T	Tutorial
P	Practical
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Examination
Tot	Total
C	Number of Credits

FIRST YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits	
				L	T	P/D	CIE	SEE	Tot		C
1	16EN1201	English-II	HS	2	-	-	30	70	100	2	
2	16PH1202	Semiconductor Physics	BS	4	1	-	30	70	100	4	
3	16MA1201	Mathematics-II	BS	3	1	-	30	70	100	3	
4	16MA1202	Mathematics-III	BS	3	-	-	30	70	100	3	
5	16CS1201	Computer Programming -II	ES	3	-	-	30	70	100	3	
6	16EN12L1	English – II Lab	HS	-	-	2	30	70	100	1	
7	16PH12L2	Semiconductor Physics Lab	BS	-	-	3	30	70	100	2	
8	16MA12L1	Computational Mathematics Lab	BS	-	-	3	30	70	100	2	
9	16CS12L1	Computer Programming - II Lab	ES	-	-	3	30	70	100	2	
10	16WS12L1*	Information Technology Workshop (ITWS)/ Engineering Workshop (EWS)	ES	-	-	3	30	70	100	2	
Total				15	2	14	300	700	1000	24	
Total Periods Per Week				31							

*CSE BoS specified the syllabus for ITWS while ME BoS specified the syllabus for EWS.

SECOND YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits	
				L	T	P/D	CIE	SEE	Tot		C
1	16CS2101	Mathematical Foundations of Computer Science	PC	4	1	-	30	70	100	4	
2	16CS2102	Data Structures	PC	4	-	-	30	70	100	4	
3	16CS2103	Object Oriented Programming through Java	PC	3	-	-	30	70	100	3	
4	16EC2103	Switching Theory and Logic Design	ES	3	1	-	30	70	100	3	
5	16EE2104	Basic Electrical Engineering	ES	3	1	-	30	70	100	3	
6	16CS21L1	Object Oriented Programming through Java Lab	PC	-	-	3	30	70	100	2	
7	16CS21L2	Data Structures Lab	PC	-	-	3	30	70	100	2	
8	16EE21L4	Basic Electrical Engineering Lab	ES	-	-	3	30	70	100	2	
9	16MA2104	Logical Reasoning	BS	-	-	2	30	70	100	1	
Total				17	3	11	270	630	900	24	
Total Periods Per Week				31							

SECOND YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS2201	Design and Analysis of Algorithms	PC	3	-	-	30	70	100	3
2	16CS2202	Computer Organization and Assembly Language Programming	PC	3	1	-	30	70	100	3
3	16CS2203	Database Management Systems	PC	3	-	-	30	70	100	3
4	16MA2201	Probability and Statistics	BS	4	1	-	30	70	100	4
5	16CH2201	Environmental Studies	HS	3	-	-	30	70	100	3
6	16CS22L1	Computer Organization and Assembly Language Programming Lab	PC		-	3	30	70	100	2
7	16CS22L2	Database Management Systems Lab	PC	-	-	3	30	70	100	2
8	16CS22L3	Algorithms Lab	PC	-	-	3	30	70	100	2
9	16HS22L1	Gender Sensitization	HS	-	-	3	30	70	100	2
Total				16	2	12	270	630	900	24
Total Periods Per Week				30						

THIRD YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits	
				L	T	P/D	CIE	SEE	Tot		C
1	16CS3101	Web Technologies	PC	3	-	-	30	70	100	3	
2	16CS3102	Operating Systems	PC	3	-	-	30	70	100	3	
3	16CS3103	Formal Languages and Automata Theory	PC	3	1	-	30	70	100	3	
4	Soft Core-I		SC	4	1	-	30	70	100	4	
	16CS3104	Data Ware Housing and Data Mining									
	16CS3105	Computer Graphics									
5	Open Elective – I		OE	3	-	-	30	70	100	3	
	16MB3121	Intellectual Property Rights									
	16EE3122	Industrial Safety and Hazards									
	16EC3124	Electronic Measuring Instruments									
	16ME3125	Nano Materials and Technology									
16CE3126	Global Warming and Climate Change										
6	Soft Core-I Lab		SC	-	-	3	30	70	100	2	
	16CS31L1	Data Ware Housing and Data Mining Lab									
	16CS31L2	Computer Graphics Lab									
7	16CS31L3	Web Technologies Lab	PC	-	-	3	30	70	100	2	
8	16CS31L4	Operating Systems Lab	PC	-	-	3	30	70	100	2	
9	16MB31P1	Human Values and Professional Ethics	HS	-	-	3	30	70	100	2	
Total				16	2	12	270	630	900	24	
Total Periods Per Week				30							

THIRD YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16MB3201	Management Science	HS	3	-	-	30	70	100	3
2	16CS3201	Software Engineering		4	-	-	30	70	100	4
3	Soft Core-II		SC	4	1	-	30	70	100	4
	16CS3202	Information Security								
	16CS3203	Image Processing								
4	Professional Elective- I		PE	3	-	-	30	70	100	3
	16CS3204	Artificial Intelligence								
	16CS3205	Distributed Databases								
	16CS3206	Simulation and Modelling								
	16CS3207	Optimization Techniques								
5	Open Elective –II		OE	3	-	-	30	70	100	3
	16MB3231	Supply Chain Management								
	16EE3233	Energy Conservation and Management								
	16EC3234	Basics of Communication Systems								
	16ME3235	Manufacturing Processes								
	16CE3236	Building Technology								
6	Open Elective –III		OE	3	-	-	30	70	100	3
	16MB3241	Banking and Insurance								
	16EE3243	Micro-Electro-Mechanical Systems								
	16EC3244	Principles of Wireless Communication Systems								
	16ME3245	Aspects of Heat Transfer in Electronically Controlled Units								
	16CE3246	Green Buildings								
	16EN3247	Foreign Languages - French								
	16EN3248	Foreign Languages - Spanish								
	16EN3249	Foreign Languages - German								
7	Soft Core-II Lab		SC	-	-	3	30	70	100	2
	16CS32L1	Information Security and Software Engineering Lab								
	16CS32L2	Image Processing and Software Engineering Lab								
8	16EN32L1	Advanced English Communication Skills Lab	HS	-	-	3	30	70	100	2
Total				20	1	6	240	560	800	24
Total Periods Per Week				27						

FOURTH YEAR SEMESTER-I[#]

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	
1	16CS4101	Compiler Design	PC	3	1	-	30	70	100	3
2	16CS4102	Computer Networks	PC	3	-	-	30	70	100	3
3	16CS4103	Mobile Application Development	PC	3	1	-	30	70	100	3
4	16CS4104	Cloud Computing, Security and Analytics	PC	3	-	-	30	70	100	3
5	Professional Elective – II		PE	3	-	-	30	70	100	3
	16CS4105	Advanced Computer Architecture								
	16CS4106	Remote Sensing and Geographical Information Systems								
	16CS4107	Distributed Systems								
	16CS4108	Soft Computing								
6	Professional Elective-III		PE	3	-	-	30	70	100	3
	16CS4109	Neural Networks								
	16CS4110	Software Practice and Testing								
	16CS4111	Parallel Algorithms								
	16CS4112	Web Services								
7	16CS41L1	Mobile Application Development and Compiler Design Lab	PC	-	-	3	30	70	100	2
8	16CS41L2	Computer Networks and Cloud Computing, Security and Analytics Lab	PC	-	-	3	30	70	100	2
9	16CS4111	Industry Oriented Mini Project	CC	-	-	-	-	100	100	1
10	16CS4112	Major Project Seminar	CC	-	-	2	100	-	100	1
Total				18	2	8	340	660	1000	24
Total Periods Per Week				28						

FOURTH YEAR SEMESTER-II[#]

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits			
				L	T	P/D	CIE	SEE	Tot		C		
1	16MB4201	Project and Financial Management	HS	4	-	-	30	70	100	4			
		Professional Elective- IV											
2	16CS4201	Big Data Analytics	PE	3	-	-	30	70	100	3			
	16CS4202	Machine Learning											
	16CS4203	Human Computer Interaction											
	16CS4204	Internet of Things											
		Open Elective – IV											
3	16MB4251	Entrepreneurship	OE	3	-	-	30	70	100	3			
	16EE4253	Renewable Energy Sources											
	16EC4254	Biomedical Instrumentation											
	16ME4255	Materials Handling											
	16CE4256	Disaster Mitigation and Management											
	16MA4257	Actuarial Statistics											
4	16CS4205	Technical Seminar	CC	-	-	2	100	-	100	1			
5	16CS4206	Major Project	CC	-	-	15	30	70	100	10			
6	16CS4207	Comprehensive Viva Voce	CC	-	-	-	-	100	100	3			
				Total			10	0	17	220	380	600	24
				Total Periods Per Week			27						

Subject to the approval of Academic Council

OPEN ELECTIVES offered by a Department SHOULD NOT be taken by the students of the same department

Open Elective I

S. No.	Course Title	Course Code
21	Intellectual Property Rights (MBA)	16MB3121/16MB3221
22	Industrial Safety and Hazards (EEE)	16EE3122/16EE3222
23	JAVA Programming (CSE)	16CS3123/16CS3223
24	Electronic Measuring Instruments (ECE)	16EC3124/16EC3224
25	Nano Materials and Technology (ME)	16ME3125/16ME3225
26	Global Warming and Climate Change (CE)	16CE3126/16CE3226

Open Elective II

S. No.	Course Title	Course Code
31	Supply Chain Management (MBA)	16MB3231/16MB4131
32	Knowledge Management (CSE)	16CS3232/16CS4132
33	Energy Conservation and Management (EEE)	16EE3233/16EE4133
34	Basics of Communication Systems(ECE)	16EC3234/16EC4134
35	Manufacturing Processes (ME)	16ME3235/16ME4135
36	Building Technology (CE)	16CE3236/16CE4136

Open Elective III

S. No.	Course Title	Course Code
41	Banking and Insurance (MBA)	16MB3241/16MB4141
42	Database Systems (CSE)	16CS3242/16CS4142
43	Micro-electro-mechanical Systems(EEE)	16EE3243/16EE4143
44	Principles of Wireless Communication Systems (ECE)	16EC3244/16EC4144
45	Aspects of Heat Transfer in Electronically Controlled Units(ME)	16ME3245/16ME4145
46	Green Buildings (CE)	16CE3246/16CE4146
47	Foreign Language – French	16EN3247/16EN4147
48	Foreign Language –Spanish	16EN3248/16EN4148
49	Foreign Language –German	16EN3249/16EN4149

Open Elective IV

S. No.	Course Title	Course Code
51	Entrepreneurship (MBA)	16MB4251
52	Web Development (CSE)	16CS4252
53	Renewable Energy Sources (EEE)	16EE4253
54	Biomedical Instrumentation (ECE)	16EC4254
55	Materials Handling (ME)	16ME4255
56	Disaster Mitigation and Management (CE)	16CE4256
57	Actuarial Statistics (S&H)	16MA4257

**Comparison of AICTE Guidelines for Curriculum Structure of B.Tech Degree Program in
Computer Science and Engineering Vis-à-vis GCET Program**

S. No.	Broad Course Classification	Course Group/ Category	Course Description	No. of Credits & Percentages (%)	Range of Percentage Credits given by AICTE
1.	Foundation Courses (FnC)	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects	31 (16.15%)	15% - 20%
2.		ES - Engineering Sciences	Includes fundamental engineering subjects	24 (12.5%)	15% - 20%
3.		HS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management	20 (10.42%)	5%-10%
4.	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	64 (33.33%)	30% - 40%
5.	Elective Courses (EIC)	SC- Soft Core	Includes core elective courses with the associated lab	10 (5.2%)	10% -15%
		PE – Professional Electives	Includes Elective subjects related to the Parent Discipline/ Department/ Branch of Engg.	15 (7.8%)	
6.		OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department/ Branch of Engg.	12 (6.25%)	5% - 10%
7.	Core Courses (CC)	Project Work	B.Tech. Project or UG Project or UG Major Project	16 (8.3%)	10% - 15%
8.		Industrial Training/ Mini-Project	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project		
9.		Seminar	Seminar/ Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.		
10.		Minor Courses	1 or 2 Credit Courses (subset of HS)	Included	
Total Credits for B. Tech. Programme				192 (100%)	

SYLLABUS

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Cheeryal (V), Keesara (M), Medchal Dist. - 501 301, Telangana State

16EN1101 – ENGLISH – I

I Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
2	-	-/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Read well and speak grammatically correct English.
2. Become a good communicator, both written and oral.
3. Analyze, interpret the given data/ text and infer appropriately.
4. Design an outline for a paragraph, essay, letters etc.
5. Listen actively and respond accordingly.
6. Apply classroom learning to conduct oneself in a multicultural environment

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Speak fluent, intelligible and grammatically correct English
 CO2. Use language appropriately in various functional contexts
 CO3. Analyze a given situation/ text and interpret accordingly.
 CO4. Write effectively in formal and informal situations
 CO5. Acquire active listening skills and demonstrate the same.
 CO6. Acquire the nuances of behavioural etiquette in a multicultural environment.

Unit-1

Reading	<i>Tea Party</i> by Ruth PraverJhabvala
Vocabulary	Homonyms, Homophones Homographs
Grammar	Nouns and Articles Types of Verbs
Speaking	Greeting people and taking leave Introducing oneself and others
Writing	Writing sentences Punctuation

Unit-2

Reading	1) <i>Risk Management</i> by Joe Crompton 2) <i>Sivakasi</i> by Amrutha Gayatri
Vocabulary	1)Synonyms 2)Antonyms and Synonyms, Commonly misspelt words
Grammar	1)Subject-verb agreement 2)The present tense
Speaking	Giving Directions
Writing	Paragraph Writing Note making, Note taking

Unit-3

Reading	1) <i>Polymer Banknotes</i> 2) <i>The one thing every business executive must understand about social media by Kerpen</i>
Vocabulary	1)Collocations 2)Technical Vocabulary
Grammar	1)Past Tense & Future Tense 2)Adjectives – Comparison, Prepositions
Speaking	1)Group Discussions 2)Speaking on the telephone (Telephone Etiquette)
Writing	Information Transfer

Unit-4

Reading	1) <i>IF</i> by Rudyard Kipling 2) <i>Courage and integrity are at the core of the successful leadership</i>
Vocabulary	1)Positive descriptive vocabulary, Common errors in English 2)Idioms and Phrases
Grammar	1)Reported Speech 2)Active voice & passive voice
Speaking	1)Talking about hypothetical situations 2)Narrating experiences/events and expressing opinions
Writing	1)Letter Writing 2)Phrasal Verbs 3)Guided Composition

Unit-5

Reading	Study Skills
Vocabulary	Functional vocabulary related to writing and reading
Grammar	Picture Reading/ Interpretation
Writing	Job Application Narrative Reviews-articles/newspaper/books/movies Essay/articles

TEXT BOOK(S)

1. Skills Annexe: Functional English for Success published by Orient Longman

REFERENCE BOOK(S)

1. Contemporary English Grammar Structures and Composition by David Green, Macmillan Publishers 2010, New Delhi.
2. Innovate with English: A course in English for Engineering students by T Samson, Foundation Books.
3. English Grammar Practice by Raj N Bakshi, Orient Longman.

4. Spoken English by R.K.Bansal and Harrison, Orient Longman.
5. Technical Communication by Meenakshi Raman, Oxford University Press.
6. Grammar Games by Renuvolcuri Mario, Cambridge University Press.
7. Enrich Your English by Thakur K.B.P. Sinha, Vijay Nicole Imprints Pvt. Ltd.

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16PH1101 – ENGINEERING PHYSICS

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course objectives

Develop ability to

1. Understand fundamental aspects of crystal structures, various types of crystal defects and methods of determining the crystal structures by using X- ray diffraction.
2. Distinguish different types of dielectric polarization mechanisms; understand the properties of different dielectric materials and their applications.
3. Demonstrate classification of magnetic materials; understand the phenomenon of superconductivity and the applications of magnetic materials and superconductors.
4. Understand the concepts of interference, diffraction, light amplification, working of various types of LASERs and their applications.
5. Outline the behavior of materials at nanoscale, three methods of preparation of nanomaterials and their characterization techniques with applications.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Explain the fundamentals of crystal structures; summarize various crystal defects and methods of determining the crystal structures using X-Rays.
- CO2. Explain different types of dielectric polarization mechanisms, and the properties of different dielectric materials and their applications.
- CO3. Explain different types of magnetic materials, phenomenon of superconductivity and applications of magnetic materials and superconductors.
- CO4. Explain phenomena of interference, diffraction, and light amplification process, construction and working of Ruby, He-Ne, Semiconductor LASERs and their applications in different fields.
- CO5. Illustrate awareness of sol-gel method, physical vapour deposition method, and ball milling method for preparation of nanomaterials and their applications.

UNIT I: Crystallography and X-Ray diffraction

Space lattice, unit cell, lattice parameters, crystal systems, Bravais lattices, atomic radius, coordination number and atomic packing factors of simple cubic, body centered cubic, face centered cubic, and diamond structure. Crystal directions & planes, Miller indices, inter planar spacing of orthogonal crystal systems.

Defects in crystal: Point defects, line defects (Qualitative Treatment). Estimation of Schottky and Frenkel defects, Burger's vector, Bragg's law, X-Ray diffraction - Laue method and powder method. Applications of X-Rays in different fields.

UNIT II: Dielectric properties

Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic and ionic polarizations (Quantitative), orientation and space charge polarizations (Qualitative). Internal fields in solids, Clausius-Mosotti equation, Piezo, Pyro & Ferro electricity and their applications.

UNIT III: Magnetic Properties

Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of Dia, Para, Ferro, Antiferro and Ferri magnetic materials; domain theory of Ferro magnetism- Hysteresis curve, soft and hard magnetic materials, applications of magnetic materials. Basic concepts of superconductivity and properties of superconductors: Type – I, Type – II superconductors, BCS theory (Qualitative), applications of superconductors in science and engineering.

UNIT IV: Optics and Lasers

Introduction to interference, theory of interference in thin films, Newton's rings, anti reflection coatings; introduction to diffraction, diffraction due to single slit, double slit and diffraction grating. LASERs and their characteristics, stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and relation between them, pumping schemes, optical resonator, various types of Lasers: Ruby Laser, He-Ne Laser, Semiconductor Laser and applications of Lasers.

UNIT V: Nanoscience

Origin of Nanoscience, Nanoscale, classification of nanomaterials- surface to volume ratio, Quantum confinement, synthesis of nanomaterials – sol gel method, physical vapour deposition method, ball milling method; properties of nanomaterials, characterization of nanomaterials using Scanning Electron Microscope(SEM), Transmission Electron Microscope(TEM), Applications of nanoscience in various fields.

TEXT BOOK(S)

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, M N Avadhanulu, S Chand Publications.

REFERENCE BOOK(S)

1. Introduction to Solid state physics by Kittel, 8th Edition, John Weily Publishers.
2. Fundamentals of Physics, David Halliday, John Weily Publishers.
3. University Physics, Sear's and Zemansky (10th Edition), Wesly Publishers.
4. Applied Physics, PK Mittal, IK International Publishing House.
5. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

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16MA1101 – MATHEMATICS-I

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand various types of Matrices, properties and rank of the matrix to find the solution for system of equations, if it exists.
2. Apply the knowledge of eigenvalues and eigenvectors of a matrix from quadratic form into a canonical form through linear and orthogonal transformations.
3. Identify the methods of solving the differential equations of first order and applications in engineering problems namely, Newton's law of cooling, Natural growth and decay.
4. Solve second and higher order differential equations and apply the same to electrical circuits and simple harmonic motion.
5. Analyse properties of Laplace Transform, Inverse Laplace Transform, convolution theorem and apply the same to ordinary differential equations.

Course Outcomes (COs)

At the end of the course, the student would be able to:

- CO1. Write the matrix representation of a set of linear equations and analyse solutions of a system of equations.
- CO2. Deduce eigenvalues and eigenvectors of a matrix and apply the same to reduce quadratic form into a canonical form through linear and orthogonal transformations.
- CO3. Identify the type of differential equation and use the appropriate method to solve the differential equation.
- CO4. Apply differential equations to solve engineering problems particularly, electrical circuits and simple harmonic motion.
- CO5. Solve ordinary differential equations of second and higher order using Laplace Transform techniques.

UNIT-I: Theory of Matrices-I

Real matrices-symmetric, Skew-symmetric, Orthogonal, Complex matrices: Hermitian, Skew Hermitian, Unitary Matrices and Idempotent Matrix, Finding rank of a matrix by reducing to Echelon and Normal forms, Inverse of a non-singular matrix using row/column transformations (Gauss-Jordan method). Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix, Solving $m \times n$ and $n \times n$ linear system of equations by Gauss elimination.

UNIT- II: Theory of Matrices-II

Cayley-Hamilton Theorem(without proof)-Verification, Calculating inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors, Linear Transformation-Orthogonal Transformation, Eigenvalues and eigenvectors of a

matrix, Properties of eigenvalues and eigenvectors of real and complex matrices, Linearly independent eigenvectors of a matrix when the eigenvalues of the matrix are repeated, Quadratic forms up to three variable, Rank-positive definite, negative definite, semi-definite, Index, signature of a quadratic form.

UNIT – III: First Order Ordinary Differential Equations

Differential equations- exact, linear and Bernoulli, Applications of first order differential equations-Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories. Electrical Circuits.

UNIT-IV: Higher Order Ordinary Differential Equations

Linear, homogeneous and non-homogeneous differential equations of second and higher order with constant coefficients, Non homogeneous of the type e^{ax} , $\sin ax$, $\cos ax$ and x^n , $e^{ax}V(x)$, $x^nV(x)$ and Method of variation of parameters, Applications of second order differential equations to Electrical circuits and simple harmonic motion.

UNIT-V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms. Existence of Laplace transforms. Laplace transform of standard functions, first shifting theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions-Unit step function-second shifting theorem-Dirac's delta function, Periodic function-Inverse Laplace transform by Partial fractions (Heaviside method), Inverse Laplace transforms of functions when they are multiplied or divided by "s". Inverse Laplace transforms of derivatives and integrals of functions, Convolution theorem-Applications to ordinary differential equations.

TEXT BOOK(S)

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
2. Engineering Mathematics by Srimanta pal, subhodh C.Bhunja, Oxford higher Education.
3. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
4. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
5. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.
6. Ordinary & Partial Differential Equations, M D Raisinghanja, S. Chand.

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16CH1101 - ENGINEERING CHEMISTRY

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Define and understand various conductances in electrochemistry, functional working of electrodes, different types of batteries and cells along with their applications.
2. Understand the concept of corrosion; distinguish various types of corrosion and prevention.
3. Identify the causes of hardness in water and its treatment using various techniques.
4. Classify polymers and their applications, understand different mechanisms of polymerization and understand different fibers along with their applications.
5. Understand the engineering materials namely, cement, lubricants, ceramics and glass.
6. Understand various adsorption techniques and its applications.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Explain
- a. various conductances in electrochemistry
 - b. functional working of electrodes
 - c. construction and working of different types of batteries and cells along with their functional differences and applications.
- CO2. Explain corrosion and causes of corrosion, distinguish various types of corrosion and explain various methods to prevent corrosion.
- CO3. Explain hardness in water and various techniques used to treat the same.
- CO4. Distinguish clearly various polymers and various synthetic and natural fibers; explain various polymerisation processes.
- CO5. Explain the properties of various materials namely, cement, lubricants, ceramics and glass and their applications.
- CO6. Explain various adsorption techniques and its applications.

UNIT I: Electrochemistry and Batteries

Electro Chemistry: Conductance -Specific, Equivalent and Molar, their Units;

EMF: Galvanic Cell; types of Electrodes: Calomel, Quinhydrone and Glass; Nernst equation and its applications; Concentration cells, determination of pH using glass electrode-Numerical problems.

Batteries: Introduction, types of batteries: Primary cells and secondary cells, differences between them with examples.

Fuel cells: Hydrogen–Oxygen fuel cell; applications of fuel cells.

UNIT II: Corrosion and its Control Methods

Corrosion: Introduction, definition, Types of Corrosion and disadvantages of corrosion. Mechanism of corrosion- chemical and electrochemical corrosion. Factors affecting rate of corrosion- Nature of metal and Nature of Environment –Electrochemical series and its applications, Corrosion control methods–Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings –hot dipping (galvanization & tinning), Electro plating (Copper plating) and Electroless plating (Ni plating) – Organic coatings–Paints-constituents and their functions.

UNIT III: Water and its treatment

Hardness of Water: Types of hardness-temporary and permanent, units and interrelation between them, Boiler troubles–Scale & sludge, Priming and foaming, Caustic embrittlement-Treatment of boiler feed water–Internal treatment (Colloidal and Calgon conditioning)–External treatment–Zeolite process, ion exchange process. Potable water- Steps involved in treatment of potable water–Disinfecting water by chlorination and ozonization –Reverse Osmosis & its significance.

UNIT IV: Polymers

Introduction: Classification of polymers, Types of Polymerization–addition and condensation, differences between addition and condensation polymers, Mechanism of free radical addition polymerization.

Plastics: Thermoplastic & Thermosetting resins, differences between thermoplastic and thermosetting polymers. Preparation, properties and engineering applications of PVC, Teflon and Bakelite.

Fibers: Introduction, types- natural and synthetic. Preparation, properties and uses of Nylon–6,6, Nylon 6,10. Fiber reinforced plastic (FRP) –Carbon Fiber Reinforced Plastic and applications.

UNIT V: Materials and Surface Chemistry

A) Materials Chemistry

Cement –Introduction, Types of Cement, setting and hardening of Portland cement, Reinforced Concrete, **Lubricants**–Characteristics of good lubricant, properties– flash and fire, cloud and pour point and their significance, Nano Fabricated Lubricants, **Ceramics**-Advanced Ceramics, **Glass**– Reinforced glass material.

B) Surface Chemistry

Adsorption:– Introduction, Types of adsorption, **Isotherms**– Freundlich and Langmuir adsorption isotherm, applications of adsorption, application of adsorption in heterogeneous catalysis (automotive catalysts).**Colloids**– Definition, optical properties of colloids and their applications in industry.

TEXT BOOK(S)

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain and Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOK(S)

1. Engineering Chemistry by B. Siva Shankar McGraw Hill Publishing Company Limited, New Delhi (2006)

2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006)
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
5. An Introduction to Electro Chemistry by Samuel Glasstone, East-West Pvt.ltd.
6. Corrosion Engineering by Mars G,Fontana,McGraw Hill

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16CS1101 – COMPUTER PROGRAMMING - I

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand the intricacies of program development and problem solving techniques using Raptor tool.
2. Understand the structure of a C-language Program, list, describe, classify the C data types, input and output concepts as they apply to programs in C.
3. Describe the expression types; understand the rules of precedence and associativity in evaluating the expressions.
4. Understand how a C program evaluates logical and repetitive (loop) statements.
5. Describe the importance of modularity and design multi-function programs.
6. Understand the basic concepts and uses of arrays using C-Language Program.
7. Understand the concept and use of pointers for memory management techniques.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Demonstrate problem solving skills by developing algorithms to solve problems using Raptor tool.
- CO2. Incorporate the concept of variables, constants and basic data types in a C language program.
- CO3. Use simple input and output statements in a C Language Program.
- CO4. Incorporate the use of sequential, selection and repetition control statements into the algorithms implemented as computer programs using C language.
- CO5. Demonstrate an understanding of structured design by implementing programs with functions and passing of parameters to solve more complex problems.
- CO6. Implement C programs using arrays.
- CO7. Write and execute programs that access and manage data through pointers.

UNIT – I

Basics of Computers

Logic Building: Flow chart, Algorithm, Pseudo code. Introduction to Raptor Programming Tool

Introduction to Programming – Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Data Types, Variables, Constants, Input/output functions.

Operators - Arithmetic, relational, logical, bitwise, conditional, increment/decrement, assignment etc., C program examples. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions.

UNIT - II

Statements- Selection Statements (decision making) – if and switch statements with Raptor Tool, and C program examples.

Repetition statements (loops) - while, for, do-while statements with Raptor Tool, and C Program examples

Statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - III

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, C program examples.

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

UNIT -IV

Arrays – Concepts, using arrays in C, arrays and functions, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - V

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, void pointer, null pointer.

Pointer Applications - Arrays and Pointers, Pointer Arithmetic and arrays, passing an array to a function.

Memory allocation functions – malloc(), calloc(), realloc(), free().

Array of pointers, pointers to functions, C program examples.

TEXT BOOK(S)

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Thompson Learning, 2007 Reprint.

REFERENCE BOOK(S)

1. Raptor-A flow charting Tool <http://raptor.martincarlisle.com>
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
3. Programming in C. P. Dey and M Ghosh , Oxford University Press.
4. Programming with C, B.Gottfried, 3rd edition, Schaum’s outlines, TMH.
5. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.

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16ME1101 – ENGINEERING DRAWING

I Year. B Tech. CSE, Semester I

L	T	P/D	C
2	-	-/3	4

Prerequisite(s): None

Course Objectives

Develop ability to

1. Visualize and communicate all engineering elements and understand various concepts such as dimensions, conventions and standards related to working drawings.
2. Understand the fundamentals of geometrical curves and their applications in engineering.
3. Visualize different positions of planes and solids.
4. Visualize various isometric views and their applications in engineering.
5. Understand multi-view representations and their conversion into pictorial views and vice versa.

Course Outcomes (COs)

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

- CO1. Visualize and communicate all engineering elements and represent the same using standard dimensions and conventions related to working drawings used in engineering practice.
- CO2. Comprehend concepts of all 2D elements such as Conic Sections and 3D Objects namely, Prisms, Cylinders, Pyramids and Cones.
- CO3. Draw orthographic projections of straight lines, planes and solids of given engineering components.
- CO4. Construct isometric scale, isometric projections and views of given engineering components.
- CO5. Visualize multi-view representations and its conversion into pictorial views and vice versa.

Unit-I

Introduction to engineering drawing & Importance of engineering drawing:

Principles of Engineering Drawing, Various Drawing Instruments., Lettering & dimensioning, BIS standards, Title block, Geometrical constructions, Bisecting a line, arc and angle, Dividing straight line in to equal number of parts, Tangents to circles and arcs, Construction of pentagon, hexagon, inscribing circles inside regular polygons and vice versa etc.,

Curves:

Constructions of curves used in engineering practice: Conic sections including rectangular hyperbola - **General method only**, Cycloid, Epi-cycloid, Hypocycloid and Involute.

Scales: Construction of different types of scales - Plain scale, Diagonal scale, vernier scale

Unit-II

Introduction to Orthographic projections: conventions-first and third angle projections.

Projections of points: in all four quadrants.

Projections of straight lines: lines in simple position, inclined to one plane and parallel to other plane.

Projections of straight lines: Line inclined to both the planes.

Unit-III

Projections of planes: planes in simple position, plane inclined to one plane and perpendicular to other plane, plane inclined to both the planes.

Projections of solids: (Cube, tetrahedron, Cone, Cylinder, Regular Prisms and Pyramids): solids in simple position (Axis perpendicular to one plane)

UNIT-IV

Isometric projections: Principle of isometric projection - isometric scale - isometric views - conventions - plane figures. Simple and compound solids - isometric projection of objects having non-isometric lines.

Unit-V

Transformation of projections: conversion of Isometric views to orthographic views. Conversion of orthographic views to Isometric views - simple objects.

TEXT BOOK(S)

1. Engineering Drawing – N.D. Bhatt, charotar publications.
2. Engineering Drawing- Basant Agrawal, TMH.

REFERENCE BOOK(S)

1. Engineering Graphics- P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering Drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Mcgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing - K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing - John. PHI Learning Publisher.

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16EN11L1 – ENGLISH - I LAB

I Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
-	-	2/-	1

Prerequisite(s): None

Course Objectives

Develop Ability to

1. Use Computer-aided Multimedia learning tool for individual language learning.
2. Sensitize student to the nuances of English speech sounds, accent, intonation and rhythm.
3. Listen actively and speak with intelligibility.
4. Apply language skills in real life situations.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Demonstrate the nuances of language through audio-visual tools during presentation.
- CO2. Demonstrate good writing skills.
- CO3. Speak intelligibly.
- CO4. Practice usage of International Phonetic Alphabet.

Module: 1 Ice Breaking Activities, JAM

Module: 2 Speech sounds, Neutralization of Mother Tongue Influence and Conversation Practice

Module: 3 Syllables, Stress, Intonation

Module: 4 Listening Activities (only for demonstrative purposes)

Module: 5 Situational Dialogues and Role Play

Module: 6 Information Transfer

Additional Topics

Stress Management

Negotiation Skills

REFERENCE BOOK(S)

1. Speaking English Effectively 2nd Edition by Krishna Mohan and N.P.Singh, MacMillan Publishers, 2011.
2. How to prepare for interviews by Shashi Kumar.V and Dhamija P.V
3. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
4. Spoken English, a Manual of Speech and Phonetics, by R.K.Bansal and J.B.Harrison, Orient Black Swan 2013.
5. Spoken English CDs by Shashi Kumar and Dhamija.
6. A Manual entitled English Language Communication Skills Lab Manual cum Workbook by Cengage Learning India 2013
7. GCET ELCS Lab Workbook.

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16CH11L1 - ENGINEERING CHEMISTRY LAB

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand the preparation of compounds namely, Aspirin and Biodiesel.
2. Use instrumental methods namely, Potentiometry, Conductometry and Colorimetry to find the concentration of a given solution.
3. Experimentally determine the physical constants namely, viscosity and surface tension of a given liquid using Ostwald's Viscometer and Stalagmometer respectively.
4. Use EDTA method to find the hardness of water, estimate chlorides in hard water by Precipitation Titration, ferrous iron in water by Dichrometry and iodine in different salts using Iodometry.
5. Understand the preparation of Oil of Winter green.
6. Experimentally determine ferrous iron in cement by Colorimetric method.

Course Outcomes (COs)

Students would be able to

- CO1. Employ the techniques which are fundamental in the preparation of Aspirin, Biodiesel and Oil of Winter Green.
- CO2. Use various instrumental methods in volumetric analysis namely, Potentiometry, and Conductometry to determine the concentration of a given solution.
- CO3. Use various titration methods namely, EDTA, Precipitation, Iodometry and Dichrometry for estimating different chemical compounds/ions present in various samples.
- CO4. Estimate the concentration of a coloured compound using the technique of Colorimetry.
- CO5. Experimentally determine the physical properties of liquids such as viscosity and surface tension.

Any TEN of the following TWELVE experiments must be conducted.

List of Experiments

I. Preparation

1. Preparation of Aspirin
2. Preparation of Biodiesel

II. Instrumental Methods

A. Potentiometry

3. Titration of Strong acid vs Strong base by Potentiometry.
4. Titration of Weak acid vs Strong base by Potentiometry.

B. Conductometry:

5. Titration of Strong acid vs Strong base by Conductometry.

C. Colorimetry:

6. Estimation of Copper by Colorimetric method.

III. Physical Constants

7. Determination of Viscosity of given liquid by Ostwald's Viscometer.
8. Determination of Surface tension of given liquid by Stalagmometer.

IV. Titrimetry

9. Estimation of Hardness of water by EDTA method.
10. Estimation of Chlorides in hard water Precipitation method.
11. Estimation of Ferrous Iron by Dichrometry.
12. Estimation of Iodine in different salts using Iodometry.

V. Additional Experiments (Mandatory)

1. Preparation of Oil of Winter green.
2. Determination of Ferrous iron in cement by Colorimetric method.

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16CS11L1 – COMPUTER PROGRAMMING – I LAB

I Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Have understanding intricacies of program development and problem solving techniques using Raptor tool.
2. Understand the structure of a C-language Program, list, describe, classify the C data types, input and output concepts as they apply to programs in C.
3. Describe the expression types; understand the rules of precedence and associativity in evaluating the expressions.
4. Understand how a C program evaluates logical and repetitive (loop) statements.
5. Describe the importance of modularity and design multi-function programs.
6. Understand the basic concepts and uses of arrays using C-Language Program.
7. Understand the concept and use of pointers for memory management techniques.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Demonstrate problem solving skills by developing algorithms to solve problems using Raptor tool.
- CO2. Incorporate the concept of variables, constants and basic data types in a C language program.
- CO3. Use simple input and output statements in a C Language Program.
- CO4. Incorporate the use of sequential, selection and repetition control statements into the algorithms implemented as computer programs using C language.
- CO5. Demonstrate an understanding of structured design by implementing programs with functions and passing of parameters to solve more complex problems.
- CO6. Implement C programs using arrays.
- CO7. Write and execute programs that access and manage data through pointers.

LIST OF EXPERIMENTS	
1.	Introduction to RAPTOR Tool Draw Flow chart using RAPTOR for, <ol style="list-style-type: none"> a. Read a number and Display the same number b. Read and Display the student details c. Read two numbers from user and calculate addition and subtraction of those numbers d. Read two numbers from user at the time of execution and calculate

	<p>multiplication and division of those numbers</p> <p>e. Find the square of a given number (take the number from the user)</p> <p>f. Calculate the value of Y from the equation $y = x^2 + 2x + 3$ (read the value of X from user)</p>
2.	<p>Draw Flow chart using RAPTOR for,</p> <p>a. Calculate the area of a Circle</p> <p>b. Calculate the area of a Square</p> <p>c. Calculate the area of a Rectangle</p> <p>d. Interchange two numbers</p> <p>e. Find the sum of square of two numbers</p> <p>f. Convert Centigrade to Fahrenheit</p> <p>g. Convert Radius to Degrees</p> <p>h. Display the roots of Quadratic Equation</p>
3	<p>Draw Flow chart using RAPTOR for,</p> <p>a. Check the given number is Positive or Negative</p> <p>b. Check the given number is even or odd</p> <p>c. Display whether a person is eligible for vote or not</p> <p>d. Calculate the Largest of two numbers</p> <p>e. Check the given year is leap year or not</p> <p>f. Check whether two numbers are equal or not</p> <p>g. Find the largest value among three given numbers</p>
4	<p>Draw Flow chart using RAPTOR for,</p> <p>a. Calculate and display the grade of a student</p> <p> i. < 30 % - Fail</p> <p> ii. Between 31 and 50 – C grade</p> <p> iii. Between 51 to 60 – B grade</p> <p> iv. Between 61 to 75 – A grade</p> <p> v. Greater than 75 - distinction</p> <p>b. Find the quadratic roots of an equation (real or imaginary)</p> <p>c. Check the given number is multiple of 2,4and 8</p>
5	<p>Draw Flow chart using RAPTOR for,</p> <p>a. Display n numbers using looping</p> <p>b. Calculate the sum of n natural numbers</p> <p>c. Display the even numbers below n</p> <p>d. Calculate sum of even numbers and odd numbers from 1 to n (n value supplied by the user)</p>
6	<p>a. Write a C program to display student details</p> <p>b. Write a C program to perform arithmetic operations</p> <p>c. Write a C program to implement increment and decrement operators</p> <p>d. Write a C program to implement conditional operator</p> <p>e. Write a C program to implement bit wise operator</p>

7	<ul style="list-style-type: none"> a. Write a C program to calculate the biggest of given two numbers b. Write a C Program to print the result depending on the following <ul style="list-style-type: none"> i. < 30 % - Fail ii. Between 31 and 50 – C grade iii. Between 51 to 60 – B grade iv. Between 61 to 75 – A grade c. Write a C Program to implement arithmetic calculator using switch case
8	<ul style="list-style-type: none"> a. Write a C program to find sum of n natural numbers b. Write a C program to find individual digits of the given number c. Write a C program to find factorial of a given number
9	<ul style="list-style-type: none"> a. Write a C program to display the prime numbers below n (where n value is given by user) 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. c. Write a C program to generate the first n terms of the sequence. d. Write a C program to find the quadratic roots of an equations e. Write a c program to calculate sum of the following geometric equation $\text{Sum}=1+x+x^2+x^3+\dots + x^n$
10	<ul style="list-style-type: none"> a. Write a C program to find the given number is palindrome or not b. Write a C program to find GCD and LCM of two given numbers using functions c. Write a C program to find the factorial of a given number using recursive function d. Write a C program to generate the fibonacci series using recursive function
11	<ul style="list-style-type: none"> e. Write a c program to find largest and smallest numbers in a list of array elements using functions f. Write a C program to sort the given list of elements in ascending order using functions. g. Write a c program to search for a given element in the list of array and display the “location” if the number is found else print “the number is not found”. <ul style="list-style-type: none"> i. Using fixed length array ii. Using variable length array.
12	<ul style="list-style-type: none"> a. Find the duplicate elements in the list of sorted array b. Write a C program that uses functions to perform the Addition of Two Matrices c. Write a C program that uses functions to perform the Multiplication of Two Matrices
13	<ul style="list-style-type: none"> a. Write a C program to swap two integers using following methods <ul style="list-style-type: none"> i. call by value ii. call by reference b. Write a C program to find sum of even and odd numbers using functions and pointers

14	<ul style="list-style-type: none">a. Write a C program to find Largest Number Using Dynamic Memory Allocation.b. Write a C program to return multiples values from a function using pointers
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16EN1201 – ENGLISH - II

I Year. B.Tech. (CSE) – II Sem

L	T	P/D	C
2	-	-/-	2

Prerequisite(s): 16EN1101 – ENGLISH – I

Course Objectives

Develop ability to

1. Function in multidisciplinary teams.
2. Understand of professional and ethical responsibility.
3. Apply strategies and inculcate life skills.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Acquire interpersonal and life skills
- CO2. Demonstrate professional ethics and etiquette.
- CO3. Demonstrate application of various strategies to real life situations.

Unit-1

Writing	Steps in Writing Process Cover letter and Job Application, Letter Curriculum Vitae Résumé Abstract Writing and Responding to a blog
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Unit-2

Reading	1) <i>Mokshagundam Visvesvaraya</i> 2) <i>The Palm Islands</i>
Vocabulary	Prefixes and Suffixes
Grammar	Joining ideas using conjunctions, Adverbs
Speaking	Opinion-based questions
Writing	Summarizing

Unit-3

Reading	1) <i>Leela's Friend</i> by R.K.Narayan 2) <i>Forensic Science</i>
Vocabulary	Guessing the words, Using the Appropriate word, Phrasal verbs
Grammar	Knowing with questions
Speaking	Presentation
Writing	Report Writing

Unit-4

Reading	1) <i>The Last Leaf</i> by O.Henry 2) <i>Chose how to start your day</i>
Vocabulary	Idioms
Grammar	Relating objects by using prepositions, Ergative verbs
Speaking	Creative Speaking Activity
Writing	Technical Report Writing

Unit-5

Reading	1) <i>Indian Crowds</i> by Nirad C.Chaudhuri 2) <i>Snippets that focus on cultural differences among the people</i>
Vocabulary	One-Word Substitutes (related to the lesson)
Grammar	Synthesis of Sentences
Speaking	Activity on Indo-American Cultural Differences
Writing	Day to day-experiences of students while travelling

TEXT BOOK(S)

1. Epitome of Wisdom published by Orient Longman
2. A Passage to England by Nirad C. Chaudhuri

REFERENCE BOOK(S)

1. Contemporary English Grammar Structures and Composition by David Green, Macmillan Publishers 2010, New Delhi
2. Innovate with English: A Course in English for Engineering Students by T Samson, Foundation Books
3. English Grammar Practice by Raj N Bakshi, Orient Longman
4. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
5. Technical Communication by Meenakshi Raman, Oxford University Press
6. Grammar Games by Renuvolcuri Mario, Cambridge University Press
7. Enrich Your English by Thakur K.B.P. Sinha, Vijay Nicole Imprints Pvt.Ltd

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16PH1202 – SEMICONDUCTOR PHYSICS

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): 16PH1101 ENGINEERING PHYSICS

Course Objectives

Develop ability to

1. Discuss the formation of energy bands in solids, classification of solids, and find the carrier concentration in intrinsic and extrinsic semiconductors, understand the concept of Fermi level and Hall effect.
2. Analyse p-n junction diode and its load line characteristics; understand breakdown mechanisms in semiconductor diodes.
3. Understand functioning of rectifiers and filters; functioning of zener diode as a voltage regulating device.
4. Understand the working of BJT, its various configurations and applications.
5. Discuss various methods of transistor biasing, understand fundamentals of RC coupled amplifier, basic concepts of FET and JFET.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Distinguish between conductors, semiconductors and insulators, evaluate carrier concentration in intrinsic and extrinsic semiconductors; identify the type of extrinsic semiconductor through Hall effect.
- CO2. Analyze V-I characteristics of p-n junction diode and its cut-in voltage.
- CO3. Explain working of half wave and full wave rectifiers, filters and their applications.
- CO4. Explain the functioning of BJT, distinguish various configurations of BJT and their applications.
- CO5. Analyse various transistor biasing methods and explain fundamentals of RC coupled amplifier, functioning of FET, summarize the differences between BJT and FET.

UNIT I: Band theory of solids and semiconductors

Electron in a periodic Potential, Bloch theorem, Kronig-Penny Model (Qualitative Treatment), Brillouin Zones(E-K curve), origin of energy band formation in solids, concept of effective mass of an electron, classification of materials into conductors, semiconductors & insulators.

Classification of semiconductors: n-type, p-type, Fermi level in Intrinsic and Extrinsic Semiconductors, variation of Fermi level with temperature and concentration of dopants in extrinsic semiconductors, calculation of carrier concentration in Intrinsic & Extrinsic Semiconductors, equation of continuity, direct and indirect band gap semiconductors, Hall effect.

UNIT II: p-n junction diode

Qualitative theory of p-n junction, Energy level diagram of p-n junction in forward & reverse bias condition, p-n junction as a diode, volt-ampere characteristics, temperature dependence of V-I characteristic, ideal versus practical – Resistance levels (Static and Dynamic), Transition and Diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes, Zener diode characteristics.

UNIT III: Rectifiers and filters

p-n junction as a rectifier, half wave rectifier, full wave rectifier, bridge rectifier, harmonic components in a rectifier circuit, inductor filters, capacitor filters, L- section filters, π - Section Filters, Comparison of Filters, voltage regulation using Zener Diode.

UNIT IV: Bipolar Junction Transistor

Junction transistor, BJT symbol, transistor construction, BJT operation, common base, common emitter and common collector configurations. Transistor current components, limits of operation, transistor as an amplifier, BJT specifications, comparison of CB, CE, CC amplifier configurations.

UNIT V: Transistor Biasing-stabilization and Field Effect Transistor

The DC and AC load lines, Operating point, need for biasing, fixed bias, collector feedback bias, Emitter feedback bias, Collector-Emitter feedback bias, Voltage divider bias - bias stability and stabilization factors, stabilization against variations in V_{BE} and β , RC coupled amplifier (qualitative treatment)

Field Effect Transistor: The Junction field effect Transistor (Construction, Principle of operation, symbol)- Pinch – off voltage – volt ampere characteristics, The JFET small signal model, comparison of BJT and FET (Qualitative treatment analysis).

TEXT BOOK(S)

1. Millman's Electronic devices & Circuits, Jacob Millman, Christos C Halkias, Satyabrata JIT, 3rd edition, Mc Graw Hill Book Publishers.
2. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.

REFERENCE BOOK(S)

1. Electronic devices & Circuits, S Salivahanan, N Srushkumar, A Vallava Raj, Second Edition, Tata Mc Graw Hill Book Publishers.
2. Fundamentals of Physics, David Halliday, John Wiley Publishers.
3. University Physics, Sear's and Zemansky (10th Edition), Wesley Publishers.
4. Modern Physics, R. Murugesan, S Chand & Co Publishers (For Statistical Mechanics)
5. Fiber optic communication, Gerd Keiser, Tata Mc Graw Hill Book Publishers, 5th Edition.
6. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

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Cheeryal (V), Keesara (M), Medchal Dist. - 501 301, Telangana State

16MA1201 – MATHEMATICS – II

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16MA1101 MATHEMATICS I

Course Objectives

Develop ability to

1. Identify the methods of differential calculus to optimize single and multivariable functions.
2. Evaluate Improper integrals using Beta and Gamma functions.
3. Evaluate multiple integrals and apply the same to solve engineering problems.
4. Understand convergence of the series using Fourier series technique and to find solution of integral equations using Fourier Transforms.
5. Explain properties of vector operators. Use vector calculus to determine the length of a curve, area between surfaces and volume of solids.

Course Outcomes (COs)

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

- CO1. Apply the methods of differential calculus to optimize single and multivariable functions.
- CO2. Evaluate improper integrals using Beta and Gamma functions.
- CO3. Evaluate multiple integrals and apply the concepts of the same to find the areas, volumes and moment of inertia of regions on a plane or in space.
- CO4. Apply Fourier series to find convergence of series and Fourier Transforms to solve integral equations.
- CO5. Apply vector operators on scalar and vector point functions to compute length of a curve, area between surfaces and volume of solids, using vector calculus.

UNIT-I: Functions of Several Variables

Limit, Continuity, Partial Differentiation, Total Derivatives, Functions of several variables- Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers

UNIT-II: Improper Integration

Gamma and Beta Functions – Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

UNIT-III: Multiple Integration and its Applications

Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical), Finding the area of a region using double integration and volume of a region in space using triple integration.

UNIT – IV: Fourier series and Transforms

Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients–Fourier series of even and odd functions–Fourier series in an arbitrary interval –even and odd periodic continuation – Half-range Fourier sine and cosine expansions, Fourier integral theorem –Fourier sine and cosine integrals, Fourier Integral transforms–Fourier sine and cosine transforms and their properties–inverse transforms–Finite Fourier transforms

UNIT –V: Vector Calculus

Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties, - Laplacian operator- Solenoidal and irrotational vectors, Scalar Potential function, directional derivatives. Line integral – work done – Surface integrals -Volume integral. Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

TEXT BOOK(S)

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa publishing House, Delhi.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
3. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
4. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.
5. Ordinary & Partial Differential Equations, M D Raisinghanian, S. Chand.

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16MA1202 – MATHEMATICS – III

I Year. B.Tech. CSE – II Sem

Prerequisite(s): 16MA1101 MATHEMATICS I

L	T	P/D	C
3	-	-/-	3

Course Objectives

Develop ability to

1. Understand approximation of a polynomial/curve to satisfy the given set of data.
2. Determine approximate zeros of an algebraic/transcendental/system of equations using suitable numerical methods.
3. Evaluate differentiation/integration methods for a given set of data using numerical methods.
4. Apply various numerical methods to compute approximate solution of a given ordinary differential equation with initial conditions.
5. Apply Partial Differential Equations to solve problems in one dimensional heat and wave equations.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Approximate a polynomial/curve to satisfy the given set of data.
 CO2. Apply suitable numerical methods to find the approximate root/solution of algebraic/transcendental/system of equations.
 CO3. Apply various numerical methods to evaluate differentiation/integration for a given set of data.
 CO4. Solve a given ordinary differential equation with initial conditions using suitable numerical methods.
 CO5. Apply partial differential equations to solve problems namely, one dimensional wave equation and heat equation.

UNIT – I: Interpolation and Curve fitting

Interpolation: Introduction-Errors in polynomial Interpolation - Finite Differences - Forward Differences - Backward Differences - Central Differences - Symbolic relations and separation of symbols - Difference Equations - Differences of a polynomial - Newton's formulae for interpolation-interpolation with unevenly spaced points-Lagrange's interpolation formula.

Curve fitting: Fitting of a straight line - Second degree curve –exponential curve -power curve by method of least squares.

UNIT – II: Root finding Methods

Solution of Algebraic and Transcendental Equations and Linear system of equations, Introduction – Graphical interpretation of solution of equations, the bisection method – The

Method of False Position – The Iteration Method – Newton-Raphson Method, Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method) Jacobi's and Gauss Seidel Iteration method.

UNIT – III: Numerical Differentiation, Integration

Numerical differentiation: Newton's forward and backward difference derivatives, Stirling's Central difference derivatives, Numerical integration – General quadrature formula, Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ Rule.

UNIT – IV: Numerical solutions of First order differential equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge - Kutta Methods.

UNIT – V: Partial Differential Equations

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation, Method of separation of variables for second order equations –Applications of Partial differential equations- one dimensional wave equation, one dimensional Heat equation.

TEXT BOOK(S)

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.

REFERENCE BOOK(S)

1. Computer Oriented Numerical Methods by V. Rajaraman, PHI Learning.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
4. A text book of Higher Engineering Mathematics, Bali N P and Saxena, Lakshmi Publications.
5. Introductory methods of Numerical Analysis by S.S. Sastry, PHI learning.

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16CS1201 – COMPUTER PROGRAMMING - II

I Year. B.Tech. CSE –II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I

Course Objectives

Develop ability to

1. Understand the concepts of String Manipulation Functions using C language in programming.
2. Introduce the structure, union, and enumerated types
3. Understand the classical approaches to sorting arrays: selection, bubble, insertion, merge sorting; sequential and binary searching algorithms.
4. Introduce the basic concepts of lists, stacks and queues and their applications.
5. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Write and execute programs that read, write and manipulate strings using C language program.
- CO2. Use the type definition, enumerated types, define and use structures, unions in programs using C language.
- CO3. Write programs that sort data using selection, bubble, insertion techniques and perform search mechanisms either by sequential or binary search techniques using C language program.
- CO4. Demonstrate the basic operations of stacks and queues using C program.
- CO5. Write programs that read and write text, binary files using the formatting and character I/O functions.

UNIT – I

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

Enumerated – The Type Definition (typedef), Enumerated types

Preprocessor commands: C program examples.

UNIT – II

Structure and Union Types

Structures – Declaration, initialization, accessing structures, operations on structures, Complex structures, C program examples.

Structures in C

Structures and functions, passing structures through pointers, self referential structures, unions, bit fields, C programming examples

UNIT – III

Sorting - Selection sort, bubble sort, insertion sort and merge sort techniques (Using Arrays)

Searching - Linear search, binary search, binary recursive search techniques (Using Arrays)

UNIT - IV

Linear list - Singly linked list implementation, insertion, deletion and searching operations on linear list

Stacks - Push and Pop Operations, Introduction to In-fix and Post-Fix Notation. (Arrays and List implementation.)

Queues - Enqueue and Dequeue operations. (Arrays and List implementation.)

UNIT – V

File 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, C program examples.

Command line arguments, C program examples.

Program Development – Simple file, Multi-function, Multi-source files, Separate Compilation of functions

TEXT BOOK(S)

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Thompson Learning, 2007 Reprint.

REFERENCE BOOK(S)

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.
3. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
4. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
5. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.

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16EN12L1 – ENGLISH – II LAB

I Year. B.Tech. (CSE) – II Sem

L	T	P/D	C
-	-	2/-	1

**Prerequisite(s): 16EN1101 ENGLISH - I
16EN11L1 ENGLISH - I LAB**

Course Objectives

Develop ability to

1. Usage of Computer Aided Multimedia learning tools for advanced language learning.
2. Sensitize the student to the nuances of combination of speech sounds, accent, intonation and rhythm of English language.
3. Listen actively and speak fluently at various fora.
4. Apply language skills with ease in real life situations.
5. Enhance writing skills.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Demonstrate with ease the nuances of English language through audio-visual tools.
- CO2. Listen actively and speak fluently at various fora.
- CO3. Demonstrate language skills aptly in various situations.
- CO4. Demonstrate writing skills with appropriate usage of words.

Module: 1 Consonant Clusters, Past Tense and Plural Markers, Minimal Pairs

Module: 2 Describing people, places, situations – Narrating- Giving Directions

Module: 3 Discussions and Public Speaking

Module: 4 Debate

Module: 5 Oral Presentations

Module: 6 Creative Writing

Additional Topics

- a. Assertive Communication
- b. Time Management

REFERENCE BOOK(S)

1. Speaking English Effectively 2nd Edition by Krishna Mohan and N.P.Singh, MacMillan Publishers, 2011.
2. How to prepare for interviews by Shashi Kumar.V and Dhamija P.V
3. English Pronunciation in Use by Hancock, M. 2009, Cambridge University Press
4. Spoken English, a Manual of Speech and Phonetics, by R.K.Bansal and J.B.Harrison, Orient Black Swan 2013.
5. Spoken English by Shashi Kumar and Dhamija.

6. A Manual entitled English Language Communication Skills Lab Manual cum Workbook by Cengage Learning India 2013
7. Creative Writing Skills by Ashraf Rizvi, Tata Mc. Graw Hill
8. CD's on listening.

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16PH12L2 – SEMICONDUCTOR PHYSICS LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16PH1101 ENGINEERING PHYSICS

(Any ten of the following twelve experiments compulsory)

Course Objectives

Develop ability to

1. Determine moduli of elasticity.
2. Determine wavelength of spectral lines in Mercury spectrum, wavelength of LASER, radius of curvature of a plano-convex lens.
3. Determine time constant of a capacitor, energy gap of a given semiconductor, study V-I characteristics of p-n junction and Zener diode; calculate ripple factor of a given rectifier.
4. Plot input and output characteristics of a given transistor in different configurations, understand methods of transistor biasing, plot V-I characteristics of a Field Effect Transistor (FET).
5. Determine the magnetic induction at several points on the axis of coil carrying current using Stewart and Gee's method; plot the V-I characteristics of solar cell.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Infer moduli of elasticity of a given material, computer shearing stress and strain: identify their limitations.
- CO2. Demonstrate the optical phenomenon like interference and diffraction by computing wavelength of spectral lines of a given source.
- CO3. Explain the signal delay in electronic circuits by calculating time constant of a capacitor, plot V-I characteristics of p-n junction diode and zener diode, Compute ripple factor of a given rectifier.
- CO4. Evaluate current gain of a given transistor; computer drain resistance and transconductance of a FET.
- CO5. Compute the magnetic induction using Stewart and Gee's method; Obtain the V-I characteristics of solar cells and specify their applications.

List of Experiments

1. Determination of Rigidity Modulus of a given wire using Torsional Pendulum.
2. Determination of radius of curvature of a given Plano Convex lens by forming Newton's Rings.
3. Determination of wavelength of spectral lines of mercury spectrum - Diffraction grating.
4. Determination of Wavelength of a given source of LASER-Diffraction Grating.
5. Determination of Time constant of a given RC combination.
6. Determination of Energy gap of a given semiconductor.

7. V-I Characteristics of p-n junction diode and zener diode.
8. Input and Output Characteristics of n-p-n Transistor - CE configuration.
9. Input and Output Characteristics of n-p-n Transistor - CB configuration.
10. Conversion of ac to dc by using Half wave rectifier without filters.
11. Conversion of ac to dc by using Full wave rectifiers without filters.
12. FET Characteristics.

Additional Experiments

1. Determination of magnetic field of induction at several points on the axis of coil carrying current using Stewart and Gee's method.
2. V-I characteristics of Solar cell.

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16MA12L1 – COMPUTATIONAL MATHEMATICS LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING I

Course Objectives

Develop ability to write and execute programs using C-programming/ Octave/ Scilab to

1. Find the solution of system of non-homogeneous equations by L-U decomposition method.
2. Construction of a polynomial of suitable degree by using the discrete data.
3. Find the numerical solutions of ordinary differential equations using different numerical methods like Taylor's series method, Picard's method, Euler's method, Euler's modified method and Runge-Kutta method, when usual methods fail to find the general solution of differential equation.
4. Apply numerical integration methods to find integration of unintegrable functions.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Determine the solution of system of non-homogeneous equations by L-U decomposition method
- CO2. Construct a polynomial of suitable degree by using the discrete data.
- CO3. Apply Numerical differentiation techniques to find first, second and higher order derivatives, when the function under consideration is not differentiable
- CO4. Determine the numerical solutions of ordinary differential equations using different numerical methods like Taylor's series method, Picard's method, Euler's method, Euler's modified method and Runge-Kutta methods, when usual methods failed to apply to find the general solution of differential equation.

Programming Tasks

1. Determine y for a given x, if two arrays of x and y of same size are given (using Newton's interpolation both forward and backward).
2. Determine y for a given x, if two arrays of x and y of same size are given (using Lagrange's and Gauss's interpolation)
3. Find the solution of given system of linear equations using L-U decomposition method.
4. Find the solution of given system of linear equations using Jacobi's method.
5. Find the solution of given system of equations using Gauss-seidel iteration method.
6. Find the solution of given system of equations using Gauss Jordan elimination method.
7. Evaluate definite integral using trapezoidal rule, Simpson's 1/3rd rule and 3/8th rule.
8. Solve a given differential equation using Taylor's series.
9. Solve a given differential equation using Euler's and modified Euler's method.
10. Solve a given differential equation using Runge-Kutta method.

Advance Lab techniques

1. Solve system of equations using QR-algorithm.
2. Solve system of equations using Predictor-Corrector algorithm.

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16CS12L1 – COMPUTER PROGRAMMING – II LAB

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS11L1 COMPUTER PROGRAMMING - I LAB

Course Objectives

Develop ability to

1. Understand the concepts of String Manipulation Functions using C language in programming.
2. Introduce the structure, union, and enumerated types
3. Understand the classical approaches to sorting arrays: selection, bubble, insertion, merge sorting; sequential and binary searching algorithms.
4. Introduce the basic concepts of lists, stacks and queues and their applications.
5. Understand the basic characteristics of text, binary files and C implementation of file I/O using streams.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Write and execute programs that read, write and manipulate strings using C language program.
- CO2. Use the type definition, enumerated types, define and use structures, unions in programs using C language.
- CO3. Write programs that sort data using selection, bubble, insertion techniques and perform search mechanisms either by sequential or binary search techniques using C language program.
- CO4. Demonstrate the basic operations of stacks and queues using C program.
- CO5. Write programs that read and write text, binary files using the formatting and character I/O functions.

Week No	Name of the program
1	a. Write a C program to find whether a given string is palindrome or not. b. Write a C program to insert characters at a given location in a given string. c. Write a C program to delete characters from a given string and position d. Write a C program to print the number of vowels and consonants using Strings.
2	a. Write a C program to convert Roman number to Decimal Number. b. Write a C program to find the 2's Complement of a given string c. Write a C program to Reverse a String by Passing it to function d. C Program to Input a String with at least one Number, Print the Square of all the Numbers in a String

3	<p>a. Write a c program to implement complex structures for the following operations.</p> <ul style="list-style-type: none"> i. Addition of 2 Complex numbers ii. Multiplication of 2 Complex Numbers
4	<p>a. Write a c program to implement arrays of structures?</p> <p>b. Write a c program to implement bit fields in C?</p>
5	<p>a. Write a C Program to store the information (name, roll no, and branch) of a student using unions.</p> <p>b. Write a c program to implement inter function communication by passing pointers to a structure.</p>
6	<p>a. Write a c program to sort the elements using selection sort</p> <p>b. Write a c program to sort the elements using Bubble sort.</p> <p>c. Write a c program to sort the elements using Insertion sort</p> <p>d. Write a c program to sort the elements using Merge sort</p>
7	<p>a. Write a c program to search an element in a list of elements using linear search. If the element found display the position, otherwise print “element not present”.</p> <p>b. Write a c program to search an element in a list of elements using Binary search. If the element found display the position, otherwise print “element not present”.</p> <p>c. Write a c program to search an element in a list of elements using recursive Binary search. If the element found display the position, otherwise print “element not present”.</p>
8	<p>Write a c program to implement singly linked list for the following operations.</p> <p>a) Insertion b) Deletion c) Search</p>
9	<p>a. Write a c program implement Stack using arrays.</p> <p>b. Write a c program implement Stack using linked list.</p> <p>c. Write a c program convert infix to postfix notation.</p>
10	<p>a. Write a c program implement Queue using arrays for the following operations.</p> <ul style="list-style-type: none"> i) Enqueue ii) Dequeue <p>b. Write a c program implement Queue using Linked list for the following operations.</p> <ul style="list-style-type: none"> i) Enqueue ii) Dequeue
11	<p>a. Write a c program open a new file and implement the following I/O functions.</p> <ul style="list-style-type: none"> i. fprintf(), fscanf() ii. getw(), putw() iii. getc(), putc() <p>b. Write a c program to copy data from one file to another.</p> <p>c. Write a c program to merge two files, using command line arguments.</p>

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16WS12L1 – INFORMATION TECHNOLOGY WORKSHOP (ITWS) / ENGINEERING WORKSHOP (EWS)

I Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Identify different components of Personal Computer (PC) and their configurations.
2. Identify various steps for disassembly and assembly of PC components.
3. Install Windows and Linux operating systems on Personal Computers.
4. Troubleshoot simple hardware and software related problems.
5. Make Text Documents using various features of document preparation tools such as MS-Word, Libre Office Write, LaTeX.
6. Make Spread Sheet using various features of worksheet preparation tools namely, MS-Excel, Libre Office Calc.
7. Make Presentations using various features of presentation tools namely, MS-Powerpoint, Libre Office Express.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Identify the components of Personal Computer (PC) System.
- CO2. Disassemble and assemble the components of Personal Computer.
- CO3. Troubleshoot trivial hardware and software related problems.
- CO4. Use productivity software such as MS Office Tools: Word, Excel, Power Point, Libre Office Tools: Write, Calc, Express and LaTeX.
- CO5. Install Operating Systems such as Windows and Linux on personal computers

Week 1	<p>Task 1: Different generations of computers, computing environments, Identify the peripherals of a computer, components in CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral.</p> <p>Task 2: The students need to go through the video which shows the process of assembling a PC. The student should disassemble and assemble the PC back to its working condition.</p>
Week 2	<p>Task 1: Every student should learn installing Windows-7 in the personal computer.</p> <p>Task 2: Hardware & software Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals and Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.</p>

Week 3	Task: Every student should learn the process of installing Linux in the computer along with configuring as dual boot with both windows and Linux.
Week 4	Task 1: Features of Word Processor Tool: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track changes. Task 2: Creating a Newsletter: Features: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge.
Week 5	Task 1: Features of Spreadsheet Tool: Creating a Scheduler - Features:- Gridlines, Format Cells, Summation, auto fill, Formatting Text Task 2: Calculating GPA : Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, lookup, Sorting, Conditional formatting.
Week 6	Task: Features of Presentation tool: Students will work on basic power point utilities and tools which help them to create power point presentation. Presentation Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts Lines and Arrows.
Week 7	Task: Document preparation using LaTeX
Week 8	Task: Document, Spreadsheet and Presentation using Libre Office

TEXT BOOK(S)

1. Comdex Information Technology Course Tool Kit, Vikas Gupta, WILEY Dreamtech, 2009-10 Edition.
2. Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education, 2012.

REFERENCE BOOK(S)

1. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
2. LaTeX Companion, Leslie Lamport, PHI/ Pearson.
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education.
4. IT Essentials PC Hardware and Software Companion Guide, Third Edition, David Anfinson and Ken Quamme, CISCO Press, Pearson Education.

ENGINEERING WORKSHOP

Prerequisite(s): None

Course Objectives

Develop ability to

1. Inculcate general machining skills.
2. Understand the dignity of labour, precision, safety at work place, team working and development of positive attitude.
3. Gain hands on experience on different trades of engineering such as fitting, carpentry, tin smithy, welding, foundry, black smithy, house wiring and sheet metal.
4. Acquire knowledge of thread cutting and pipe joining in plumbing.
5. Understand the concept of Machining with lathes and automats.
6. Be aware of power tools used in various Engineering applications.

Course Outcomes (COs)

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

- CO1. Use various modern engineering tools for engineering practice
- CO2. Recognize dignity of labour and workshop safety regulations.
- CO3. Design and model different prototypes in carpentry such as T-Lap Joint and L-Lap Joint.
- CO4. Make basic prototypes in Tin Smithy such as Open Scoop and Rectangular Tray.
- CO5. Perform basic House Wiring techniques such as Series wiring, Staircase (one lamp with two switches) Connection, Connecting one lamp with one switch, connecting two lamps with one switch.
- CO6. Design and model basic prototypes in fitting such as L-Fitting, V-Fitting and Dove tail Fitting.
- CO7. Make basic prototypes in Black Smithy such as S-Hook, C –Hook and Flat Chisel.
- CO8. Perform basic Foundry such as Dumbbell Pattern, Stepped Pulley Pattern and Gear Pattern
- CO9. Demonstrate knowledge of welding process, Plumbing and power Tools.

List of Experiments

I. TRADES FOR EXERCISES:

At least TWO exercises from each trade:

1. **Carpentry:** T-Lap Joint, L-Lap Joint, Cross Lap joint, Dove Tail Joint
2. **Fitting:** L-Fitting, V-Fitting, Dove tail Fitting.
3. **Tin-smithy and development of jobs carried out and soldering.:** Open Scoop, Rectangular Tray, Funnel.
4. **House-wiring:** Series Wiring, Staircase Wiring, Connecting one lamp with one switch, connecting two lamps with one switch.
5. **Black smithy:** S-Hook, C –Hook, Flat Chisel.
6. **Foundry:** Doumble Pattern, Stepped Pulley Pattern, Gear pattern

II. TRADES FOR DEMONSTRATION & EXPOSURE:

1. **Welding:** V-Butt Joint, Corner Butt Joint, Lap Joints.
2. Power tools used in construction, wood working, electrical engineering and mechanical engineering.
3. **Plumbing:** Thread Cutting, Pipe Joining –1, Pipe Joining -2.

TEXT BOOK(S)

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy, 2nd Edn, Scitech publishers.

REFERENCE BOOK(S)

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.
2. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
3. Jeyapooan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

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16CS2101 – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives

Enable student to

1. Understand concepts of Mathematical Logic and its applications.
2. Understand mechanisms of inference rules for propositional and predicate logic and their applications.
3. Understand principles of Mathematical Induction and Contradiction.
4. Understand the concepts of relations, functions, sets, algebraic structures and counting and their applications.
5. Understand the fundamental notions of statistics, such as sample space, mean and distributions.
6. Understand basic definitions and properties of graphs and their applications in computer science and engineering.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Distinguish between Propositional Logic and Predicate Logic and check the proposition satisfiability.
- CO2. Illustrate by examples the basic terminology of functions, relations, sets and algebraic structures along with their associated operations.
- CO3. Demonstrate basics of counting, principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- CO4. Apply induction proof techniques towards solving recurrences and other problems in elementary algebra.
- CO5. Compute the probability of an event in a well-defined distribution.
- CO6. Represent a problem as a graph in solving computer science and engineering problems.

UNIT-I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-II

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.

Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties.

UNIT-III

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

UNIT-IV

Recurrence Relation: Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions. Characteristic roots solution of In-homogeneous Recurrence Relations.

UNIT-V

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

TEXT BOOK(S)

1. Discrete Mathematical Structures with Applications to Computer Science, J.P.Tremblay, R.Manohar, 1st Edition, Tata McGraw Hill, 2001.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, 2nd Edition, PHI, 2009.

REFERENCE BOOK(S)

1. Elements of Discrete Mathematics- A computer Oriented Approach-C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
3. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

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16CS2102 – DATA STRUCTURES

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
4	-	-/-	4

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS1201 COMPUTER PROGRAMMING - II

Course Objectives

Develop ability to

1. Understand the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
2. Identify the notations used to represent the Performance of algorithms.
3. Understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
4. Familiarize with various data structures for various applications.
5. Understand various searching and sorting algorithms.
6. Write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Explain the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
- CO2. Calculate the performance of the different algorithms in terms of time and space.
- CO3. Write programs in C for different data structures like stacks, queues, linked lists (singly and doubly).
- CO4. Select appropriate data structure for a given problem.
- CO5. Write C programs for different searching and sorting algorithms.
- CO6. Write C programs on non-linear data structures such as trees and graphs.

UNIT- I

Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations,
 Introduction to Linear and Non Linear data structures: Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT- II

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

Queue ADT, definition and operations, array and linked implementations in C, Circular queues- Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees.

Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap. , Sorting-Insertion Sort, Selection Sort, Merge sort, Quick sort, Heapsort Radix Sort, Comparison of Sorting methods.

UNIT- IV

Search Trees - Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, Insertion into an AVL Tree, B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees, Comparison of Search Trees.

UNIT-V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations-Adjacency matrix, Adjacency lists, Adjacency multi lists, Graph traversals- DFS and BFS. Static Hashing-Introduction, hash tables, hash functions, Overflow Handling. Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

TEXT BOOK(S)

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and SusanAnderson-Freed, Universities Press.

REFERENCE BOOK(S)

1. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
2. Data Structures using C, R.Thareja, Oxford University Press.
3. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
4. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
5. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
6. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI
7. Data Structures, S.Lipscutz, Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

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16CS2103 – OBJECT ORIENTED PROGRAMMING THROUGH JAVA

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16CS1101 COMPUTER PROGRAMMING - I
16CS1201 COMPUTER PROGRAMMING - II

Course Objectives

Develop ability to

1. Understand basic concepts of object oriented programming.
2. Understand the primitive data types built into the Java language and features of strongly typed language.
3. Learn scope, lifetime, and the initialization mechanism of variables and parameter passing mechanisms.
4. Write simple graphics programs involving drawing of basic shapes.
5. Create Graphical User Interfaces by means of Java Programming Language.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Apply the concepts of OOPs in problem solving.
- CO2. Use data abstraction, inheritance, polymorphism, encapsulation and method overloading principles in structuring computer applications.
- CO3. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
- CO4. Use Java Collection of Application Programming Interface (API) as well as the Java standard class library with necessary exception handling mechanisms in constructing computer applications.
- CO5. Develop java programs using multi-threading, files and database concepts and their connectivity.
- CO6. Design and develop Graphical User Interface applications using Abstract Window Toolkit (AWT), Swings and Applets.

UNIT-I

OOP concepts - Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, procedural and Object oriented programming paradigms

Java Programming - History of Java, comments, datatypes, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops break and continue statements. simple java program, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this keyword, overloading methods and constructors recursion, garbage collection, building strings, exploring string class

UNIT-II

Inheritance - Definition, hierarchies, super and subclasses, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism - Dynamic binding, method overriding, abstract classes and methods.

Interfaces - Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

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

Packages - Definition, Creating and Accessing a package, understanding CLASSPATH, importing packages.

UNIT-III

Exception handling – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multi-Threading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication, producer consumer pattern.

UNIT –IV

GUI Programming with java - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, containers- JFrame, JApplet, JDialog, JPanel, Overview of some swing components - JButton, JLabel, JTextField, JTextArea, simple Swing Applications, Layout Management- Layout Manager types- border , grid and flow

Event handling - Events, event sources, event classes, event Listeners, Relationship between event sources and Listeners Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

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

UNIT –V

Connecting to Database - JDBC type 1 to 4 drivers, connecting to a data base, querying a data base and processing the results, updating data with JDBC.

Files: streams – byte streams, character streams, text input/ Output binary input/ output Random access file operations, file management using File class

Collection Frame work in java - Introduction to java Collections, overview of java collection frame work, Generics, commonly used collection classes- ArrayList, Vector, Hash table, Stack, Enumeration, Iterator, String tokenizer, Random, Scanner, Calendar and Properties

TEXT BOOK(S)

1. Java fundamentals- A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH, 1st Edition, 2013.

REFERENCE BOOK(S)

1. Core Java 2–Volume1, Cay S. Horstmann and Gary Cornell
2. Java for Programmers, P.J. Dietel and H.M Deitel Pearson education.
3. Object Oriented Programming through Java. P.Radha Krishna. Universities Press.
4. Thinking in Java, Bruce Eckel, Pearson Education.

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16EC2103– SWITCHING THEORY AND LOGIC DESIGN

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand basic concepts of various number systems used in digital systems.
2. Understand boolean algebra and various boolean simplification theorems
3. Understand simplification of boolean functions using k-map and tabular method.
4. Understand design and analysis of combinational and sequential logic circuits.
5. Understand the concepts of various memories and PLDs.
6. Understand symmetric functions and design the same using relay contacts
7. Understand Threshold logic and design switching functions using threshold elements.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO 1. Perform conversions from one number system to another
- CO 2. Simplify Switching functions using Boolean minimization theorems, map method and tabulation method.
- CO 3. Analyze and Design the combinational and sequential logic circuits that are hazard free.
- CO 4. Distinguish between RAM, ROM and PLDs and synthesize logic circuits using PLDs.
- CO 5. Synthesize symmetric functions using relay contact networks
- CO 6. Design switching circuits using threshold elements

UNIT I

Number Systems: Number Systems, Base Conversion Methods, Binary arithmetic, Complements of Numbers, Codes-Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Alpha Numeric Codes, Error Detecting and Correcting Codes.

Boolean Algebra and Switching Functions: Switching algebra, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT II

Minimization of switching functions: Introduction, The Minimization with theorem, The Karnaugh Map Method, Five and six Variable maps, Prime and essentials implications, Don't care map entries, using the maps for simplifying, Tabular method, partially specified expressions.

UNIT III

Design of Combinational Circuits: Design using Conventional Logic gates, Data Selectors, Encoders, Priority Encoder, Decoders, comparators, Adders, multiplexers, De-multiplexers, MUX realization of switching functions, Parity generators and code converters. Multi-output minimizations, Hazards and Hazard Free Realizations.

Memory Elements and Programmable Logic Devices: Types of Memory Elements (RAM and ROM). Basic PLD's- ROM, PROM, PLA and PAL. Realization of Switching functions using PLD's.

UNIT IV

Synthesis of Symmetric Networks: Relay Contacts, Analysis and Synthesis of Contact Networks, Symmetric Networks, Identification of Symmetric Functions.

Threshold Logic: Threshold Elements, Capabilities and Limitations of Threshold logic, Elementary Properties, Synthesis of threshold networks (Unate function, Linear separability, Identification and realization of threshold function, Map based synthesis of two-level networks).

UNIT V

Sequential Machines Fundamentals: Introduction, State table, State Assignment, Finite State Model-Basic Definitions. Memory Elements and their Excitation Functions-SR flip-flop, T flip-flop, JK flip-flop, D flip-flop, Clock timing and Master Slave flip-flop. Synthesis of Synchronous Sequential circuits-Sequence Detector, Binary counter, Parity bit generator.

Counters and Shift Registers: Ripple Counter, Ring Counters, Twisted Ring Counter, Shift Registers and their types, Ring Counter using Shift Register

TEXT BOOK(S)

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.
2. Digital Design- Morris Mano, PHI, 3rd Edition.

REFERENCE BOOK(S)

1. Introduction to Switching Theory and Logic Design - Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons Inc.
2. Digital Fundamentals - A Systems Approach - Thomas L. Floyd, Pearson, 2013.
3. Digital Logic Design - Ye Brian and Holds Worth, Elsevier.
4. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, Sth, Edition, 2004.
5. Digital Logic Applications and Design, John M. yarbrough, Thomson Publications, 2006.
6. Digital Logic and State Machine Design - Comer, 3 ed, Oxford, 2013.

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16EE2104 – BASIC ELECTRICAL ENGINEERING

II Year B.Tech. CSE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand Network theorems, fundamentals of Alternating Current (AC).
2. Understand basic operating principles, construction and functions of single phase transformers.
3. Understand basic operating principles of Direct Current (DC) machines and AC motors.
4. Understand basic operating principles, construction and working of Permanent Magnet Moving Coil (PMMC) and Moving Iron (MI) ammeters and voltmeters.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Analyze electrical circuits and solve simple network problems by applying suitable laws and network theorems.
- CO2. Analyze basic AC circuits and calculate AC network parameters.
- CO3. Determine efficiency, power loss (iron loss and copper loss) and percentage regulation of a single phase transformer.
- CO4. Determine parameters of DC machines and AC motors, namely, power loss, torque, efficiency etc.
- CO5. Distinguish between PMMC and MI ammeters and voltmeters.

UNIT – I

Introduction to Electrical Engineering: Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems. **Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. **Network theorems:** Superposition, Thevenin's, Maximum power transfer theorems and simple problems.

UNIT-II

Alternating Quantities: Principle of AC voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of AC circuits with single basic network element, single phase series circuits.

UNIT-III

Transformers : Principles of operation, constructional details, ideal transformer and practical transformer, losses, transformer test, efficiency and regulation calculations (All the above topics are only elementary treatment and simple problems).

UNIT-IV

DC and AC Machines: DC generators: Principle of operation of dc machines, types of DC generators, EMF equation in DC generator. **DC motors:** Principle of operation of DC motors, types of DC motors, losses and torque equation, losses and efficiency calculation in DC generator. **AC Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

UNIT V

Basic Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, PMMC and MI instruments of Ammeters and Voltmeters (elementary treatment only).

TEXT BOOK(S)

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

REFERENCE BOOK(S)

1. Basic Electrical Engineering, Abhijit Chakrabarthy, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T. K. Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

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16CS21L1 – OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): **16CS11L1 COMPUTER PROGRAMMING - I LAB**
16CS12L1 COMPUTER PROGRAMMING - II LAB

Course Objectives

Develop ability to

1. Understand basic concepts of object oriented programming.
2. Understand the primitive data types built into the Java language and features of strongly typed language.
3. Learn scope, lifetime, and the initialization mechanism of variables and parameter passing mechanisms.
4. Write simple graphics programs involving drawing of basic shapes.
5. Create Graphical User Interfaces by means of Java Programming Language.

Course Outcomes

After completion of the course, student would be able to

- CO1. Apply the concepts of OOPs in problem solving.
- CO2. Use data abstraction, inheritance, polymorphism, encapsulation and method overloading principles in structuring computer applications.
- CO3. Identify classes, objects, members of a class and relationships among them needed for a specific problem.
- CO4. Use Java Collection of Application Programming Interface (API) as well as the Java standard class library with necessary exception handling mechanisms in constructing computer applications.
- CO5. Develop java programs using multi-threading, files and database concepts and their connectivity.
- CO6. Design and develop Graphical User Interface applications using Abstract Window Toolkit (AWT), Swings and Applets.

Week 1 :(Basic programs to get used to java syntax) Write a Java program to

- a. print the Fibonacci series upto the given number.
- b. write a Java program to print the reverse of the given number
- c. write a Java program to find factorial of the given number at command line.
- d. write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer

Week 2:Write a Java program to

- a. check whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
- b. sort a given list of names in ascending order.
- c. find frequency count of words in a given text.

Week 3: Write a java program to

- a. illustrate creation of classes and objects
- b. illustrate constructor and method overloading
- c. create a stack ADT

Week 4

- a. implement different types of inheritance
- b. illustrate method overriding and Dynamic method dispatch
- c. illustrate static keyword with variables and methods

Week 5

- a. Create an interface for stack of integers with abstract methods push, pop and display. Write an implementation of the above mentioned abstract methods for a fixed size stack and a dynamic size stack.
- b. illustrate inner classes
- c. illustrate creation and importing the packages

Week 6 Write a java program to

- a. illustrate usage of try, catch, finally with multiple exceptions
- b. create user defined exceptions.

Week 7

- a. Write a java program that implements a multi-thread applications that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the thread will print the value of the number.
- b. create a thread by implementing Runnable interface.
- c. implement producer consumer problem using the concept of inter thread communication.

Week 8

- a. Develop an applet that displays a simple message.
- b. 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.
- c. c)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.

Week 9

- a. Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired .
- b. Applet handle a keyboard event for a name textbox to accept only alphabets (skip off any other characters)

Week 10

- a. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, 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.

- b. Applet that depicts a login page.

Week 11

- a. 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.
- b. Write a Java program that allows the user to draw lines, rectangles and ovals.
- c. Applet which displays current date and time every second using Thread and Calendar class

Week 12

- a. Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides (). 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.
- b. 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.

Week 13

- a. Write a java Program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- b. Implement the above program with database instead of a text file.

Week 14

- a. Write a java Program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- b. Write a java program that prints the meta-data of a given table.

Week 15

- a. Write a java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.
- b. An applet to check for a valid user id and password using the data in table users(user_id, password)

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16CS21L2 – DATA STRUCTURES LAB

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16CS11L1 COMPUTER PROGRAMMING - I LAB
16CS12L1 COMPUTER PROGRAMMING - II LAB

Course Objectives

Develop ability to

1. Understand the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
2. Identify the notations used to represent the Performance of algorithms.
3. Understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
4. Familiarize with various data structures for various applications.
5. Understand various searching and sorting algorithms.
6. Write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Course Outcomes

After completion of the course, student would be able to

- CO1. Explain the basic concepts of Abstract Data Types, Linear and Non Linear Data structures.
- CO2. Calculate the performance of the different algorithms in terms of time and space.
- CO3. Write programs in C for different data structures like stacks, queues, linked lists (singly and doubly).
- CO4. Select appropriate data structure for a given problem.
- CO5. Write C programs for different searching and sorting algorithms.
- CO6. Write C programs on non-linear data structures such as trees and graphs.

List of Programs

Week 1: Write a C program that uses functions to perform the following:

- a. Create a singly linked list of integers.
- b. Delete a given integer from the above linked list.
- c. Display the contents of the above list after deletion.

Week 2: Write a C program that uses functions to perform the concatenation of a singly linked list

Week3: Write a C program that uses functions to perform the following:

- a. Create circularly linked lists
- b. Delete a given integer from the above linked list.
- c. Display the contents of the above list after deletion.

Week4: Write a C program that uses functions to perform the following:

- a. Create a doubly linked list of integers.
- b. Delete a given integer from the above doubly linked list.
- c. Display the contents of the above list after deletion

Week 5: Write a C program for polynomial addition using linked lists.

Week6: Write C programs to implement a Stack and Queue ADT using

- i) Array and ii) singly linked list respectively.

Week7. Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent. Implement the stack using an array.

Week8: Write C programs to implement a double ended queue ADT using

- i) Array and ii) doubly linked list respectively.

Week9:

- a. Write a C program that uses functions to perform the following:
 - i. Create a binary search tree of characters.
 - ii. Traverse the above Binary search tree recursively in Post order.
- b. Create a binary search tree of integers.
- c. Traverse the above Binary search tree non recursively in in order, pre order, post-order.

Week 10: Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Insertion sort b) Selection sort c) Merge sort

Week 11: Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Quick sort b) Radix Sort c) Heap Sort

Week 12: Write a C program to perform the following operation:

- a) Insertion into a B-tree. b) Searching a B-Tree.

Week 13: Write C programs for implementing the following graph traversal algorithms:

- a) Depth first traversal b) Breadth first traversal

Week 14: Write a C program to implement all the functions of a dictionary (ADT) using hashing.

Week15: Write a C program for pattern matching algorithm (KMP).

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16EE21L4 – BASIC ELECTRICAL ENGINEERING LAB

II Year B.Tech. CSE I Semester

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand Network theorems.
2. Understand magnetization characteristics of DC shunt generator.
3. Understand Swinburne's Test on a DC shunt motor.
4. Understand characteristics of DC shunt motor by Brake test.
5. Understand Open Circuit (OC) and Short Circuit (SC) Tests on a single phase transformer.
6. Understand characteristics of three phase induction motor by Brake test

Course Outcomes

At the end of the course, student would be able to

- CO1. Experimentally verify Network theorems.
- CO2. Determine critical resistance and critical speed from magnetization characteristics of DC shunt generator.
- CO3. Experimentally validate efficiency of DC machine.
- CO4. Determine efficiency of DC shunt motor.
- CO5. Calculate efficiency, percentage regulation and determine the equivalent circuit parameters of single phase transformer.
- CO6. Determine efficiency of three phase induction motor.

List of Experiments

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum Power Transfer theorem.
3. Experimental verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of DC Shunt Generator.
5. Swinburne's Test on a DC Shunt Motor.
6. Brake test on a DC Shunt Motor.
7. OC and SC test on a single phase transformer.
8. Brake test on three phase Induction Motor.

Additional Experiment

1. Verification of KVL(Kirchhoff's Voltage Law) and KCL(Kirchhoff's Current Law)

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16MA2104 – LOGICAL REASONING

II Year. B.Tech. CSE – I Sem

L	T	P/D	C
-	-	2/-	1

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand and compute LCM, HCF, Square Roots & Cube Roots.
2. Calculate averages; solve problems on time, distance and work done.
3. Understand relation between capital investment, period of investments and shares.
4. Think analytically and logically to solve a given problem.
5. Understand concepts of clocks and calendars.

Course Outcomes:

At the end of the course, student would be able to

- CO1. Apply cogent methods to evaluate LCM, HCF, Square Roots & Cube Roots.
- CO2. Apply various principles to solve mathematical problems on time, distance and work done involving lesser computations.
- CO3. Apply relation between Capital investments, period of investments and shares to solve numerical problems which involves shorter computational time.
- CO4. Demonstrate analytical and logical thinking by solving various problems which include relations and puzzle solving abilities.
- CO5. Solve problems related to time.

UNIT-I

Numbers- Classification of numbers, Divisibility rules, Finding the units digit, Finding remainders in divisions involving higher powers, LCM and HCF Models, Decimal fractions, Simplifications, Square Roots & Cube Roots, Surds and Indices.

UNIT- II

Averages- Definition of Average, Rules of Average, Problems on Average, Problems on Weighted Average, Finding average using assumed mean method.

Time and Distance- Relation between speed, distance and time, Converting kmph into m/s and vice versa, Problems on average speed, Problems on relative speed, Problems on trains.

Time and Work- Problems on Unitary method, Relation between Men, Days, Hours and Work, Problems on Man-Day-Hours method, Problems on alternate days, Problems on Pipes and Cisterns.

UNIT-III

Partnership - Introduction, Relation between capitals, Period of investments and Shares.

Simple Interest - Definitions, Problems on interest and amount, Problems when rate of interest and time period are numerically equal.

Compound Interest-Definition and formula for amount in compound interest, Difference between simple interest and compound interest for 2 years on the same principle and time period.

UNIT – IV

Analytical Reasoning puzzles- Problems on Linear arrangement, Problems on Circular arrangement, Problems on Double line-up, Problems on Selections, Problems on Comparisons.

Blood relations- Defining the various relations among the members of a family, Solving Blood Relation puzzles, Solving the problems on Blood Relations using symbols and notations.

UNIT – V

Clocks - Finding the angle when the time is given, Finding the time when the angle is known, Relation between Angle, Minutes and Hours, Exceptional cases in clocks.

Calendars - Definition of a Leap Year, Finding the number of Odd days, Framing the year code for centuries, Finding the day of any random calendar date.

Odd man out- Problems on number Odd man out, Problems on letter Odd man out, Problems on verbal Odd man out.

TEXT BOOK(S)

1. Quantitative Aptitude for Competitive Examinations by R.S. Aggarwal, S Chand Publication.
2. Quantitative Aptitude for Competitive Examination by Abhijit Guha, McGraw Hill Education.

REFERENCE BOOK(S)

1. Quantitative Aptitude for the CAT by Nishit K. Sinha, Pearson Education.
2. Wiley's Quantitative Aptitude by P.A. Anand, Wiley; First Edition.

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16CS2201 – DESIGN AND ANALYSIS OF ALGORITHMS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):

16CS2101 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
16CS2102 DATA STRUCTURES

Course Objectives

Develop ability to

1. Realize the asymptotic performance of algorithms.
2. Understand the behavior of Greedy strategy, Divide and Conquer approach, Dynamic Programming and branch and bound theory for several problem solving techniques.
3. Understand how the choice of data structures and algorithm design methods impact the performance of programs.
4. Distinguish deterministic and non-deterministic algorithms and their computational complexities.

Course Outcomes

After completion of the course, student would be able to

- CO1. Analyze algorithms and estimate their best-case, worst-case and average-case behavior in terms of time and space and execute the same through programming.
- CO2. Identify suitable problem solving technique for a given problem and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, and branch and bound theory accordingly and execute the same through programming.
- CO3. Implement algorithm design method into appropriate data structures using programming.
- CO4. Design deterministic and non-deterministic algorithms for tractable and intractable problems and categorize them as P Class/ NP Class/ NP-Hard/ NP-complete problems accordingly.

UNIT-I

INTRODUCTION: Algorithm, Pseudo code for expressing algorithms, Performance analysis - Time complexity and space complexity, Asymptotic Notations: O notation, Omega notation, Theta notation, and little oh notation, probabilistic analysis and amortized complexity.

DIVIDE AND CONQUER: General method, applications – binary search, merge sort, quick sort, Strassen’s matrix multiplication.

UNIT-II

SEARCHING AND TRAVERSAL TECHNIQUES : Efficient non-recursive binary tree traversal algorithms, spanning trees, graph traversals- BFS and DFS, Connected components, bi-Connected components, AND/OR graphs, game tree.

Disjoint sets: operations, union and find algorithms.

UNIT-III

GREEDY-METHOD: General method, Applications-Job sequencing with deadlines, 0/1 knapsack problem, minimum cost spanning tree, single source shortest path problem.

DYNAMIC PROGRAMMING: General method, applications-multistage graphs, matrix chain multiplication, optimal binary search trees, 0 /1 knapsack problem, travelling sales person problem, reliability design problem.

UNIT-IV

BACK TRACKING: General method, applications: n-queens problem, sum of sub set problem, graph colouring problem, Hamiltonian cycles.

BRANCH and BOUND: General method, applications: Job Sequencing with deadlines, travelling sales person problem, 0 /1 knapsack problem, LC branch and bound, FIFO branch and bound solution

UNIT-V

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP-hard and NP- complete classes, NP- Hard problems, Cook's theorem.

TEXT BOOK(S)

1. Fundamentals of Computer Algorithms Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekharan, 2nd Edition, Universities Press, 2009 Reprint.
2. Design and Analysis of Algorithms, Aho, Ullman and Hopcroft, Pearson education, Reprint 2004.

REFERENCE BOOK(S)

1. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd/Person Education
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. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education
4. Algorithms-Richard Johnson baugh and Marcus Schaefer, Pearson Education
5. Design and Analysis Algorithms-Parag Himanshu Dave, Himanshu Bhalachndra Dave Publisher: Person
6. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John wiley and sons

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**16CS2202 – COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE
PROGRAMMING**

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EC2103 SWITCHING THEORY AND LOGIC DESIGN

Course Objectives

Develop ability to

1. Understand computer components in general and in particular Von Neumann Architecture and their functionalities.
2. Understand the data representation (2's complement, floating point) inside the processor, and perform arithmetic operations on them.
3. Understand the rationale behind memory organization, storage, I/O, and know how cache operates.
4. Understand 8086 processor architecture and its organization: pin diagram, different types of registers, addressing modes and data transfer.
5. Illustrate computer organization concepts by Assembly Language programming, structure of assembly language program and function call mechanisms.

Course Outcomes

After completion of the course, student would be able to

- CO1. Explain various computer abstract levels and functions of computer hardware components and concept of stored program organization.
- CO2. Identify different hardware components associated with the memory organization of a computer.
- CO3. Recommend instruction formats, addressing modes, interrupts, I/O and Memory buses, Isolated and Memory mapped I/O.
- CO4. Recommend mode of asynchronous serial data transfer using an interface (UART).
- CO5. Design and implement simple systems using 8086 processor with the knowledge of pin diagram, registers and instruction formats of 8086 processor by writing assembly language programs.

UNIT-I

Basic Computer Organization – Functions of CPU, I/O Units, Memory, Instruction Formats- one address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples; Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

UNIT-II

Input-Output Organizations- I/O Interface, I/O Bus and Interface Modules: I/O Vs Memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous Data Transfer- Strobe Control, Hand Shaking; Asynchronous Serial Transfer- Asynchronous Communication Interface, Modes of Transfer- Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP- CPU-IOP Communication, Intel 8089 IOP.

UNIT-III

Memory Organizations: Memory Hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, Associate Memory.

Cache Memory, Data Cache, Instruction Cache, Miss and Hit Ratio, Access Time, Associative Mapping, Set-Associative Mapping, Writing 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 BOOK(S)

1. Computer System Architecture, M. Morris Mano, 3/e, Pearson Education. (UNIT-1,2,3).
2. Advanced Micro Processor and Peripherals, Hall/A K Ray, McGraw Hill Education, 2006. (UNIT-4,5).

REFERENCE BOOK(S)

1. Computer Organization and Architecture, William Stallings, Sixth Edition, Pearson/PHI.
2. Structured Computer Organization-Andrew S Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, Sivaraama Dandamudi, Springer Int. Edition.
4. Computer Architecture a Quantitative Approach, John L. Hennessy and David A. Patterson, 4th Edition, Elsevier.
5. Computer Architecture: Fundamentals and Principles of Computer Design, SJoseph D. Dumas II, BS Publication.

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16CS2203 – DATABASE MANAGEMENT SYSTEMS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):

16CS1101 COMPUTER PROGRAMMING - I

16CS1201 COMPUTER PROGRAMMING - II

16CS2101 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

16CS2102 DATA STRUCTURES

Course Objectives

Develop ability to

1. Learn and practice data modeling using entity-relationship and develop database design.
2. Understand the features of database management systems and Relational database.
3. Understand Structured Query Language (SQL) and learn SQL syntax.
4. Understand normalization process of a logical data model and correct any anomalies.
5. Understand needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes

After completion of the course, student would be able to

CO1. Design and describe data models and schemas in DBMS.

CO2. Use SQL- the standard language of relational databases, for database processing.

CO3. Resolve redundant and functional dependencies, design a normalized database.

CO4. Implement Transaction and Query processing techniques for data storage and retrieval.

UNIT I

Introduction- Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction , Instances and Schemas , Data Models ,Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets , Relationships and Relationship sets , Additional features of ER Model , Conceptual Design with the ER Model , Conceptual Design for Large enterprises, database Access for applications Programs ,Data Storage and Querying,– data base Users and Administrator ,data base System Structure ,History of Data base Systems. Database Languages–DDL, DML,DCL.

Relational Model: 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.

UNIT II

Relational Algebra and Calculus : 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.

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.

UNIT III

Introduction to Schema refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Function dependencies- reasoning about FDS,

Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF – properties of Decompositions Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form, Join Dependencies, FIFTH Normal Form, Inclusive Dependencies.

UNIT IV

Transaction Management- Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control - Lock –Based Protocols – Timestamp Based Protocols- Validation-Based Protocols – Multiple Granularity.

Recovery system – Failure Classification- Storage Structure- Recovery – Atomicity – Log – Based Recovery- Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage - Advance Recovery systems- Remote Backup systems.

UNIT V

Overview of Storage and Indexing: 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.

Tree Structured Indexing - Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based indexing: Static Hashing, Extendable Hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOK(S)

1. Fundamentals of Database Systems, Elmasri, Navathe, 7th Edition, Pearson Education, 2016.

REFERENCE BOOK(S)

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, VI edition.
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
4. Introduction to Database Systems, C.J.Date Pearson Education

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16MA2201 – PROBABILITY AND STATISTICS

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand different types of random variables and their distributions.
2. Estimate population parameters statistically from a sample of population.
3. Estimate correlation coefficient and coefficient of regression of the given data.
4. Examine statistical hypothesis for large and small samples.

Course Outcomes

At the end of the course, student would be able to

- CO1. Distinguish between random variables pertaining to discrete and continuous distribution systems.
- CO2. Compute moments and moment generating functions of Binomial, Poisson and Normal distribution.
- CO3. Calculate sample statistics from given population and estimate population parameters.
- CO4. Identify similarity between two variables using correlation coefficient and coefficient of regression.
- CO5. Apply hypothesis procedure to test means and proportions using z-test for large samples and t-test, F-test, chi-square test for small samples.

UNIT-I: Single Random variables and probability distributions

Probability Theory, Baye's Theorem, Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution, Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution, Binomial, Poisson & normal distributions and their properties, Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT-II: Sampling Distributions & Estimations

Definitions of population, sampling, statistic, parameter, Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, interval estimations.

UNIT-III: Correlation & Regression

Correlation, coefficient of correlation, rank correlation (Karl Pearson's coefficient of correlation, Spearman's coefficient of correlation), regression, regression coefficient, lines of regression.

UNIT-IV: Testing of hypothesis (Large Samples)

Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test, Large sample tests: (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances) (ii) Tests of significance of difference between sample S.D and population S.D. (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

UNIT-V: Testing of hypothesis (Small Samples)

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples Snedecor's F- distribution and its properties. Test of equality of two population variances Chi-square distribution, its properties, Chi-square test of goodness of fit.

TEXT BOOK(S)

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.
3. Operations Research by S.D. Sharma.

REFERENCE BOOK(S)

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
2. Probability and Statistics by John J. Schiller, Murray R Spiegel, A. V. Srinivasan, Tata McGraw - Hill Education.
3. Engineering Mathematics by Srimanta pal, subhodh C.Bhunia, Oxford higher Education.
4. Probability and Statistics by T. K. V. Iyengar & B. Krishna Gandhi Et, S Chand.
5. Fundamentals of Mathematical Statistics by S C Gupta and V. K. Kapoor.
6. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
7. Operations Research by S. Kalavathy, Vikas Publishing House Pvt LTD.

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16CH2201 – ENVIRONMENTAL STUDIES

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Identify the importance of ecosystem and its functions.
2. Understand the natural resources and their usage in day to day life.
3. Understand the concept of bio-diversity, its values and conservation.
4. Be aware of the causes of different types of pollution and its control.
5. Understand various environmental impacts, requirement of various policies and legislations towards environmental sustainability.

Course Outcomes

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

- CO1. Explain ecosystem and its functions namely, food chain, ecological pyramids etc.
- CO2. Acquire knowledge about different types of natural resources such as land, water, minerals, non-renewable energy and their excessive usage leading to detrimental effects on environment.
- CO3. Comprehend ecosystem diversity, its values and importance of hot spots to preserve the same.
- CO4. Explain different types of pollution, its control and impact on global environment.
- CO5. Recognize various environmental impacts and the importance of various acts and policies towards environmental sustainability.

UNIT- I: Ecosystem

Scope and importance of ecosystem, Classification of ecosystem, Introduction to biotic and abiotic components, Forest and desert ecosystem, Functions of eco system food chains, food webs and ecological pyramids, Flow of energy in an ecosystem, Biogeochemical cycles, Nitrogen cycle and Carbon cycle, Phosphorous cycle and Hydrological cycle.

UNIT- II: Natural Resources

Classification of resources, Water resources-Use and over utilization of surface and ground water, Mineral resources-Environmental effects of extracting and using mineral resources –Case study, Land resources – Land degradation, man induced landslides, Energy resources – renewable, solar energy, wind energy, applications, Non renewable resources- fossil fuels, nuclear energy, Chernobyl and Fukushima Daiichi nuclear disasters.

UNIT- III: Biodiversity and Biotic Resources

Introduction, definition, genetic, species and ecosystem diversity, Types of diversity, Alpha, Beta and Gamma, Value of biodiversity- Consumptive use, productive use, ethical, aesthetic and intrinsic values, Hotspots of biodiversity in India, Threats to biodiversity, Conservation of biodiversity – In-situ and Ex-situ methods, bioaccumulation and biomagnifications.

UNIT- IV: Environmental Pollution and Control Technologies

Classification of Pollution, Air pollution causes, effects and remedial measures, Water pollution, causes, effects and remedial measures, Noise Pollution, Emission standard limits, Acid rains. Waste water treatment technologies- Common and Combined Effluent Treatment Plants (CETP), Thermal Pollution causes, effects and remedial measures, Solid Waste Management, Green house effect and Global warming, Ozone layer depletion and its effects.

UNIT- V: Environmental Policy, Legislation & EIA

Definition of Impact and Types of Impact, Steps involved in Environmental Impact Assessment (EIA) methodology, methods of base-line data acquisition, Impacts of development on different environmental components, Prediction of Impacts, Methods of rain-water harvesting traditional and modern methods, National Environmental Policy. Air conservation act, Water conservation act, Forest conservation act.

Towards Sustainable Future: Concept of Sustainable development, Threats of sustainable development, Environmental Education, Conservation of resources, Concept of Green building.

TEXT BOOK(S)

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha- University Grants Commission.
2. Environmental Studies by Anubha Kaushik & C.P. Kaushik

REFERENCE BOOK(S)

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, B S Publication
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Introduction to Environmental Management by Mary.k. Theodare, Louis Theodare, CRC Press, Taylor & Francis group.
4. Fundamentals of Ecology by Eugene P.Odum, Gary W.Barrett, Thomson International.

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**16CS22L1 – COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE
PROGRAMMING LAB**

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand computer components in general and in particular Von Neumann Architecture and their functionalities.
2. Understand the data representation (2's complement, floating point) inside the processor, and perform arithmetic operations on them.
3. Understand the rationale behind memory organization, storage, I/O, and know how cache operates.
4. Understand 8086 processor architecture and its organization: pin diagram, different types of registers, addressing modes and data transfer.
5. Illustrate computer organization concepts by Assembly Language programming, structure of assembly language program and function call mechanisms.

Course Outcomes

After completion of the course, student would be able to

- CO1. Explain various computer abstract levels and functions of computer hardware components and concept of stored program organization.
- CO2. Identify different hardware components associated with the memory organization of a computer.
- CO3. Recommend instruction formats, addressing modes, interrupts, I/O and Memory buses, Isolated and Memory mapped I/O.
- CO4. Recommend mode of asynchronous serial data transfer using an interface (UART).
- CO5. Design and implement simple systems using 8086 processor with the knowledge of pin diagram, registers and instruction formats of 8086 processor by writing assembly language programs.

List of Experiments

1. Write a program to display string “Computer Science and Engineering” for 8086.
2. Write an ALP to find the maximum of three numbers for 8086.
3. Write an ALP to find the minimum of three numbers for 8086.
4. Write an ALP to find the average of four numbers for 8086.
5. Write an ALP to find the factorial of a number for 8086.
6. Write an ALP to take n values from user and calculate their sum for 8086.

7. Write an ALP to take n values from user and calculate maximum & minimum values for 8086.
8. Write 8086 ALP to transfer a block of data from one location to another.
9. Write an ALP to reverse the given string for 8086.
10. Write an ALP to take n values from user and sort them in ascending order for 8086.

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16CS22L2 – DATABASE MANAGEMENT SYSTEMS LAB

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Learn and practice data modeling using entity-relationship and develop database design.
2. Understand the features of database management systems and Relational database.
3. Understand Structured Query Language (SQL) and learn SQL syntax.
4. Understand normalization process of a logical data model and correct any anomalies.
5. Understand needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes

After completion of the course, student would be able to

- CO1. Design and describe data models and schemas in DBMS.
- CO2. Use SQL- the standard language of relational databases, for database processing.
- CO3. Resolve redundant and functional dependencies, design a normalized database.
- CO4. Implement Transaction and Query processing techniques for data storage and retrieval.

List of Experiments

1. E-R Model: Analyze the problem with the entities which identify data persisted in the database which contains entities, attributes.
2. Concept design with E-R Model: Apply cardinalities for each relationship, identify strong entities and weak entities for relationships like generalization, aggregation, specialization.
3. Relation Model: Represent attributes as columns in tables and different types of attributes like Composite, Multi-valued, and Derived. Apply Normalization.
4. Installation of Mysql and Queries using DATA DEFINITION LANGUAGE (DDL) COMMANDS - Create, Alter, Drop, Truncate
5. Data Manipulation Language (DML) COMMANDS:- SELECT, INSERT, UPDATE, DELETE
6. Data Control Language (DCL):- GRANT, REVOKE
Transaction Control Language (TCL) COMMANDS :- COMMIT , ROLL BACK
SAVE POINT

7. In Built Functions: - DATE FUNCTION, NUMERICAL FUNCTIONS , CHARACTER FUNCTIONS, CONVERSION FUNCTION
8. Querying: Queries using ANY, ALL, IN, INTERSECT, UNION
9. Querying: Using aggregate functions COUNT, SUM using GROUPBY and HAVING
 - a. Using aggregate functions AVERAGE using GROUPBY and HAVING
10. Querying: NESTED QUERIES AND JOIN QUERIES: Nested Queries , Correlated sub queries , Simple Join, a) Equi-join b) Non Equi-join , Self join , Outer Join
11. Set Operators: Union , Union all , Intersect , Minus
12. Views: Creating and dropping view
13. Triggers: Creation of INSERT TRIGGER, DELETE TRIGGER, UPDATE TRIGGER
14. Procedures: Creation, Execution and Modification of stored Procedure
15. Database Design and Implementation: MINI DATABASE PROJECT

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16CS22L3 – ALGORITHMS LAB

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s):

- 16CS11L1 COMPUTER PROGRAMMING - I LAB**
- 16CS12L1 COMPUTER PROGRAMMING - II LAB**
- 16CS21L2 DATA STRUCTURES LAB**

Course Objectives

Develop ability to

1. Realize the asymptotic performance of algorithms.
2. Understand the behavior of Greedy strategy, Divide and Conquer approach, Dynamic Programming and branch and bound theory for several problem solving techniques.
3. Understand how the choice of data structures and algorithm design methods impact the performance of programs.
4. Distinguish deterministic and non-deterministic algorithms and their computational complexities.

Course Outcomes

After completion of the course, student would be able to

- CO1. Analyze algorithms and estimate their best-case, worst-case and average-case behavior in terms of time and space and execute the same through programming.
- CO2. Identify suitable problem solving technique for a given problem and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, and branch and bound theory accordingly and execute the same through programming.
- CO3. Implement algorithm design method into appropriate data structures using programming.
- CO4. Design deterministic and non-deterministic algorithms for tractable and intractable problems and categorize them as P Class/ NP Class/ NP-Hard/ NP-complete problems accordingly.

List of Experiments

1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
2. Using Open MPI, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. Implement Binary tree traversal techniques using recursion and without recursion. Identify the best method, Justify your answer.
4.
 - a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
 - b. Check whether a given graph is connected or not using DFS method.
5. Write and implement an algorithm determining articulation points and the biconnected components in the given graph.
6. Implement an algorithm to find the minimum cost spanning tree using
 - i) Prims algorithm
 - ii) Kruskals Algorithm
7. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
8. Implement Job Sequencing with Deadlines algorithm and Fast Job Sequencing with Deadlines.
9. Implement Matrix Chain multiplication algorithm. Parallelize this algorithm, implement it using OpenMP and determine the speed-up achieved.
10. Implement 0/1 Knapsack problem using Dynamic Programming.
11. Implement an algorithm to find the optimal binary search tree for the given list of identifiers.
12. Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.
13. Implement N Queen's problem using Back Tracking.
14. Write a program for Hamiltonian Cycle Problem
15. Implement the solution for TSP problem using Branch & Bound technique

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(Autonomous)
Cheeryal (V), Keesara (M), Medchal Dist. - 501 301, Telangana State

16HS22L1 – GENDER SENSITIZATION
(Activity Based Course)

II Year. B.Tech. CSE – II Sem

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): None

Course Objectives

Facilitate students to

1. Sensitize with regard to gender issues.
2. Provide a critical perspective on the requirements of healthy socialization of both genders.
3. Create awareness and understanding on some of the key biological changes of both genders.
4. Apprise on the importance of sharing domestic work and the economic contribution of women.
5. Create awareness on the impact of gender violence on society.
6. Create consciousness on the contribution of women of Telangana in its development.

Course Outcomes

At the end of the course, student would be able to

- CO1. Demonstrate sensitivity with regard to gender issues.
- CO2. Show healthy socialization among both the genders that can be observable.
- CO3. Show empathy on some of the key biological changes of both genders.
- CO4. Realize the importance of sharing domestic work and economic contribution of women.
- CO5. Realize the impact of gender violence on society.
- CO6. Show awareness on the contribution of women of Telangana in its development.

UNIT-I

UNDERSTANDING GENDER:

Gender: Why Should We Study It?(Towards a World of Equals Unit-1)

Socialization: Making Women, Making Men(Towards a World of Equals Unit-2)

Introduction, Preparing for Womanhood, Growing up Male, First lessons in Caste, Different Masculinities.

Just Relationships: Being Together as Equals (Towards a World of Equals Unit-12)

Mary Kom and Onler, Love and Acid just do not Mix, Love Letters, Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

UNIT-II

GENDER AND BIOLOGY:

Missing Women: Sex Selection and its Consequences(Towards a World of Equals Unit-4)

Declining Sex Ratio, Demographic Consequences

Gender Spectrum: Beyond the Binary(*Towards a World of Equals Unit-10*)

Two or Many? Struggles with Discrimination

Additional Reading: Our Bodies, Our Health (*Towards a World of Equals Unit-13*)

UNIT-III

GENDER AND LABOUR:

House work: The Invisible Labour(*Towards a World of Equals Unit-3*)

“My Mother doesn’t Work”. “Share The Load”.

Women’s Work: Its Politics and Economics (*Towards a World of Equals Unit-7*)

Fact and Fiction, Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT-IV

ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (*Towards a World of Equals Unit-6*)

Sexual Harassment, not Eve-teasing, Coping with Everyday Harassment Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (*Towards a World of Equals Unit-8*)

Is Home a Safe Place? When Women Unite [Film]. Rebuilding Lives, Further Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals Unit-11*)

Blaming the Victim- “I Fought for my Life” Further Reading: The Caste Face of Violence.

UNIT-V

GENDER STUDIES:

Knowledge: Through the Lens Gender (*Towards a World of Equals Unit-5*)

Point of View, Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.

Whose History? Questions for Historians and Others(*Towards a World of Equals Unit-9*)

Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

TEXT BOOK(S)

1. “Towards a World of Equals: A Bilingual Textbook on Gender” written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Thaar.

REFERENCE BOOK(S)

1. Sen Amartya. "More the One Million Women are Missing", New York Review of Books 37,20(20 December 1990), Print. "We Were Making History..." Life Stories of Women in the Telangana People's Struggle, New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work", Women's Studies Journal (14 November 2012). Available online at: <http://blogs.wsj.com/Indiarealtime/2012/11/14/by-the-numbers-where-Indian-women-work/>
3. K.Satyanarayana and Susie Thar (Ed.). Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu and Kannada http://harpercollins.co.in/BookDetail.asp?Book_Code=3732
4. Vimala. "Vantillu (The Kitchen)", Women Writing in India:600 BC to the Present, Volume II, The 20th Century, Ed. Susie Tharu and K.Lalita, Delhi: Oxford University Press, 1995 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, National Institute of Nutrition, Indian Council of Medical Research, 1993.
6. Stree Shakti Sanghatana. "We Were Making History . . ." Life Stories of Women in the Telangana People's Struggle, New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. "Seeing like a Feminist", New Delhi: Zubaan-Penguin Books, 2012.
8. Jayaprada A. "Chupulu (Stares)", Women Writing in India: 600 BC to the Present Volume II: The 20th Century Ed. Susie Tharu and K.Lalita, Delhi: Oxford University Press, 1995, 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Womne and Wage Discrimination in India: A Critical Analysis", International Journal of Humanities and Social Science Invention 2.4 (2013).
10. Gautam, Liela and Gita Ramaswamy. " A 'conversation' between a Daughter and a Mother", Broadsheet on Contemporary Politics, Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila. "I Fought For My Life and Won", Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>
12. Jeganathan Pradeep, Partha Chatterjee (ed). "Community, Gender and Violence Subaltern Studies XI", Permanent Black and Ravi Dayal Publishers, New Delhi, 2000.
13. K.Kapadia. "The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India", London, Zed Books, 2002.
14. S. Benhabib. "Situating the Self: Gender, Community and Postmodernism in Contemporary Ethics", London, Routledge, 1992.
15. Virginia Woolf. "A Room of One's Own", Oxford: Black Swan, 1992.
16. T.Banuri and M.Mahmood. "Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford university Press, 1997.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
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16CS3101 - WEB TECHNOLOGIES

III Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand the basic web concepts and Internet protocols
2. Understand XML and processing of XML data
3. Understand client side scripting with Javascript and DHTML
4. Understand server side programming with Java servlets and JSP
5. Understand server side programming with PHP

Course Outcomes (COs):

At the end of the course, student would be able to

- CO1. Create dynamic and interactive web sites
- CO2. Write and execute client side scripts using Javascript and DHTML.
- CO3. Write, parse and execute XML schemas.
- CO4. Write, implement, deploy and execute server side programs and components using Java Servlets and JSP.
- CO5. Write, implement, deploy and execute server side programs and components using PHP.

UNIT I:

HTML: Common Tags – List, Tables, images, forms, frames; Cascading Style Sheets.

Client side Scripting: Introduction to JavaScript: JavaScript language – declaring variables, Scope of variables, functions, event handlers (on click, on submit etc.), Document Object Model, Form validation.

UNIT II:

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definitions, XML Schemas, Document Object Model, XHTML

Parsing XML Data – DOM and SAX Parsers in Java.

UNIT III:

Introduction to Servlets:

Common Gateway Interface (CGI), life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization Parameters, Handling Http Request & Responses, Using Cookies and Sessions, 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 and session for sessions tracking, connecting to database in JSP.

UNIT V:

Introduction to PHP : Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to Database (MYSQL as reference), executing simple queries, handling results, Http sessions and cookies.

File Handling PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

TEXT BOOK(S)

1. Web Technologies, Uttam K Roy, Oxford University Press.
2. The Complete Reference PHP – Steven Holzner, Tata McGraw – Hill.

REFERENCE BOOK(S)

1. Web Programming, building internet applications, Chirs Bates 2nd edition, Wiley Dreamtech.
2. Java Server Pages – Hans Bergsten, SPD O'Reilly.
3. Java Script, D.Flanagan, O'Reilly, SPD
4. Beginning Web Programming – Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and world wide web – How to program, Dietel and Nieto, Pearson.

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16CS3102 - OPERATING SYSTEMS

III Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand main components of Operating System (OS) and their working.
2. Understand the different scheduling policies of OS.
3. Understand the different memory management techniques.
4. Understand process concurrency and synchronization.
5. Understand the concepts of input/output, storage and file management.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Explain synchronous and asynchronous communication mechanisms in their respective Operating Systems.
- CO2. Implement CPU Scheduling algorithms and explain turnaround time, waiting time response time, throughput for a given set of processes.
- CO3. Explain various memory management techniques and analyze them.
- CO4. Explain process concurrency and synchronization
- CO5. Explain the concepts of input/output, storage and file management

UNIT - I:

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems, Operating System services, user OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual machines.

UNIT - II:

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

UNIT - III:

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT - IV:

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management.

UNIT - V:

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection - System 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.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

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16CS3103 - FORMAL LANGUAGES AND AUTOMATA THEORY

III Year.B.Tech. (CSE) – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisites

16MA1101 - Mathematics-I

16CS2101 - Mathematical Foundations of Computer Science

Course Objectives

Develop ability to

1. Understand mathematical methods of computing devices called abstract machines namely finite automata, pushdown automata and turing machines.
2. Understand capabilities of these abstract machines.
3. Understand classification of machines by their power to recognize languages.
4. Employ finite state machines to solve problems in computing.
5. Explain deterministic and non-deterministic machines.
6. Identify different formal language classes and their relationships.
7. Design grammars and recognizers for different formal languages.
8. Determine the decidability and intractability of computational problems.
9. Comprehend the hierarchy of problems arising in computer science.

Course Outcomes:

At the end of the course, student would be able to

- CO1. Explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory.
- CO2. Explain abstract models of computing, including deterministic (DFA), non-deterministic (NFA), and Turing (TM) machine models.
- CO3. Explain the process of application of machine models and descriptors to compiler theory and parsing.
- CO4. Explain the practical problems in terms of languages, automata, computability, and complexity
- CO5. Apply mathematical and formal techniques for solving problems in computer science
- CO6. Explain the relationship among language classes and grammars with the help of Chomsky Hierarchy.

UNIT I :

Fundamentals : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

Finite Automata: NFA with $\hat{\Gamma}$ transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without $\hat{\Gamma}$ transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

UNIT II :

Regular Languages : Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

Grammar Formalism : Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

UNIT III :

Context Free Grammars : Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

Push Down Automata : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

UNIT IV :

Turing Machine : Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

UNIT V :

Computability Theory : Chomsky hierarchy of languages, linear bounded automata and context sensitive language, decidability of problems, Universal Turing Machine, undecidability of post Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

TEXT BOOKS :

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education

REFERENCES BOOKS:

1. Introduction to Theory of Computation – Sipser 2nd edition Thomson
2. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan Rama R.
3. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
4. Theory Of Computation: A Problem - Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
5. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
6. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI.

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16CS3104 - DATA WAREHOUSING AND DATA MINING
(SOFT CORE – I)

III Year.B.Tech. (CSE) – I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): Database Management Systems

Course Objectives

Develop ability to

1. Understand and implement classical models and algorithms in data warehousing and data mining.
2. Design and build data warehouse from heterogeneous data sources using data integration tools.
3. Identify the problems and analyze given data and choose the relevant models and algorithms.
4. Apply models and algorithms for mining the data and to discover knowledge and generate reports accordingly.
5. Assess the strengths and weaknesses of various methods and algorithms and analyze their behavior.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Explain methodology used in legacy databases for data warehousing and data mining to derive business rules for decision support systems.
- CO2. Apply the knowledge gained from different patterns evaluated during data mining process.
- CO3. Apply the principles in web mining, text mining, and ethical aspects of data mining.
- CO4. Use data warehousing tools for building the data warehouse or data mart and perform ETL operations.
- CO5. Design multi-dimensional data models for data preprocessing and OLAP analysis.
- CO6. Use data mining tool(s) to build reliable products for end users.

UNIT – I

Data Warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses. Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction – Transformation – Loading, Logical (Multi – Dimensional), Data Modeling, Schema Design, Star and Snow – Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi – Addictive, Non Addictive Measures; Fact Consultation, Fact Table, Fully Addictive, Semi – Addictive, Non Addictive Measures; Fact – Less – Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture – ROLAP, MOLAP and HOLAP.

UNIT – II

Introducing to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity – Basics.

UNIT – III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP - Growth Algorithms, Compact Representation of Frequent Item set- Maximal Frequent Item Set, Closed Frequent Item Sets.

UNIT – IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of classifiers, Classification Techniques, Decision Tree – Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive Bayes Classifier, Bayesaian Belief Networks; K – Nearest neighbour classification – Algorithm and Characteristics.

UNIT – V

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering - K-Means Algorithm, PAM Algorithm; Hierarchical Clustering – Agglomerative Methods and divisive methods, Outlier Detection.

TEXT BOOK(S)

1. Data Mining – Concepts and Techniques – Jiawei Han, MichelineKamber, Morgan Kaufmann Publishers, Elsevier, 2nd Edition, 2006.
2. Introduction to Data Mining, Pang – Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

REFERENCE BOOK(S)

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Warehouse Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
3. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

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16CS3105 – COMPUTER GRAPHICS
(SOFT CORE – I)

III Year.B.Tech. (CSE) –I Sem

L	T	P/D	C
4	1	-/-	4

Prerequisites

- **16CS1101 – COMPUTER PROGRAMMING – I**
- **16CS1201 – COMPUTER PROGRAMMING – II**
- **16CS2102 – DATA STRUCTURES**

Course Objectives

Develop ability to

- Understand the computer graphics system components with an appreciation towards application areas.
- Understand the process involved in displaying output primitives and filled area primitives.
- Understand 2-D geometrical transformations and perform object clipping using 2-D viewing pipeline for the given 2-D object.
- Understand 3-D geometrical transformations and perform object clipping using 3-D viewing pipeline for the given 3-D object.
- Understand various illumination and surface rendering methods with the help of visible surface detection methods.
- Understand steps involved in various computer animation techniques.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Distinguish computer graphics system components with an appreciation towards application areas.
- CO2. Explain the process involved in displaying output primitives and filled area primitives.
- CO3. Compute 2-D geometrical transformations and perform object clipping using 2-D viewing pipeline for the given 2-D object.
- CO4. Compute 3-D geometrical transformations and perform object clipping using 3-D viewing pipeline for the given 3-D object.
- CO5. Explain various illumination and surface rendering methods with the help of visible surface detection methods.
- CO6. Explain steps involved in various computer animation techniques.

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

Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms

Filled area primitives: Scan-line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-II:

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

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, Polygon Filling

UNIT-III:

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.

UNIT-IV:

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:

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

TEXT BOOK(S)

1. “Computer Graphics C Version”, Donald Hearn and M.Pauline Baker, Pearson Education.

REFERENCE BOOK(S)

1. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.
2. Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
3. Principles of Computer Graphics, ShaliniGovil, Pai, 2005, Springer.
4. “Computer Graphics Principles & practice”, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
5. Computer Graphics, Steven Harrington, TMH

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16MB3121-INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE - I)

III Year. B. Tech. CSE - I Semester

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course objectives

Develop ability to

1. Understand the various concepts, importance and types of intellectual property rights.
2. Discuss the purpose, functions and registration process of trademarks.
3. Analyze the fundamental laws of copy rights and patents.
4. Understand trade secret laws, trade secret litigation and unfair completion.
5. Understand the latest developments in IPR.

Course outcomes (COs)

At the end of the course, student would be able to:

- CO1. Acquire knowledge on intellectual property rights
- CO2. Know about the acquisition of trademarks.
- CO3. Identify the importance of copyrights, patents searching process and transfer of Ownership
- CO4. Know about secret laws, unfair competition, false advertising.
- CO5. Reciprocate to new developments of intellectual property rights.

UNIT - I:

Introduction to Intellectual property: Concepts, types of intellectual property, international organizations, agencies and treaties, and importance of intellectual property rights.

UNIT - II:

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III:

Law of Copy Rights: Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right laws.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT - IV:

Trade Secrets: Trade secrets law, determination of trade secrets status, liability for misappropriations of trade secrets, protection for submission, trade secrets litigation. Unfair competition - misappropriation right of publicity, false advertising.

UNIT - V:

Latest development of intellectual property Rights: new developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international - trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT BOOK(S)

1. Intellectual property right, Deborah, E. Bouchoux, Cengage learning.
2. Intellectual property right - Unleashing the knowledge economy, Prabuddha Ganguli, Tata Mc Graw Hill Publishing Company Ltd.
3. Cornish, William Rodolph & Llewelyn, David. Intellectual property: patents, copyright, trademarks and allied rights. Sweet & Maxwell, 8/e, 2013.

REFERENCE BOOK(S)

1. Cornish, William Rodolph. Cases and materials on intellectual property. Sweet & Maxwell, 5/e, 2006.
2. Lo, Jack and Pressman, David. How to make patent drawings: a patent it yourself companion. Nolo, 5/e 2007.

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16EE3122 – INDUSTRIAL SAFETY AND HAZARDS
(OPEN ELECTIVE-I)

III Year B.Tech. CSE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Upon successful completion of the course, the student will be able to:

1. Determine responsibility for safety in the workplace.
2. Learn to recognize workplace hazards.
3. Learn how to develop procedures to eliminate or lessen those hazards.
4. Apply basic Federal and State Safety Rules to the workplace.

Course Outcomes (COs)

- CO1. Understand the fundamental concepts of accident prevention with a basic knowledge of safe work rules designed to promote an accident free workplace.
- CO2. Understand the relief systems.
- CO3. Understand the electrical hazards and safety handling of equipments.
- CO4. Understand the effects of momentum and buoyancy.
- CO5. Understand different case studies.

UNIT I: FIRE AND EXPLOSION

Introduction - Industrial processes and hazards potential, mechanical electrical, thermal and process hazards. Safety and hazards regulations, Industrial hygiene. Factories Act, 1948 and Environment (Protection) Act, 1986 and rules thereof. Shock wave propagation, vapour cloud and boiling liquid expanding vapours explosion (VCE and BLEVE), mechanical and chemical explosion, multiphase reactions, transport effects and global rates.

UNIT II: RELIEF SYSTEMS

Preventive and protective management from fires and explosion-inerting, static electricity passivation, ventilation, and sprinkling, proofing, relief systems –relief valves, flares, scrubbers.

UNIT III: ELECTRICAL HAZARDS

Primary and secondary hazards-shocks, burns, scalds, falls-human safety in the use of electricity. Energy leakage-clearances and insulation-classes of insulation-voltage classifications excess energy-current surges-Safety in handling of war equipments-over current and short circuit current-heating effects of current-electromagnetic forces-corona effect-static electricity – definition, sources, hazardous conditions, control, electrical causes of fire and explosion-ionization, spark and arc-ignition energy-national electrical safety code ANSI. Lightning, hazards, lightning arrestor, installation–earthing, specifications, earth resistance, earth pit maintenance.

UNIT – IV: LEAKS AND LEAKAGES

Spill and leakage of liquids, vapors, gases and their mixture from storage tanks and equipment; Estimation of leakage/spill rate through hole, pipes and vessel burst; Isothermal and adiabatic flows of gases, spillage and leakage of flashing liquids, pool evaporation and boiling; Release of toxics and dispersion. Naturally buoyant and dense gas dispersion models; Effects of momentum and buoyancy; Mitigation measures for leaks and releases.

UNIT V: CASE STUDIES

Flixborough, Bhopal, Texas, ONGC offshore, HPCL Vizag and Jaipur IOC oil-storage depot incident; Oil, natural gas, chlorine and ammonia storage and transportation hazards.

TEXT BOOK(S)

1. Fordham Cooper, W., “Electrical Safety Engineering” Butterworth and Company, London, 1986.

REFERENCE BOOK(S)

1. Crowl D.A. and Louvar J.F., “Chemical Process Safety: Fundamentals with Applications”, 2nd Ed., Prentice Hall.2001
2. Mannan S., “Lee’s Loss Prevention in the Process Industries”, Vol.I, 3rdEd., Butterworth-Heinemann.2004.
3. Mannan S., “Lee’s Loss Prevention in the Process Industries”, Vol.II, 3rdEd., Butterworth-Heinemann.2005.
4. Indian Electricity Act and Rules, Government of India.
5. Power Engineers –Handbook of TNEB, Chennai, 1989.
6. Martin Glov Electrostatic Hazards in powder handling, Research Studies Pvt. Ltd., England,1988.

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16EC3124 – ELECTRONIC MEASURING INSTRUMENTS
(OPEN ELECTIVE-I)

III Year B.Tech. CSE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Note: No detailed mathematical treatment is required.

Course Objectives:

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. Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

Course Outcomes(COs)

On completion of this course, Students would be able to

- CO1. Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
- CO2. Measure various physical parameters by appropriately selecting the transducers.
- CO3. Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.

Unit I:

Block Schematics of Measuring Systems and Performance Metrics: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag.

Unit II:

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

Unit III:

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. CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes.

Unit IV:

Recorders: X-Y Plotter, Curve tracer, Galvanometric Recorders, Servo transducers, pen driving mechanisms, Magnetic Recording, Magnetic recording techniques.

Unit V:

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

TEXT BOOK(S)

1. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage, TMH Reprint 2009.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCE BOOK(S)

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbins, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

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16ME3125 – NANO MATERIALS AND TECHNOLOGY
(OPEN ELECTIVE-I)

III Year B.Tech. CSE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives:

1. This course is primarily intended to expose the students to a highly interdisciplinary subject
2. To enable the students understand the basic concepts of Nanotechnology
3. To enhance the knowledge of students in nanomaterials
4. To familiarize the students with the properties of nanomaterials and their applications
5. To expose the students MEMS / NEMS devices and their applications

Course Outcomes:

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

- CO1. Design a component / material that would provide us a “ better tomorrow” via Nanotechnology
- CO2. Understand synthesis and properties of nanostructured materials.
- CO3. Analyze magnetic and electronic properties of quantum dots
- CO4. Understand structure, properties and applications of Carbon nanotubes.
- CO5. Understand applications of nanoparticles in nanobiology and nanomedicine

UNIT I: Introduction: Importance of Nano-technology, Emergence of Nano-Technology, Bottom-up and Top-down approaches, challenges in Nano Technology.

UNIT II: Zero Dimensional Nano-structures: Nano particles through homogenous nucleation; Growth of nuclei, synthesis of metallic Nano particles, Nano particles through heterogeneous nucleation; Fundamentals of heterogeneous nucleation and synthesis of nano particles using micro emulsions and Aerosol.

UNIT III: One Dimensional Nano-structures: Nano wires and nano rods, Spontaneous growth: Evaporation and condensation growth, vapor-liquid-solid growth, stress induced recrystallization.

Template based synthesis: Electrochemical deposition, Electro-phoretic deposition. Electro-spinning and Lithography.

UNIT IV: Two dimensional Nano-Structures: Fundamentals of film growth. Physical vapour Deposition (PVD): Evaporation molecular beam epitaxy (MBE), Sputtering, Comparison of Evaporation and sputtering.

Chemical Vapour Deposition (CVD): Typical chemical reactions, Reaction kinetics, transportant phenomena, CVD methods, diamond films by CVD.

UNIT V: Thin films: Atomic layer deposition (ALD), Electrochemical deposition (ECD), Sol-Gel films.

Special Nano Materials: Carbon fullerece and nano tubes: carbon fullerness, formation, properties and applications. Carbon nano tubes: formation and applications.

TEXT BOOK(S)

1. Guozhong Cao - Nano structures and Nano materials: Synthesis, properties and applications - Imperial College press in 2004, 2nd edition.
2. Rechard Booker and Earl Boysen, Nanotechnology, Willey, 2006.

REFERENCE BOOK(S)

1. T. Pradeep, Nano: The Essentials; Tata McGraw-Hill, 2008.
2. W.R. Fahrner, Nanotechnology and Nanoelectronics; Springer,2006.

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16CE3126 – GLOBAL WARMING AND CLIMATE CHANGE
(OPEN ELECTIVE-I)

III Year B.Tech. CSE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives:

Develop ability to

1. Understand the importance of Ozone layer in the atmosphere.
2. Comprehend composition of atmosphere.
3. Understand impacts of climate change on ecosystem.
4. Understand initiatives taken by different countries to reduce emission of greenhouse gases.
5. Know measures to mitigate greenhouse gases.

Course Outcomes:

At the end of the course, student would be able to

- CO1. Define greenhouse gases and their influence on global warming.
- CO2. Explain physical and chemical characteristics of atmosphere and structure of atmosphere. .
- CO3. Explain impacts of climate change on agriculture, forestry and ecosystem.
- CO4. Explain initiatives taken by countries to reduce global warming.
- CO5. Suggest mitigation measures taken to reduce global warming and climate change.

UNIT-I

Earth's Climate System: Role of ozone in environment - Ozone layer – Ozone depleting gases – Green House Effect – Radioactive effects of Greenhouse gases – The Hydrological cycle – Green House Gases and Global Warming – Carbon Cycle.

UNIT-II

Atmosphere and Its Components: Importance of Atmosphere – Physical and chemical characteristics of Atmosphere – Vertical structure of the atmosphere – Composition of the atmosphere – Atmospheric stability – Temperature profile of the atmosphere – Lapse rates – Temperature inversion – Effects of inversion on pollution dispersion.

UNIT-III

Impacts of Climate change: Causes of Climate change: Changes of Temperature in the environment – Melting of ice pole – sea level rise – Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem – Water Resources – Human Health – Industry, Settlement and Society – Methods and Scenarios – Projected Impacts for different regions – Uncertainties in the projected impacts of Climate Change – Risk of Irreversible Changes.

UNIT-IV

Observed changes and its Causes: Climate change and Carbon credits – CDM – Initiatives in India-Kyoto Protocol – Paris Convention - Intergovernmental Panel on Climate change – Climate Sensitivity and Feedbacks – The Montreal Protocol – UNFCCC – IPCC – Global Climate Models (GCM) - Evidences of Changes in Climate and Environment- on a Global scale and in India.

UNIT-V

Climate change and mitigation measures: Clean Development Mechanism – Carbon Trading – Examples of future clean technology – Biodiesel – Natural Compost – Eco-friendly plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind – Hydroelectric Power – Mitigation Efforts in India and Adaptation funding. Key Mitigation Technologies and Practices – Energy Supply – Transport – Buildings – Industry – Agriculture – Forestry – Carbon sequestration – Carbon capture and storage (CCS) – Waste (MSW & Bio-waste, Biomedical, Industrial waste) – International and Regional cooperation.

TEXT BOOK(S)

1. Climate Change: An Indian Perspective (Environment and Development), Dr. Sushil Kumar Dash, Cambridge University Press India Pvt Ltd, 2007.
2. Adaptation and mitigation of climate change – Scientific Technical Analysis, Cambridge University Press, Cambridge, 2006.

REFERENCE BOOK(S)

1. Atmospheric Science, J.M. Wallace and P.V Hobbs, Elsevier/ Academic Press, 2006.
2. “Climate Change and Climate Variability on Hydrological Regimes”, Jan C. Van Dam, Cambridge University Press, 2003.
3. <http://www.ipcc.ch/>

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16CS31L1-DATA WAREHOUSING AND DATA MINING LAB
(SOFT CORE – I LAB)

III Year.B.Tech. (CSE) – I Sem

L	T	P/D	C
-	-	3/-	2

Course Objectives

Develop ability to

1. Understand and implement classical models and algorithms in data warehousing and data mining.
2. Design and build data warehouse from heterogeneous data sources using data integration tools.
3. Identify the problems and analyze given data and choose the relevant models and algorithms.
4. Apply models and algorithms for mining the data and to discover knowledge and generate reports accordingly.
5. Assess the strengths and weaknesses of various methods and algorithms and analyze their behavior.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Explain methodology used in legacy databases for data warehousing and data mining to derive business rules for decision support systems.
- CO2. Apply the knowledge gained from different patterns evaluated during data mining process.
- CO3. Apply the principles in web mining, text mining, and ethical aspects of data mining.
- CO4. Use data warehousing tools for building the data warehouse or data mart and perform ETL operations.
- CO5. Design multi-dimensional data models for data preprocessing and OLAP analysis.
- CO6. Use data mining tool(s) to build reliable products for end users.

UNIT-I Build Data Warehouse

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).

- Identify source tables and populate sample data
- Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
- Write ETL scripts and implement using data warehouse tools
- Perform various OLAP operations such slice, dice, roll up, drill up and pivot
- Explore visualization features of the tool for analysis like identifying trends etc.

B. Explore WEKA Data Mining/Machine Learning Toolkit

- Downloading and/or installation of WEKA data mining toolkit,
- Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.
- Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)
- Study the ARFF file format
- Explore the available data sets in WEKA.
- Load a data set (ex. Weather dataset, Iris dataset, etc.)
- Load each dataset and observe the following
 1. List the attribute names and they types
 2. Number of records in each dataset
 3. Identify the class attribute (if any)
 4. Plot Histogram
 5. Determine the number of records for each class.
 6. Visualize the data in various dimensions

UNIT- II Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

- A. Explore various options available in WEKA for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset
- B. Load each dataset into WEKA and run Apriori algorithm with different support and confidence values. Study the rules generated.
- C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

UNIT - III Demonstrate performing classification on data sets

- A. Load each dataset into WEKA and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
- B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
- C. Load each dataset into WEKA and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
- D. Plot RoC Curves
- E. Compare classification results of 1D3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

UNIT - IV Demonstrate performing clustering of data sets

- A. Load each dataset into WEKA and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
- B. Explore other clustering techniques available in WEKA.

- C. Explore visualization features of WEKA to visualize the clusters. Derive interesting insights and explain.

UNIT - V Demonstrate Regression on data sets

- A. Load each dataset into WEKA and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
- B. Use options cross-validation and Percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
- C. Explore Simple linear regression technique that only looks at one variable.

Resource Sites

- <http://www.pentaho.com>,
- <http://www.cswajkatoacflz.mI.,wk&>

DATA MINING LAB

Task 1: Credit Risk Assessment

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a Customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible, Interest on these loans is the banks profit Source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset.

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

- owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks: (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately. (5 marks)
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree — train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against “foreign workers” (attribute 20), or “personal-status” (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in WEKA’s GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the am data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in WEKA. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning – Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in WEKA) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
12. How can you convert a Decision Trees into “if-then-else rules”. Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules – one such classifier in WEKA is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources

- Mentor lecture on Decision Trees
- Andrew Moore’s Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU) Tom Mitchell’s book slides (See slides on Concept Learning and Decision Trees)
- WEKA resources:
- Introduction to WEKA (html version) (download ppt version)
- Download WEKA
- WEKA Tutorial
- ARFF format
- Using WEKA from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table. REMEMBER The following Dimension

The dimension object (Dimension):

- Name
- Attribute S (Levels) , with one primary key
- Hierarchies

One time dimension is must. About Levels and Hierarchies Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent child relationships among a set of levels. For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels

- H1: YearL>QuarterL>MonthL>WeekL>DayL
- H2: YearL>WeekL>DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

- TIME (day, month, year),
- PATIENT (patient_name, Age, Address, etc.,)
- MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Ulimit_Price, etc.,)
- SUPPLIER (Supplier_name, Medicine_Brand name, Address, etc.,)

If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

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16CS31L2 - COMPUTER GRAPHICS LAB
 (SOFT CORE – I LAB)

III Year. B.Tech. CSE –I Sem

L	T	P/D	C
-	-	3/-	2

Course Objectives

Develop ability to

1. Understand the computer graphics system components with an appreciation towards application areas.
2. Understand the process involved in displaying output primitives and filled area primitives.
3. Understand 2-D geometrical transformations and perform object clipping using 2-D viewing pipeline for the given 2-D object.
4. Understand 3-D geometrical transformations and perform object clipping using 3-D viewing pipeline for the given 3-D object.
5. Understand various illumination and surface rendering methods with the help of visible surface detection methods.
6. Understand steps involved in various computer animation techniques.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Distinguish computer graphics system components with an appreciation towards application areas.
- CO2. Explain the process involved in displaying output primitives and filled area primitives.
- CO3. Compute 2-D geometrical transformations and perform object clipping using 2-D viewing pipeline for the given 2-D object.
- CO4. Compute 3-D geometrical transformations and perform object clipping using 3-D viewing pipeline for the given 3-D object.
- CO5. Explain various illumination and surface rendering methods with the help of visible surface detection methods.
- CO6. Explain steps involved in various computer animation techniques.

Following experiments are to be implemented in C using gcc compiler and libgraph library.

1. Display a point, line, circle and ellipse.
2. Implement line drawing algorithms
3. Implement circle drawing algorithm
4. Implement ellipse drawing algorithm
5. Implement scan line polygon fill algorithm
6. Implement boundary fill algorithm

7. Implement flood fill algorithm
8. Implement 2D geometrical transforms
 - a. Translation
 - b. Scaling
 - c. Rotation
 - d. Reflection
 - e. Shear
9. Implement Cohen Sutherland line clipping algorithm
10. Implement Cyrus Beck line clipping algorithm
11. Implement Sutherland Hodgeman polygon clipping algorithm
12. Represent a 3D object and project its 2D view for a given viewing angle.
13. Implement illumination models

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16CS31L3-WEB TECHNOLOGIES LAB

III Year.B.Tech. (CSE) – I Sem

L	T	P/D	C
-	-	3/-	2

Course Objectives

Develop ability to

3. Understand the basic web concepts and Internet protocols
4. Understand XML and processing of XML data
4. Understand client side scripting with Javascript and DHTML
4. Understand server side programming with Java servlets and JSP
5. Understand server side programming with PHP

Course Outcomes (COs):

At the end of the course, student would be able to

- CO1. Create dynamic and interactive web sites
- CO2. Write and execute client side scripts using Javascript and DHTML.
- CO3. Write, parse and execute XML schemas.
- CO4. Write, implement, deploy and execute server side programs and components using Java Servlets and JSP.
- CO5. Write, implement, deploy and execute server side programs and components using PHP.

List of Experiments:

Note:

Use LAMP stack (Linux, Apache, mysql and php) for the lab experiments. Though not mandatory, encourage the use of eclipse platform wherever applicable.

1. Write a HTML page including any required java script that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. if the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
2. Write a HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.
3. Write a HTML page that contains a selection box with a list of 5 countries. When user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of capital (color, bold, and font size).

4. Write a XML file which will display the Book information which includes the following:
Title of the book, Author Name, ISBN number, Publisher name, Edition, Price
 - i) Write a Document Type Definition (DTD) to validate the above XML file.
 - ii) Write a XSD to validate the above XML file.
5. Create a XML document that contains 10 users information. Write a java Program, which takes User Id as input and returns the user details by taking the user information from XML document using (a) DOM Parser and (b) SAX parser.
6.
 - a) Write a Servlet for User validation web application, where the user submits a login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
 - b) Modify the above Program to an xml file instead of database.
7.
 - a) Write a Servlet for a simple calculator web application that takes two numbers and an operator (+,-,/,*,%) from an HTML page and returns the result page with the operation performed on the operands.
 - b) Write a Servlet for web application that lists all cookies stored in the browser on clicking “List Cookies” button. Ass cookies if necessary.
8.
 - a) Write JSP for User validation web application, where the user submits a login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
 - b) Write JSP for a simple calculator web application that takes two numbers and an operator (+,-,/,*,%) from an HTML page and returns the result page with the operation performed on the operands.
9.
 - a) Write JSP for a web application that lists all cookies stored in the browser on clicking “List Cookies” button. Ass cookies if necessary.
 - b) Write JSP for a web application that takes name and age from an HTML page. If the age is less than 18, it should be send a page with “Hello <name >, you are not authorized to visit this site” message, where < name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to this site” message.

10.

- a) Write PHP code for user validation web application, where the user submits a login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
- b) Write PHP code for a simple calculator web application that takes two numbers and an operator (+,-,/,*,%) from an HTML page and returns the result page with the operation performed on the operands.

11. Write PHP code Validate the following fields of registration page.

- i) Name (it should contains alphabets and length at least 6 characters)
- ii) Password (it should not be less than 6 characters)
- iii) Email id (it should not contains any invalid character must follow the standard pattern name@domain.com)
- iv) Phone number (it should contain 10 digits only)

12. A web application for implementation using PHP:

The user is first served login page which takes user's name and password. After submitting the details the server checks these values against the data from a data base and takes the following decisions

If name and password match serves a welcome page with user's full name.

If name matches and password doesn't match, then serves 'password mismatch' page

If name is not found in the data base, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the data base (hint: Use session for storing the submitted login name and password)

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16CS31L4 – OPERATING SYSTEMS LAB

III Year.B.Tech. CSE – I Sem

L	T	P/D	C
-	-	3/-	2

Course Objectives

Develop ability to

1. Understand main components of Operating System (OS) and their working.
2. Understand the different scheduling policies of OS.
3. Understand the different memory management techniques.
4. Understand process concurrency and synchronization.
5. Understand the concepts of input/output, storage and file management.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Explain synchronous and asynchronous communication mechanisms in their respective Operating Systems.
- CO2. Implement CPU Scheduling algorithms and explain turnaround time, waiting time response time, throughput for a given set of processes.
- CO3. Explain various memory management techniques and analyze them.
- CO4. Explain process concurrency and synchronization
- CO5. Explain the concepts of input/output, storage and file management

List of Programs:

1. Practice various Vi Editor Commands under UNIX environment.
2. Use bash for following Shell scripts:
 - a. 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.
 - b. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
 - c. 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.
 - d. 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.
 - e. Write an awk script to find the number of characters, words and lines in a file.
 (Use appropriate System Calls for 3 and 4 programs)
3. Write a C program that allows some tasks to be performed automatically from a menu-driven interface. Automate the following tasks:
 - a. Rename a file and move a file from one directory to another directory
 - b. Delete a file or a directory
 - c. Output Process Information

- d. Execute “mode 644 ls -l”
 - e. Exit
4. Write a C program for performing the file operations such as Read, Write and Append on sample data and perform the tasks:
 - a. Copy the contents of a file to another file.
 - b. Change the contents of a file using find and replace operations.
5. Simulate the following CPU scheduling algorithms
 - a. First Come First Serve (FCFS)
 - b. Shortest Job First (SJF)
 - c. Priority
 - d. Round Robin
6. Simulate Multiprogramming with Variable number of Tasks (MVT)
7. Simulate Multiprogramming with Fixed number of Tasks (MFT)
8. Simulate all page replacement algorithms
 - a. First In First Out (FIFO)
 - b. OPTIMAL
 - c. Least Recently Used (LRU)
9. Simulate all File Organization Techniques
 - a. Single level directory
 - b. Two level
 - c. Hierarchical
10. Simulate all File allocation strategies
 - a. Sequential
 - b. Indexed
 - c. Linked
11. Simulate Bankers Algorithm for Dead Lock Avoidance

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16MB31P1– HUMAN VALUES AND PROFESSIONAL ETHICS

III Year.B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	2

Prerequisite(s): None

Course Objectives

Develop ability to

1. Help the students appreciate the essential complementarities between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. Facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Ensure sustained happiness and prosperity
- CO2. Appreciate values and skills and imply them in life situations
- CO3. Develop a holistic approach towards life, profession and co-existence with others around
- CO4. Emphasize the implications of ethical human conduct
- CO5. Develop trust worthiness and interaction with nature enriching human behavior.

UNIT - I

Course Introduction - Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti;

Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) - from family to world family!

UNIT - IV

Understanding Harmony in the nature and Existence - Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a. Ability to utilize the professional competence for augmenting universal human order,
- b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- d. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.
- e. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- f. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOK(S)

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. SubbaRaju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOK(S)

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumaner, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) KrishiTantraShodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan& V. S Senthilkumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

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16MB3201- MANAGEMENT SCIENCE

III Year. B.Tech. CSE - II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Identify various types of management theories, principles and other important areas.
2. Understand the production operations in the organization and grab the concepts relating to marketing.
3. Integrate HRM function for better function of the organization.
4. Discuss the key elements in strategic management.
5. Analyze contemporary strategic issues for better production function.

Course Outcomes (COs)

At the end of the course, student would be able to:

- CO1. Plan an organizational structure for a given context in the organization.
- CO2. Carry out production operations through work study and understand the markets, customers. Estimate competition and pricing of the given products.
- CO3. Plan and implement the HR functions.
- CO4. Evolve a strategy for a business or service organization.
- CO5. Ensure quality for a given product or service.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization-nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayol's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Herzberg 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 and Marketing 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 for Variables and Attributes (simple Problems) and Acceptance Sampling.

Functions of Marketing, Marketing Mix, and 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:

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT - V:

Contemporary Strategic Issues: Bench Marking and Balanced Score Card , TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management.

TEXT BOOK(S)

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, Management 2012.

REFERENCE BOOK(S)

1. Philip Kotler and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Wehrich: Essentials of Management, McGraw Hill, 2012.
3. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
4. Parnell: Strategic Management, Cengage, 2012.
5. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

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16CS3201 – SOFTWARE ENGINEERING

III Year B.Tech. (CSE) – II Sem

L	T	P/D	C
4	-	-/-	4

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand software development principles and reusable technology.
2. Use UML as the standard for software modeling.
3. Understanding the customer and the user.
4. Understand Risk management in all software engineering activities.

Course Outcomes

At the end of this course, student would be able to

- CO1. Differentiate the customer and the user.
- CO2. Distinguish between various software development models.
- CO3. Evaluation of alternatives in requirements and design.
- CO4. Use UML for software modeling.
- CO5. Communicating effectively using documentation.
- CO6. Use Risk management in all software engineering activities.

UNIT-I

INTRODUCTION

Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models -cost/effort estimation - planning - Risk analysis - Software project scheduling, control & monitoring.

UNIT-II

REQUIREMENTS ANALYSIS

Prototyping - Specification - Analysis modeling- various techniques in software requirement analysis and system specification [SSADM/SADT/Formal methods – Z/B, Behavioral specification, Data flow specs, DFD, State charts].

UNIT-III

SOFTWARE DESIGN

Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design- Layered design – Reuse based design – case studies from different domains like embedded systems.

UNIT-IV

USER INTERFACE DESIGN

User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards. Programming languages and coding - Language classes – Code documentation - Code efficiency - Software Configuration Management.

UNIT-V

SOFTWARE QUALITY AND TESTING

Software Quality Assurance - Quality metrics - Software Reliability - - software development standards like DOD-2167A, IEEE 12207 - Quality models like 6-sigma, ISO2000 applied to quality - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Software Maintenance - Reverse Engineering and Re-engineering. CASE tools - projects management, tools - analysis and design tools - programming tools - integration and testing tool - Case studies

TEXT BOOK(S)

1. Roger Pressman.S., Software Engineering : A Practitioner's Approach, (6th Edition), McGraw Hill, 1997.

REFERENCE BOOK(S)

1. Sommerville, Software Engineering, 7 th edition: Adison Wesley, 1996.
2. Pfleeger, Software Engineering, Prentice Hall, 1999.
3. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli Fundamentals of Software Engineering, Prentice Hall of India 1991.
4. Watts Humphrey , Managing software process, Pearson education, 2003

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16CS3202 -INFORMATION SECURITY
(SOFT CORE – II)

III Year B.Tech. (CSE) – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives

Develop ability to

1. Understand the importance and application of information security aspects, namely, confidentiality, integrity, authentication and availability.
2. Understand cryptographic algorithms.
3. Understand the basic categories of threats to computers and networks.
4. Understand public-key cryptosystem.
5. Understand enhancements made to IPv4 by IPSec.
6. Understand intrusions and intrusion detections.
7. Understand key management in PGP.
8. Understand Web security and Firewalls.

Course Outcomes (COs)

At the end of the course students would be able to

- CO1. Explain information security aspects, namely, confidentiality, integrity, authentication and availability.
- CO2. Explain symmetric and asymmetric key cryptographic algorithms.
- CO3. Explain authentication algorithms, functions and services.
- CO4. Explain and apply authentication, email security, web security services and mechanisms.
- CO5. Distinguish and explain different protocols, namely, SSL, TLS vis-à-vis their applications.
- CO6. Explain security services and mechanisms.

UNIT-I

Attacks on Computers and Computer Security: Introduction, The need of Security, Security approaches, Principles of Security, Types of Security Attacks, Security Services, Security Mechanisms, A model for Network Security.

Cryptography: Concepts and Techniques: Introduction, Plain text and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption, Symmetric and Asymmetric Cryptography, Steganography, Key Range and Key Size, Possible types of Attacks

UNIT-II

Symmetric Key Ciphers: Block Cipher Principles and Algorithms (DES, AES), Concepts of Differential and Linear Cryptanalysis, Block Cipher Modes of Operations, Stream Ciphers, RC4, Location and Placement of encryption function, Key Distribution.

Introduction to Number Theory: Prime numbers, Fermat's and Euler's Theorems, Chinese Remainder Theorem, Discrete Logarithms.

Asymmetric Key Ciphers: Principles of Public Key Cryptosystems, Algorithms (RSA, Diffie-Hellman, Concept of ECC), Key Distribution.

UNIT-III

Message Authentication Algorithms and Hash Function: Authentication Requirements, Functions, Message Authentication Codes, Hash Functions, Secure Hash Algorithms, Whirlpool, HMAC, CMAC, Digital Signatures, Knapsack Algorithm.

Authentication Applications: Kerberos, X.509 Authentication Services, Public-Key Infrastructure, Biometric Authentication.

UNIT-IV

Email Privacy: Pretty Good Privacy (PGP) and S/MIME. **IP Security:** IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT-V

Web Security: Web Security Considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Intruders, Viruses and Firewalls: Intruders, Intrusion Detection, Password Management, Virus and related threats, Counter measures, Firewall Design Principles.

TEXT BOOK(S)

1. Cryptography and Network Security Principles and Practice: William Stallings, Pearson Education, 7th Edition

REFERENCE BOOK(S)

1. Cryptography and Network Security: Atulkahate, McGraw Hill, 2nd Edition.
2. Cryptography and Network Security: C K Shyamala, N Harini, Dr. T R Padmanabhan, Wiley India, 1st Edition.
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: VM Arthur Conklin, Greg White, TMH.
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.

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16CS3203 – IMAGE PROCESSING
(SOFT CORE – II)

III Year B.Tech. (CSE) – II Sem

L	T	P/D	C
4	1	-/-	4

Prerequisite(s): None

Course Objectives:

Develop ability to

1. Understand the fundamental steps in image processing and various components of image processing system.
2. Understand spatial and frequency domain filters for smoothing and sharpening operations on images.
3. Understand morphological operations, segmentation and edge detection on images.
4. Understand the need for and perform image compression.
5. Understand various concepts related to color image processing.
6. Identify the need for and perform object representation and description.
7. Identify the need for and perform image transformations.

Course Outcomes (COs):

After completion of the course, students would be able to

- CO1. Explain the fundamental steps in image processing and various components of image processing system.
- CO2. Apply spatial and frequency domain filters for smoothing and sharpening operations on images.
- CO3. Perform morphological operations, segmentation and edge detection on images.
- CO4. Explain the need for and perform image compression.
- CO5. Explain the various concepts related to color image processing.
- CO6. Explain the need for and perform object representation, description and image transformations.

UNIT I

Fundamental steps of image processing, components of an image processing of system, the image model and image acquisition, sampling and quantization, station ship between pixels, distance functions, scanner.

UNIT II

Statistical and spatial operations, Grey level transformations, histogram equalization, smoothing and sharpening-spatial filters, frequency domain filters, homomorphic filtering, image filtering and restoration. Inverse and weiner filtering.FIR weiner filter. Filtering using image transforms, smoothing splines and interpolation.

UNIT III

Morphological and other area operations, basic morphological operations, opening and closing 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 linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

UNIT IV

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.

Basics of color image processing, pseudo color image processing, color transformation, color smoothing and sharpening, color segmentation, color image compression, compression standards.

UNIT V

Image Transforms - Fourier, DFT, DCT, DST, Haar, Hotelling, Karhunen - Loeve, Walsh, Hadamard, Slant. Representation and Description - Chain codes, Polygonal approximation, Signatures Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, PCA.

TEXT BOOK(S)

1. Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods, 3rd edition, Pearson Education, 2008.
2. Fundamentals of Digital Image Processing, A.K. Jain, PHI

REFERENCE BOOK(S)

1. Digital Image Processing – William K, Part I - John Wiley edition.
2. Digital Image Processing using MATLAB – by Rafael C. Gonzalez, Richard E. Woods and Steven L.Eddins, Pearson Education, 2006.
3. Digital Image Processing, Kenneth R. Castleman, Pearson Education, 2007.

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16CS3204– ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE - I)

III Year B.Tech. (CSE) – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s)

16CS1101 – COMPUTER PROGRAMMING – I
16CS1201 – COMPUTER PROGRAMMING – II
16CS2102 – DATA STRUCTURES

Course Objectives

Develop ability to

1. Understand optimal reasoning and human like reasoning.
2. Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. Understand and use different knowledge representation techniques.
4. Understand the applications of AI, namely game playing, theorem proving, expert systems, machine learning and natural language processing

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Formulate an efficient problem space for a problem expressed in English.
- CO2. Identify a suitable search algorithm to search the solution of a problem in view of its characteristics namely time and space complexities.
- CO3. Represent the knowledge of the given problem domain using the appropriate knowledge representation technique.
- CO4. Identify different phases of building an expert system in the given architecture.
- CO5. Suggest a suitable machine learning technique for the solution of a given problem.
- CO6. Apply AI techniques to solve problems of game playing, natural language processing.

UNIT I

Introduction: AI problems, The Underlying Assumption, AI Techniques, The Level of the Model, Criteria for Success

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs

Heuristic Search Techniques: Generate – and – Test, Hill Climbing, Best – First Search, Problem Reduction, Constraint Satisfaction, Means - Ends Analysis.

UNIT II

Knowledge Representation:

Issues in Knowledge Representation, Representing Simple Facts in Predicate Logic, Representing Instance and ISA Relations, Computable Functions and Predicates, Resolution, Natural Deduction

Representing Knowledge Using Rules: Procedural Vs Declarative Knowledge, Logic Programming, Forward Vs Backward Reasoning, Matching, Control Knowledge

Weak Slot – and – Filler Structures: semantic nets, frames, **Strong Slot – and – Filler Structures:** conceptual dependency, scripts, CYC

UNIT III

Reasoning Techniques: Introduction to Non Monotonic Reasoning, Logics for Non Monotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation of Depth First Search and Breadth First Search, Probability and Bayes Theorem, Certainty Factors and Rule-based Systems, Bayesian Networks.

UNIT IV

Game Playing: Overview, Minimax Search, Alpha – Beta Cutoffs

Planning System: Overview, The Blocks World, Components of a Planning System, Goal Stack Planning, Hierarchical Planning.

Understanding: Understanding as constraint satisfaction, Waltz Algorithm.

Natural Language Processing: Introduction, Syntactic Processing, Augmented Transition Networks, Semantic Analysis

UNIT V

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK(S)

1. Artificial Intelligence, 3rdEdn. , E.Rich, K.Knight and Shivashankar B Nair, (TMH).

REFERENCE BOOK(S)

1. Artificial Intelligence A Modern Approach, Second Edition, Stuart Russell, Peter Norvig, PHI/ Pearson Education.
2. Artificial Intelligence and Expert systems – Patterson PHI.

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**16CS3205 - DISTRIBUTED DATABASES
(PROFESSIONAL ELECTIVE - I)**

III Year B.Tech. (CSE) – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s)

16CS2203 – DATABASE MANAGEMENT SYSTEMS

Course Objectives

Develop ability to

1. Understand distributed database design and distributed database management systems architecture.
2. Understand distributed query processing and decomposition techniques for query optimization.
3. Understand transaction management in distributed database context.
4. Understand the concept of reliability in distributed database management systems.
5. Understand architecture of parallel database systems and distributed object database management systems.
6. Understand object oriented data model.

Course Outcomes (COs)

At the end of the course, student would be able to

- CO1. Explain distributed database design methods and distributed database management systems architecture.
- CO2. Perform distributed query optimization with reference to distributed query processing and decomposition techniques.
- CO3. Explain the concepts related to transaction management in distributed databases.
- CO4. Identify the factors related to distributed database management systems which influence reliability
- CO5. Highlight the similarities and differences between architectures of parallel database systems and distributed object database management systems.
- CO6. Explain importance of different components of object oriented data model.

UNIT-I

Introduction: Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDBMS Architecture.

Distributed Database Design: Alternative Design Strategies, Distributed Design Issues, Fragmentation, Allocation.

UNIT-II

Query Processing and Decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed Query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT-III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms and algorithms, time – stamped and optimistic concurrency control algorithms, deadlock management.

UNIT-IV

Distributed DBMS Reliability: Reliability concepts and measures, fault tolerance in distributed systems, failures in distributed DBMS, local and distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT-V

Distributed Object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison of OODBMS and ORDBMS.

TEXT BOOK(S)

1. M. Tamer OZSU and Patuck Valduriez, Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti, Distributed Databases, McGraw Hill.

REFERENCE BOOK(S)

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, Database Systems: The Complete Book, 2nd Edition, Pearson International Edition.

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16CS3206– SIMULATION AND MODELLING
(PROFESSIONAL ELECTIVE - I)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand of methods, techniques and tools for modeling, simulation and performance analysis of complex systems.
2. Understand system models and studies; random number generation; simulation of continuous and discrete systems; simulation of queuing systems and pert networks.
3. Understand simulation experimentation and introduces simulation languages.

Course Outcomes

At the end of the course, the student would be able to:

- CO1. Construct a model for a given system/set of data.
- CO2. Generate and test random number variates and employ them in developing simulation models.
- CO3. Infer from the model and apply the results to resolve issues in a real world environment.

Unit-I: System Models and Studies

System Models: Concepts of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Static Physical Models, Dynamic Physical Models, Static Mathematical Models, Dynamic Mathematical Models, Principles Used in Modeling.

System Studies: Subsystems, A Corporate Model, Environment Segment, Production Segment, Management Segment, The Full Corporate Model, Types of System Study, System Analysis, System Design, System Postulation

Unit-II: Random Numbers

Random Number Generation: Properties, Generation of Pseudo-Random Numbers, Techniques of generating random numbers, tests for random numbers, Random - Variate Generation: Inverse-Transform Technique, Acceptance-Rejection Technique, Special Properties.

Unit-III: Simulation of Continuous and Discrete Systems

Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.

Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV: System Simulation

Simulation of Queueing Systems: Rudiments of queueing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Simulation of a Pert Network: Network model of a project, Analysis of activity network, Critical path computation, Uncertainties in activity durations, Simulation of activity network, Computer program for simulation, Resource allocation and cost considerations.

Unit-V: Simulation Experimentation

Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation.

Simulation Languages: Continuous and discrete simulation languages, Continuous simulation languages, Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages, GPSS.

TEXT BOOK(S)

1. Discrete-Event System Simulation, Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, Pearson, Fifth Edition, 2010.
2. System Simulation with Digital Computer, Narsingh Deo, Prentice-Hall of India Private Limited, 1979.

REFERENCE BOOK(S)

1. System Modeling and Simulation: An Introduction, Frank L. Severance, Wiley Publisher, 2005
2. System Simulation, Geoffrey Gordon, Prentice-Hall of India Private Limited, Second Edition, 1978.

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16CS3207 - OPTIMIZATION TECHNIQUES
 (PROFESSIONAL ELECTIVE - I)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

UNIT-I

Development- Definition, characteristics and phases, types of models, operations research models, applications.

Allocation: Linear programming problem- formulations, graphical solutions, 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, graphical model.

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 and 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, 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.

TEXT BOOK(S)

1. Operation Research, J.K.Sharma, MacMilan.
2. Operations Research, A.C.S.Kumar, Yesdee.

REFERENCE BOOK(S)

1. Operations Research: Methods and Problems, Maurice Saseini, Arthur 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 and Libermann, TMH.
5. Introduction to O.R., Taha, PHI.

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16MB3231 – SUPPLY CHAIN MANAGEMENT
(OPEN ELECTIVE - II)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives:

Develop ability to

1. Distinguish the different functional areas in businesses management, understand the cross functional integrations and map supply chains of various business sectors.
2. Identify different types of distribution/ modes of transport/ network design.
3. Analyze the operational issues in SCM.
4. Recognize the drivers of supply chain.
5. Interpret the importance of relationships with suppliers and customers.

Course Outcomes:

At the end of the course, student would be able to:

- CO1. Understand the role of an Engineer as well as Manager in Supply chain management
- CO2. Appreciate the importance of logistics in integrating different functional areas.
- CO3. Integrate operations with functional areas.
- CO4. Visualize the role of logistics and distribution as supply chain drivers
- CO5. Understand the importance of supplier and customer relationship management.

Unit I: Introduction to Supply Chain Management

Understanding the Supply Chain, Supply Chain Performance: Achieving Strategic Fit and Scope including: Customer and Supply Chain Uncertainty, Competitive and Supply Chain Strategies, Product development strategy, Marketing and sales strategy, Supply chain strategy, Scope of strategic fit; Supply Chain Drivers and Metrics.

Unit II: Logistics Management

Designing distribution networks and applications to e-Business, Network design in the Supply Chain, Designing global supply chain, network design, 3 PL, 4 PL, Transportation in supply chain management.

Unit III: Planning and managing inventories

Managing Economies of Scale in a Supply Chain: Cycle Inventory, Managing Uncertainty in a Supply Chain: Safety Inventory, Determining the Optimal Level of Product Availability. Demand Forecasting in a Supply Chain, Aggregate Planning in a Supply Chain, Sales and Operations Planning: Planning Supply and Demand in a Supply Chain, Coordination in a Supply Chain. E- Procurement, Global alliances.

Unit IV: Managing Cross-Functional Drivers in a Supply Chain

Importance of sourcing decisions in Supply Chain Management, Price and Revenue management, role of Information Technology in a Supply Chain, Sustainability and the Supply Chain. Customer Relationship management.

Unit V: Logistics and supply chain relationships

Identifying logistics performance indicators- channel structure- economics of distribution- channel relationships- logistics service alliance. Managing global logistics and global supply chains: Logistics in a global economy- Views of global logistics- global operating levels interlinked global economy. Global supply chain, Supply chain management in Global environment Global strategy- Global purchasing- Global logistics- Global alliances- Issues and Challenges in global supply chain management.

TEXT BOOK(S)

1. Sunil Chopra, Peter Meindl, D.V Kalra, Supply Chain Management 6/e, Pearson
2. Donald J. Bowersox and David J. Closs, Logistics Management: The Integrated Supply Chain Process, TMH, 2006.
3. Sridhara Bhat: Logistics and Supply Chain Management, EXCEL, 2009

REFERENCE BOOK(S)

1. The Toyota Way Paperback by Jeffrey Liker

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16EE3233 – ENERGY CONSERVATION AND MANAGEMENT
(OPEN ELECTIVE - II)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to

1. Understand different basic terms related to Indian Energy Scenario and Energy Conservation Act.
2. Understand the principles of energy conservation, audit and management.
3. Understand energy conservation in different mechanical utilities.
4. Understand efficient heat and electricity utilization, saving and recovery in different thermal and electrical system.
5. Understand different basic terms related to Energy economy, Financial Management and to understand the role of Energy Service Companies.

Course Outcomes:

On completion of this course, student would be able to

- CO1. Perform energy accounting and balancing.
- CO2. Prepare energy audit report for different energy conservation instances.
- CO3. Suggest energy saving methodologies.
- CO4. Evaluate the energy saving and conservation in different mechanical utilities.
- CO5. Evaluate the energy saving and conservation in different electrical utilities.

UNIT – I

Energy Scenario, Conservation Act and related policies

Classification of Energy, Indian energy scenario, Sectorial energy consumption (domestic, industrial and other sectors), energy needs of growing economy, energy intensity, long term energy scenario, energy pricing, energy security, energy conservation and its importance, energy strategy for the future. Energy conservation Act 2001 and its features, notifications under the Act, Schemes of Bureau of Energy Efficiency (BEE) including Designated consumers, State Designated Agencies, Electricity Act 2003, Integrated energy policy, National action plan on climate change, ECBC code for Building Construction.

UNIT – II

Energy Management and Audit

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting- Energy manger, Qualities and functions, language, Questionnaire – check list for top management. Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, Bench marking,

energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering.

UNIT – III

Energy Efficient systems-I

Energy efficient motors, factors affecting efficiency, loss distribution , constructional details , characteristics - variable speed , variable duty cycle systems, RMS hp- voltage variation-voltage unbalance- over motoring- motor energy audit.

Power Factor Improvement, Lighting and Energy Instruments

Power factor – methods of improvement, location of capacitors, power factor with non-linear loads, effect of harmonics on power factor, power factor motor controllers - Good lighting system design and practice, lighting control, lighting energy audit - Energy Instruments- wattmeter, data loggers, thermocouples, pyrometers, lux meters, tongue testers, application of PLC's.

UNIT – IV

Energy Efficient systems-II

Thermal Utilities and systems: Boilers -Types, combustion in boilers, performances evaluation, analysis of losses, feed water treatment, blow down, energy conservation opportunities. Boiler efficiency calculation, evaporation ratio and efficiency for coal, oil and gas, Soot blowing and soot deposit reduction.

Heat Exchangers: Types, networking, pinch analysis, multiple effect evaporators, condensers, distillation column, etc.

Waste Heat Recovery: Classification, advantages and applications, commercially viable waste heat recovery devices, saving potential.

Cogeneration: Definition, need, application, advantages, classification, saving potentials, Heat balance, steam turbine efficiency, tri-generation, micro turbine.

UNIT – V

Energy Economics

Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing, role of Energy Service Companies (ESCOs), Investment-need, appraisal and criteria, financial analysis techniques simple payback period, return on investment, net present value, internal rate of return, cash flows, risk and sensitivity analysis; financing options, energy performance contracts.

TEXT BOOK(S)

1. Energy Manager Training Manual (4 Volumes) available at www.energymanagertraining.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.

REFERENCE BOOK(S)

1. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Publ, Washington, 1988.
2. Callaghn, P.W. "Design and Management for Energy Conservation", Pergamon Press, Oxford, 1981.
3. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982.
4. Turner. W.C., "Energy Management Hand book", Wiley, New York, 1982.
5. Murphy. W.R. and G. Mc KAY, "Energy Management", Butterworths, London 1987.
6. Energy Conservation Guidebook, Dale R Patrick, Stephen W Fardo, 2nd Edition, CRC Press
7. Handbook of Energy Audits, Albert Thumann, 6th Edition, The Fairmont Press
8. Bureau of Energy Efficiency Reference book: No.1, 2, 3 4
9. Energy Management Handbook, W.C. Turner, John Wiley and Sons, A Wiley Inter-science publication
10. Carbon Capture and Sequestration: Integrating Technology, Monitoring, and Regulation edited by E J Wilson and D Gerard, Blackwell Publishing
11. Heating and Cooling of Buildings - Design for Efficiency, J. Krieder and A. Rabl, McGraw Hill Publication, 1994.

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16EC3234 – BASICS OF COMMUNICATION SYSTEMS
(OPEN ELECTIVE - II)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Note: Only Block Diagram Approach with Qualitative Treatment of the topics is required. Detailed mathematical treatment is not required.

Course Objectives:

1. Introduce the students to modulation and various analog and digital modulation schemes.
2. They can have a broad understanding of satellite, optical, cellular, mobile, wireless and telecom concepts.

Course Outcomes:

After Completion of this course, the students would be able to:

- CO1. Distinguish various types of modulations.
- CO2. Explain different communication modules and their implementation.
- CO3. Distinguish various wireless and cellular, mobile and telephone communication systems.

UNIT I:

Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

UNIT II:

Simple description on Modulation: Analog Modulation-AM, FM, Pulse Modulation-PAM, PWM, AM Radio, FM Radio, Transmitters and Receivers.

UNIT III:

Telecommunication Systems: Telephones, Telephone system, Paging systems, Internet Telephony.

Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

UNIT IV:

Satellite Communication: Satellite Orbits, Satellite communication systems, Satellite subsystems, Ground Stations, Satellite Applications, Global Positioning systems.

Optical Communication: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

UNIT V:

Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.

Wireless Technologies: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

TEXT BOOK(S)

1. Principles of Electronic Communication Systems, Louis E. Frenzel, 3e, McGraw Hill publications, 2008.
2. Kennedy, Davis, Electronic Communications systems, 4e, TMH, 1999

REFERENCE BOOK(S)

1. Tarmo Anttalainen, Introduction to Telecommunications Network Engineering, Artech House Telecommunications Library.
2. Theodore Rappaport, Wireless Communications-Principles and practice, Prentice Hall, 2002.
3. Roger L. Freeman, Fundamentals of Telecommunications, 2e, Wiley publications.
4. Wayne Tomasi, Introduction to data communications and networking, Pearson Education, 2005.

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16ME3235 – MANUFACTURING PROCESSES
 (OPEN ELECTIVE - II)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

1. Understand about sand casting and metal casting techniques.
2. Impart the knowledge of various welding processes.
3. Understand about the importance rolling, forging and sheet metal operations.
4. Understand about the processing of plastics.

Course Outcomes:

- CO1. Analyze and select the suitable casting technique for making the components.
- CO2. Differentiate the different types of welding processes are needed for various materials and importance of welding
- CO3. Recognize and adopt the methods involved in forming processes, sheet metal operations, rolling, forging etc.,
- CO4. Perform the methods involved in press work
- CO5. Know the various manufacturing methods in processing of plastics.

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.

UNIT – II: 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 – III: Forming: Hot working, cold working, strain hardening, recovery, recrystallization 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 – IV: 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

UNIT – V: 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 BOOK(S)

1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOK(S)

1. Production Technology / R.K. Jain
2. Metal Casting / T.V Ramana Rao / New Age
3. Principles of Metal Castings / Rosenthal.
4. Welding Process / Parmar /
5. Production Technology /Sarma P C /
6. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.

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16CE3236 – BUILDING TECHNOLOGY
(OPEN ELECTIVE - II)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to

1. Study the basic building materials, properties and their applications.
2. Grasp the knowledge of planning of buildings.
3. Understand the concepts of fire safety, ventilation and plumbing services provided for a building.

Course Outcomes:

At the end of the course, student would be able to

- CO1. Explain characteristics of building materials.
- CO2. Apply basic principles to develop stable and sustainable buildings.
- CO3. Explain the principles of planning of building including building bye-laws.
- CO4. Identify different materials, quality and methods of fabrication and construction.
- CO5. Adopt standard building provisions for natural ventilation and lighting.
- CO6. Explain principles of acoustics in building and plumbing.

UNIT – I

Stones: Uses of stones as building materials, Characteristics of good building stones. Types of stones and their significance.

Bricks: Characteristics of good building bricks. Types of bricks and their significance.

Cement and Concrete: Ingredients of cement – Types of cement, properties and uses of cement. Overview on concrete.

UNIT – II

Building: Basic definitions, Types, components, economy and design, principles of planning of buildings and their importance, building bye-laws.

Ventilation: Definitions and importance of circulation; Lighting and ventilation; how to consider these aspects during planning of building.

UNIT – III

Repairs in Buildings: Inspection, control measures and precautions for various construction defects, General principles of design of openings, and various types of fire protection measures to be considered while planning a building.

Vertical transportation in buildings: Types of vertical transportation, Stairs, different forms of stairs, planning of stair cases, other modes of vertical transportation – lifts, ramps, escalators.

UNIT – IV

Prefabrication systems: Prefabrication systems in residential buildings – walls, openings, cupboards, shelves, etc., planning and modules and sizes of components in prefabrication.

Air conditioning: Process and classification of air conditioning, Dehumidification. Systems of air conditioning, ventilation, functional requirements of ventilation.

UNIT – V

Acoustics: Acoustics, effect of noise, properties of noise and its measurements, Principles of acoustics of building. Sound insulation – Importance and measures.

Plumbing services: Water supply system, maintenance of building pipe line, Sanitary fittings, principles governing design of building drainage.

TEXT BOOK(S)

1. Building Materials, P.C. Varghese, Prentice Hal India Learning Pvt. Ltd., 2015.
2. Building Construction, B.C.Punmia, Er. Ashok Kumar Jain and Dr. Arun Kumar Jain, Laxmi Publications, 2016.

REFERENCE BOOK(S)

1. Building Materials, S.K. Duggal, New Age, 2016.
2. Building Materials, S.S. Bhavikatti, Vikas Publishers, 2016.
3. Engineering Materials and Building Construction, Rangwala, Charotar Publishing House, 2015.
4. A Text book of Building Construction, Arora and Bindra, Dhanpat Rai Publications, 2014.

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16MB3241 – BANKING AND INSURANCE
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop the ability to

1. Learn the importance of banking business and its functions.
2. Understand the services in banking sector.
3. Examine the importance of RBI and its significance.
4. Understand the insurance sector.
5. Identify regulatory framework of insurance sector.

Course Outcomes (COs):

At the end of the course, student would be able to:

- CO1. Acquire the knowledge of banking system.
- CO2. Acknowledge banking services and types of banks.
- CO3. Absorb regulation pattern on banking sector.
- CO4. Identify the need of insurance sector and its significance.
- CO5. Acknowledge IRDA and other insurance patterns in India.

UNIT-I

Introduction to banking business: concept and history of banking system in India, banking structure – types of accounts, advances and deposit system in India-cheque process and clearing system.

UNIT-II

Card System and classification of banks: -Types of cards and its importance (Debit, credit, smart-card) net banking, mobile banking , KYC system, Nationalization of banks- commercial, private, public and foreign banks- regional rural banks and local bankers- money lenders and pawn brokers.

UNIT-III

Reserve Bank of India Act 1934: Establishment of RBI Act and Banking Regulation Act 1949- features-functions- Mint (coin printing) -money control, deficiencies in Indian banking system- problem and challenges, Non-Performing Assets (NPA's).

UNIT-IV

Introduction to Insurance sector: concept and nature of insurance- principles of insurance- new insurance products, bancassurance. Types of plans pricing and underwriting documentation. Channels of distribution- policy servicing and settlement of clients.

UNIT-V

Insurance Regulatory Development Authority 1999: History –features- importance of IRDA- general insurance Act 1972- feature and functions– LIC Act 1956, features and functions. Non life insurance and its kinds – difference between general insurance and life insurance.

TEXT BOOK(S)

1. Vijayragavan Iyengar: Introduction to banking -Excel publications.
2. S.Arjunatesan and T.R. Vishwanthan: Risk Management and Insurance-Macmillan
3. Hals.Scott: Capital Adequacy beyond Basel banking securities and insurance -Oxford

REFERENCE BOOK(S)

1. Mishra, M.N., Insurance principle and practice, Sultan Chand &sons, New Delhi
2. VarshneyP.N.Banking law and Practice, Sultan Chand &sons, New Delhi
3. Reddy K S and Rao R.N: Banking and Insurance Paramount Publisher 2013.
4. George E.Rejda: Principles of risk Management & Insurance 9/e, Pearson Education.

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16EE3243 – MICRO-ELECTRO-MECHANICAL SYSTEMS
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives

Develop ability to

1. Understand semiconductors and solid mechanics used to fabricate MEMS devices.
2. Understand basics of Micro fabrication techniques.
3. Understand various sensors and actuators
4. Understand different materials used for MEMS
5. Understand applications of MEMS to disciplines beyond Electrical and Mechanical engineering.

Course Outcomes (COs)

After completion of the course, student would be able to

- CO1. Identify different types of semiconductor and solid mechanic materials that are used to fabricate MEMS devices.
- CO2. Apply basic science, circuit theory, Electro-magnetic field theory, control theory in Micro fabrication techniques
- CO3. Distinguish between different sensors and actuators
- CO4. Distinguish between various processes involved in Micro machining
- CO5. Apply the knowledge of MEMs to other advanced applications such as polymer and optical MEMs

UNIT-I

Basics: Intrinsic Characteristics of MEMS, Energy Domains and Transducers, Sensors and Actuators, Introduction to Micro fabrication, Silicon based MEMS processes, New Materials, Review of Electrical and Mechanical concepts in MEMS, Semiconductor devices, Stress and strain analysis, Flexural beam bending, Torsional deflection

UNIT-II

Sensors and Actuators-I:Electrostatic sensors, Parallel plate capacitors, Applications, Interdigitated Finger capacitor, Comb drive devices, Micro Grippers, Micro Motors, Thermal Sensing and Actuation , Thermal expansion, Thermal couples, Thermal resistors, Thermal Bimorph, Applications, Magnetic Actuators, Micro-magnetic components, Actuation using Shape Memory Alloys

UNIT-III

Sensors and Actuators-I: Piezoresistive sensors, Piezoresistive sensor materials, Stress analysis of mechanical elements, Applications to Inertia, Pressure, Tactile and Flow sensors, Piezoelectric sensors and actuators, piezoelectric effects, piezoelectric materials, Applications to Inertia, Acoustic, Tactile and Flow sensors.

UNIT –IV

Micromachining Silicon Anisotropic Etching, Anisotropic Wet Etching, Dry Etching of Silicon, Plasma Etching, Deep Reaction Ion Etching (DRIE), Isotropic Wet Etching, Gas Phase Etchants, Case studies, Basic surface micro machining processes, Structural and Sacrificial Materials, Acceleration of sacrificial Etch, Striction and Antistriction methods

UNIT –V

Polymer and Optical MEMS Polymers in MEMS, Polimide, SU-8, Liquid Crystal Polymer (LCP), PDMS, PMMA, Parylene, Fluorocarbon, Application to Acceleration, Pressure, Flow and Tactile sensors, Optical MEMS, Lenses and Mirrors, Actuators for Active Optical MEMS.

TEXT BOOK(S)

1. Chang Liu, “Foundations of MEMS”, Pearson Education Inc., 2006.
2. Stephen D Senturia, “Microsystem Design”, Springer Publication, 2000.
3. Tai Ran Hsu, “MEMS & Micro systems Design and Manufacture” Tata McGraw Hill, New Delhi, 2002.

REFERENCE BOOK(S)

1. Nadim Maluf, “ An Introduction to Micro Electro Mechanical System Design”, Artech House, 2000.
2. Mohamed Gad-el-Hak, editor, “ The MEMS Handbook”, CRC press Boca Raton, 2000
3. Julian w. Gardner, Vijay K. Varadan, Osama O. Awadelkarim, “Micro Sensors MEMS and Smart Devices”, John Wiley & Son LTD, 2002
4. James J. Allen, “Micro Electro Mechanical System Design”, CRC Press Publisher, 2010
5. Thomas M. Adams and Richard A. Layton, “Introduction MEMS, Fabrication and Application,” Springer 2012.

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16EC3244 – PRINCIPLES OF WIRELESS COMMUNICATION SYSTEMS
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Note: No detailed mathematical treatment is required.

Course Objectives

1. To discuss the fundamentals of cellular mobile wireless networks.
2. To provide an overview of various approaches to communication networks.
3. To study the numerous different-generation technologies with their individual pros and cons.
4. To discuss about the principles of operation of the different access technologies like FDMA, TDMA, SDMA and CDMA and their pros and cons.

Course Outcomes(COs)

After completion of this course, students would be able to:

- CO1. Explain different generations of Cell phone technology
- CO2. Explain different cellular, communication networks and different access techniques
- CO3. Distinguish between different personal communication services
- CO4. Explain the development of Wireless technologies beyond 2 G
- CO5. Explain mobile data services and short range networks.

UNIT I - TRANSMISSION FUNDAMENTALS

Cell phone Generations: 1G, 2G, 2.5G, 3G & 4G

Transmission Fundamentals: Time domain & Frequency domain concepts, Radio, Analog Vs Digital, channel capacity, transmission media, carrier-based signaling, spread-spectrum signaling.

UNIT II - NETWORK CONCEPTS

Communication Networks: LANs, MANs, WANs, circuit switching, packet switching, ATM

Cellular Networks: Cells, duplexing, multiplexing, voice coding

Multiple Access Techniques: FDMA, TDMA, SDMA, CDMA, spectral efficiency.

UNIT III - PERSONAL COMMUNICATION SERVICES

GSM, HSCSD, GPRS, D-AMPS, CDMA One, CDMA Two, Packet Data Systems.

UNIT IV - 3G & BEYOND

IMT-2000, W-CDMA, CDMA 2000, EDGE, Wi-Fi, WiMAX, OFDM.

UNIT V - MOBILE DATA SERVICES & SHORT-RANGE NETWORKS

Mobile Data Services: Messaging, wireless web, WAP, site design

Short-Range Wireless Networks: Unlicensed spectrum, WLANs, cordless telephony, IrDA, Bluetooth

Smart Phones: Future phones, mobile OSs, smart phone applications.

TEXT BOOK(S)

1. Andy Dornan, “The essential guide to wireless communications applications: from cellular systems to Wi-Fi”, 2nd Edition, Prentice Hall, 2002.
2. Misra, “Wireless Communications and Networks: 3G & Beyond”, Tata McGraw-Hill, 2009.

REFERENCE BOOK(S)

1. Theodore S. Rappaport, “Wireless Communications: Principles and Practice”, 2nd Edition, Pearson Education, 2009.
2. William Stallings, “Wireless communications and networking”, Prentice Hall, 2002.

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16ME3245 – ASPECTS OF HEAT TRANSFER IN ELECTRICALLY CONTROLLED UNITS
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

1. To apply the Energy conservation principles to electronic devices.
2. To apply the conduction, convection and radiation principles to electronic devices.
3. To apply the Refrigeration and Air conditioning concepts to industrial applications.
4. To perform the heat dissipation analysis on electronic devices.

Course Outcomes:

At the end of the course, the student will be able to

- CO1. Analyse conduction, convection and radiation heat transfer modes in electronically controlled units.
- CO2. Analyse heat generation in electronically controlled units.
- CO3. Analyse conduction and dissipation in electronically controlled units.
- CO4. Analyse the cooling load capacity in electronically controlled units.

UNIT-I: Conduction Heat transfer: Modes of heat transfer, Fourier's law of steady state heat conduction (one dimensional conduction), thermal conductivity and its unit, conduction through slab or plane wall, hollow cylinders and spheres conduction through composite walls and hollow cylinders and spheres with multi-layers, Convective heat transfer, Newton's law of cooling, electrical analogy and overall heat transfer coefficient, numerical problems

UNIT-II: Convective and radiation Heat transfer:

Dimensional analysis as a tool for experimental investigation, Buckingham pi theorem and method, radiation and radiation properties of surfaces, black body, emissive power, Stefan Boltzmann's law, emissivity, monochromatic emissive power and monochromatic emissivity, grey body, Kirchoff's law, Wien's displacement law, numerical problems.

UNIT – III: Cooling of Electronic equipment:

Introduction and history, manufacturing of electronic equipment, cooling load of electronic equipment, thermal environment, electronics cooling in different applications, conduction cooling, air cooling: natural convection and radiation, air cooling: forced convection, liquid cooling, immersion cooling, heat pipes, cooling of chips, PCBs, computers, logic chips etc.

UNIT – IV: Refrigeration and Air conditioning: Introduction to refrigeration, necessity and applications, unit of refrigeration and cop, Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

UNIT-V: Heat pipes: structure – operation - construction - thermal resistance- performance characteristics - effects of working fluid and operating temperature, wick - selection of material - pore size, applications.

TEXT BOOK(S)

1. Heat Transfer- A practical approach by Yunus A. Cengel, Tata Mc Graw-Hill Edition
2. Heat Transfer – A conceptual approach – P.K.Sarma&K.Rama Krishna/New age
3. A course in Refrigeration and Air conditioning – SC Arora and Domkundwar / Dhanpatrai

REFERENCE BOOK(S)

1. Fundamentals of Engineering, Heat and mass transfer – R.C. Sachdeva/New Age
2. Heat & mass Transfer – D.S.Kumar/S.K.Kataria & sons

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16CE3246 – GREEN BUILDINGS
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to

1. Impart knowledge on the sustainable construction strategies.
2. Understand the concepts of green buildings.
3. Know emerging building materials.
4. Understand LEED building assessment and certification process.

Course Outcomes:

At the end of the course, student would be able to

- CO1. Describe the need of green buildings for environmental sustainability.
- CO2. Select suitable sustainable planning and construction strategies.
- CO3. Determine the building rating systems and the process and implementation of green buildings.
- CO4. Describe emerging materials in the field of Civil Engineering construction.
- CO5. Explain the future scope of Green building technology in India.

UNIT – I

Sustainable Construction and Green Building Requirements: Ethics and sustainability – Increased CO₂ trade – Sustainable construction – Major environmental and resource concerns – Green building movement and obstacles – Green building requirements – Perceived use of green building – Relationship between comfort level and performance ability.

UNIT – II

Green Building Process and Assessment: Conventional versus green building delivery systems – Execution of green building process – Integrated design process – Ecological design – Merits and demerits – Historical perspective – Contemporary and future ecological designs – LEED building assessment standard – LEED certification process – International building assessment standards – Building rating system and its future – Case study of a green building.

UNIT – III

Sustainable landscaping, Energy and Atmosphere: Land and landscape approaches for green buildings – Sustainable landscapes – Enhancing ecosystems – Storm water management – Heat island mitigation – Building energy issues – Building energy design strategies – Building envelope – Active mechanical systems – Electrical power systems – Innovative energy optimization strategies – Smart buildings and energy management systems – Ozone depleting chemicals in HVAC & R and fire suppression.

UNIT – IV

Building Hydrologic System and Material Loops: Energy policy act of 1992 – High performance building hydrologic strategy - High performance building water supply strategy - High performance building wastewater strategy – Landscaping water efficiency – Green building materials issues and priorities – Difference between green building buildings and green building materials – LCA of building materials and products – Emerging construction materials and products – Design for deconstruction and disassembly – Closing material loops in practice.

UNIT – V

Green Building Implementation: Site protection planning – Health and safety planning – Construction and demolition – Waste management – Reducing the footprint of construction operations – Essentials of building commissioning – Costs and benefits of building commissioning – Case study for high performance green buildings – The economics of green buildings – Quantifying green building costs – Future directions in green buildings.

TEXT BOOK(S)

1. Sustainable Construction: Green Building Design and Delivery, Charles.J.Kibert, John Wiley & Sons, New Jersey, 2008.
2. Green Building: Guidebook for Sustainable Architecture, M.Bauer, P. Mosle and M. Schwarz, Springer, Verlag Berlin Heidelberg, 2010.

REFERENCE BOOK(S)

1. Marketing Green Building Services: Strategies for success, Jerry Yudelson, Elsevier, 2008.
2. Marketing Green Buildings: Guide for Engineering, Construction and Architecture, Jerry Yudelson, The Fairmont Press INC., 2006.
3. Green by Design: Creating a Home for Sustainable Living, Angela M. Dean, Gibbs Smith Publication, 2003.
4. Indian Green Building Council Website: <https://igbc.in/igbc/>
5. http://cpwd.gov.in/Publication/Guideleines_Sustainable_Habitat.pdf
6. For case studies: <http://www.nmsarchitects.com/>

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16EN3247 – FOREIGN LANGUAGE - FRENCH
 (OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to:

1. Recognize and pronounce French alphabet.
2. Apply grammatical concepts in both oral and written communication.
3. Appreciate the culture of Francophone countries.
4. Read authentic texts

Course Outcomes:

At the end of the course, students would be able to:

- CO1. Demonstrate competence in basic vocabulary and grammar
- CO2. Understand the culture of Francophone countries
- CO3. Read with accurate pronunciation
- CO4. Understand short and simple oral and written messages

UNIT I:

Functional Aspects

Greetings, introductions, asking/giving information, pronunciation and Spellings of Francophonic names, family relations, professions, days of the week and months nationalities, languages, cardinal numbers and ordinal numbers, descriptions

Grammatical Aspects

Definite and Indefinite articles, numbers, adjectives, interrogation, negation, conjugation of the verbs in the present tense.

UNIT II:

Functional Aspects

Intonation, vowels, orals and nasals, Inviting and responding to invitations, describing people

Grammatical Aspects

Past Tense- verbs used

UNIT III:

Functional Aspects

Polite expressions-expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Describing places, professions, dress and monuments of Paris and other public places.

Grammatical Aspects:

Regular and irregular verbs, conjugations, writing simple sentences using the verbs in present and past tense

UNIT IV:

Functional Aspects

Semi vowels, consonant sounds, Invitations; accepting and refusing invitations; fixing appointments; Inviting through telephone and e-mail,

Grammatical Aspects:

Partitif articles, adjectives :demonstrative and possessive, prépositions and adverbs of quantity and quality

UNIT V:

Functional Aspects

Asking for information in a restaurant, Ordering food in a restaurant, appreciating, describing leisure of Francophone cultures

Grammatical Aspects:

Future Tense –verbs used

TEXT BOOK(S)

1. Dominique, Philippe, *et al.* 1999. *Le Nouveau sans Frontières -I* (Including Exercise Book). Paris: Clé, International (Indian Edition).

REFERENCE BOOK(S)

1. Alter Ego I & II. Published by Hachette
2. Connexion I & II. Published by Didier
3. Echo I & II. Clé International publishers
4. Latitude I & II. Published by Didier

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16EN3248 – FOREIGN LANGUAGE - SPANISH
 (OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to:

1. Identify Spanish sounds and participate in social interactions
2. Read authentic texts in Spanish
3. Write small and simple messages in Spanish
4. Understand the nuances of Hispanic culture

Course Outcomes:

At the end of the course the students will be able to:

- CO1. Apply basic vocabulary and grammatical structures in Spanish.
- CO2. Demonstrate competence in functional and grammatical structures of the language.
- CO3. Read with accurate pronunciation
- CO4. Participate in simple conversations based on everyday situations

UNIT-I

Functional Aspects

Greetings, introductions, asking/giving information, pronunciation and Spellings- Hispanic names, family relations, professions, days of the week and months nationalities, languages.

Grammatical Aspects

Basic structure of spelling and pronunciation; present indicative of the regular verbs ('ar/er/ir) and 'querer'; subject pronouns; interrogative sentences with 'Por que', and 'quien'; causal phrase with 'porque'; 'ser' and 'estar'; negative sentences; adjectives of nationality.

UNIT-II

Functional Aspects

Ordinal and cardinal numbers: quantities; shopping, describing things(material, colour, size etc) and people(food habits, dress etc)

Grammatical Aspects

Gender and number of nouns and adjectives; the verb 'tener'; interrogative Sentences; demonstrative and qualitative adjectives.

UNIT-III

Functional Aspects

Polite expressions-expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Grammatical Aspects

Qualitative adjectives, forms and usage, gradations, superlative adjectives; exclamatory sentences; the verb 'gustar, forms and syntax; personal Pronouns; definite and indefinite pronouns, direct object pronouns, Prepositions; verbs like 'parecer' and 'encontrar and preferir, their form and syntax, interrogative pronouns.

UNIT-IV

Functional Aspects

Invitations; accepting and refusing invitations; fixing an appointments; Inviting through telephone and e-mail or telephone

Grammatical Aspects

Present indicative of irregular verbs, expressions with 'tener' and 'estar'; Prepositional pronouns; interrogative sentences.

UNIT-V

Functional Aspects

Expression of time; Making comparisons- Indian and Hispanic. Describing events- festivals- Indian and Hispanic.

Grammatical Aspects

Time with 'ser', expressions relating to festivals.

TEXT BOOK(S)

1. NOUVEAU ELE INICIAL 1

REFERENCE BOOK(S)

1. Espanol sin Fronteras, A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997
2. Entre Nosotros A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997

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16EN3249 – FOREIGN LANGUAGE - GERMAN
(OPEN ELECTIVE - III)

III Year.B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives:

Develop ability to:

1. Understand and participate in social interactions in everyday situations
2. Write simple messages in German on topics related to personal interest and everyday life.
3. Read authentic texts in German.
4. demonstrate insight into significant cultural products and historical events in German

Course Outcomes:

At the end of the course the students will be able to:

- CO1. Converse in day to day situations
- CO2. Demonstrate proficiency in writing
- CO3. Read with accurate pronunciation
- CO4. Display greater insight of German culture

Unit –I

Functional Aspects

Greetings, introductions, asking/giving information, pronunciation and Spellings- German names, family relations, professions, days of the week and months nationalities, languages.

Grammatical Aspects

Definite and Indefinite articles(including negation)

Noun: Gender and Plural forms, cases (nominative, accusative, dative & genitive)

Unit –II

Functional Aspects

Ordinal and cardinal numbers: quantities; shopping, describing things(material, colour, size etc) and people(food habits, dress etc)

Grammatical Aspects

Verb: Strong and Weak verbs, Verbs with separable and inseparable prefixes, modal verbs, position of verb in the main and subordinate clauses, auxiliary verbs, reflexive verbs in accusative and dative cases, imperative constructions

Unit –III

Functional Aspects

Polite expressions-expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Grammatical Aspects

Pronouns: personal, possessive, reflexive, interrogative and demonstrative

Prepositions: with the accusative, dative and with both these cases

Unit –IV

Functional Aspects

Invitations; accepting and refusing invitations; fixing an appointments; Inviting through telephone and e-mail or telephone

Grammatical Aspects

Adjective: declension with the

- Indefinite article
- Definite article
- Without article
- With the indefinite pronoun

Degrees of comparison (also adverbs), ordinal numbers, adjectives as nouns

Conjunctions: subordinating and coordinating with respect to the position of the verb

Unit –V

Functional Aspects

Expression of time; Making comparisons- Indian and Hispanic. Describing events- festivals- Indian and German

Grammatical Aspects

Negation: of a sentence and words therein.

Sentence structure: general principles observed in German Language.

TEXT BOOK(S)

1. Hermann Funk, Christina Kuhn, Oliver Bayerlein., Studio d A 1.2005 Comelsen Verlag, Berlin.

REFERENCE BOOK(S)

1. Rosa –Marie Dallapiazza, Eduard von Jan, Till Schonherr,unter Mitarbeit von Jutta Orth-Chambah.
2. Tangram aktuell 1 –Lektion 1-4, Lektion 5 - 8
3. Max Hueber Verlag. Munchen. 2009

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16CS32L1-INFORMATION SECURITY AND SOFTWARE ENGINEERING LAB
(SOFT CORE – II LAB)

III Year.B.Tech. (CSE) – II Sem

L	T	P/D	C
-	-	3/-	2

INFORMATION SECURITY LAB

Course Objectives

Develop ability to

1. Understand the importance and application of information security aspects, namely, confidentiality, integrity, authentication and availability.
2. Understand cryptographic algorithms.
3. Understand the basic categories of threats to computers and networks.
4. Understand public-key cryptosystem.
5. Understand enhancements made to IPv4 by IPSec.
6. Understand intrusions and intrusion detections.
7. Understand key management in PGP.
8. Understand Web security and Firewalls.

Course Outcomes (COs)

At the end of the course students would be able to

- CO1. Explain information security aspects, namely, confidentiality, integrity, authentication and availability.
- CO2. Explain symmetric and asymmetric key cryptographic algorithms.
- CO3. Explain authentication algorithms, functions and services.
- CO4. Explain and apply authentication, email security, web security services and mechanisms.
- CO5. Distinguish and explain different protocols, namely, SSL, TLS vis-à-vis their applications.
- CO6. Explain security services and mechanisms.

PART I

- Task 1. Write a Java program to Implement Ceasar/ Substitution/ Hill cipher techniques.
- Task 2. Write a Java program Implementation of DES and AES algorithm Logic.
- Task 3. Write a Java program to Implement RSA algorithms.
- Task 4. Write a Java program to Implement Diffie-Hellman key exchange mechanism.
- Task 5. Write a Java program to implement Message Authentication Code using any cryptographic (VMAC/HMAC) function.
- Task 6. Implement secure hash algorithm for Data Integrity. Implement MD5 and SHA-1 algorithm, which accepts a string input and produce a fixed size number-128 bits for MD5; 160 bits for SHA-1, this number is a hash of the input. Show that a small change in the in the input results in a substantial change in the output.

- Task 7. Using any simulation tool: demonstrate packet filtering firewalls.
- Task 8. Develop a mechanism to setup (configure) a port scanner and identify the intrusion.
- Task 9. Implement the SIGNATURE SCHEME- Digital Signature Standard
- Task 10. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).

This lab session will cover data storage and access, bypassing filtered [blocked] ports, reviewing Internet activity, and the use of steganography. Open-source forensic tools will be introduced and demonstrated for each exercise.

The lab has been setup for all of the exercises and the required executables are accessible through linked short-cuts on the desktop of the administrator (no password needed to logon).

Part II: Equipment/Software Most of the tools used for this lab exercise is freely available for non-commercial testing purposes and opensource software, either freeware or shareware.

Hidden Files:

- Hex Workshop v4.23 hex editor (Shareware download from www.hexworkshop.com)
- MD5Hash (Freeware download from www.digitaldetective.co.uk/freetools/md5.asp)
- Text editor (Notepad is good enough)

Port Redirection:

- Quick 'n Easy FTP Server (Freeware download from <http://www.pablovandermeer.nl>)
- FPIPE (Freeware download from <http://www.foundstone.com>)
- FPORT (Freeware download from www.digitaldetective.co.uk/freetools/md5.asp)

IE Activity analysis:

- Pasco (Freeware download from <http://www.foundstone.com>)
- Galleta (Freeware download from <http://www.foundstone.com>)
- Internet Explorer cache file (index.dat)
- Internet Explorer cookie files

Steganography:

- JPHS (Jpeg Hide and Seek) v0.5 (Freeware download from www.stegoarchive.com)
- Text editor (i.e. Notepad)
- Image file in jpeg format

Part III: Exercises You can do the following exercises either in laboratory in the Windows 2000 Professional machines, or re-create the exercise environment in any other Windows 2000 environment of your choice.

Exercise 1: Port Redirection

Objective: The purpose of this lab is to demonstrate how an attacker could exploit a machine and obtain access to a server with a filtered port by piping another unfiltered port. Because of sophisticated Trojans, it could be hard for a virus detection program to detect the

problem. Because of that, a port scanner/listener must be used to determine if/what ports are actively carrying traffic.

Scenario: Imagine that an IT department has an FTP server on an IBM server that they use to share source code between other departments within the organization in various locations throughout the US on the same LAN/WAN. By default, the information security department blocks certain known ports from being exposed to the internet through a firewall. Some of these ports include the well known 21, 23, 80, 8080, etc.

A users logs onto this server with Windows 2000 through Windows Remote Desktop Connection and accidentally downloads a Trojan that is meant to get access to and FTP server. However, if port 21 is blocked through the Firewall, how could the attacker connect to the FTP server? There is a very simple technique known as port redirection. Port redirection is a sophisticated way of bypassing port filtering, firewalls, and IPSEC.

Steps:

- i. Login to a Windows machine in the lab.
 - Username: Administrator
 - Password: (no password)
- ii. Get the FTP server running
 - Double Click the link “Start FTP Server” to open the FTP Server configuration tool.
 - Click the START button on the top left of the FTP Server configuration panel.
- iii. Confirm that the FTP server is running on port 21.
 - Double Click the link “View Ports” to run a windows terminal showing the various ports being used.
 - Which port is the FTP Server running on? (.....)
 - Do not close the terminal. This terminal will be referred to later as “FPORT terminal.”
- iv. Redirect the network traffic on port 21 to port 30 (or any arbitrary port number).
 - Double Click on the link “Redirect FTP port to 30” to open a windows terminal.
 - Enter command: ipconfig
 - What is the IP address of the computer? (.....)
 - Enter command: fpipe -l 30 -s 30 -r 21 -v <ip-address>
 - Do not close the terminal. This terminal will be referred to later as “FPIPE terminal.”
 - Check the FPORT terminal by entering command: fport
 - What port is the executable “fpipe” running on? (.....)
- v. Start a ftp-client session and connect to the server (Assume that port 21 is blocked)
 - Click on Start in the Windows machine and then Run. Type cmd and Enter key. Now you have a new Windows terminal.
 - At the prompt enter command: ftp
 - If you are connected, check the FPIPE terminal. What is the response. (.....)
 - Enter command: open
 - At the “to” prompt, type: <ip-address> 30
 - At the “username” prompt, enter: anonymous
 - At the “password” prompt, enter: (no password, just press Enter)
 - Type command: dir
 - Check the FPIPE terminal. What is the response? (.....)

- vi. What sort of security problems can occur due to port redirection?
(.....)
(.....)
- vii. Can port redirection be used for any useful purpose?
(.....)
(.....)
- viii. Close all open windows.

Exercise 2: Hidden Data in Files

Objective: The purpose of this lab is to demonstrate the use of a hex editor and hash tool in computer forensics. This lab will also demonstrate how data can be modified within a file or hidden on a disk without the data being saved as a file.

Description: The lab will be using a hash value to find initial evidence of tampering within a file. A hex editor will be used to compare the two files to find the exact differences. Also, the hex editor should demonstrate that hidden data can be stored onto the storage device without actually saving as a file in the operating system. The idea is that there is lots of slack space (shown as dots using the hex editor tool) on the storage device that runs to the end of the sector that the file is saved in. This is the space on a disk that is unused when a file smaller than a sector is saved into that sector. This slack space can only be used if the file saved in that sector is made large enough to take up all of the space in the sector. A hex editor can be used to directly store data directly onto this slack space, as will be demonstrated in this exercise. The MD5 hashing tool uses an algorithm to derive a hash value for any given file. Each file has a unique hash value. Therefore slight changes to a file can generate totally different hash values.

Steps:

- i. Login to a Windows machine in the lab.
Username: Administrator
Password: (no password)
 - ii. Open a Windows explorer and browse to c:\temp\forensicdata\modified and run the file spider.exe (spider solitaire). This is the modified file.
 - iii. Does the game of solitaire function as intended? (.....)
 - iv. Double click the link “MD5Hash” to open a MD5 hashing tool.
 - v. From the Windows explorer drag the file “spider.exe” in folder c:\temp\forensicdata\modified to the MD4Hash window.
 - vi. What is the hash value displayed for the modified file?
(.....)
 - vii. Similarly what is the hash value for the original file “spider.exe” in folder c:\temp\forensicdata\original (.....)
 - viii. Close all windows.
- NOTE: Hex-editors and other editors that can write directly to a storage device must be used with extreme caution.
- ix. Open Hex Workshop by double clicking the link “Hex Workshop.”

- x. Click the Compare button on the toolbar (or go to the Tools menu and click Compare > Compare Files)
- xi. Click the button (with ellipses) to the right of the Source box and browse to c:\temp\forensic data\original\spider.exe
- xii. Click the button (with ellipses) to the right of the Target box and browse to c:\temp\forensic data\modified\spider.exe
- xiii. Make sure the Resynchronizing Compare radio button option is selected
- xiv. Click Ok to begin comparing the two files.
- xv. On the toolbar, click the Next Difference button (next to the Compare button on the toolbar or go to the Tools menu and click Compare > Next Difference) This will highlight any difference in the file for you. The top window will show the original file and the bottom window shows the modified file. You should see the text that was inserted into this file using a hex editor. This could have been malicious code that was executed when you first opened the file.
- xvi. Close all windows.

Exercise 3: Steganography

Objective The purpose of this lab will be to demonstrate the typical use of steganography. This lab will require the user to use a steganography tool to store and retrieve hidden data from a jpeg file.

Description Steganography is the mechanism to hide relatively small amount of data in other data files that are significantly larger. A simple example of steganography may be the storage of text files in bit-mapped images. Each pixel in a bitmapped image is defined by three bytes representing red, blue and green colors. Each byte is made up of eight bits and represents a shade red, blue or green. Random changes to the least priority bit generally produce only slight changes of shade, typically undistinguishable by the normal human eye as shown by the figure (the arrow shows the changed least significant bit.

kilobyte, the number of bits that may be changed is given by the total number of least significant bits available (one bit from each byte) divided by the number of bits required for one text character (we consider 8 bits). Therefore, 1 kilobyte of image file can accommodate $1024/8$ bits = 128 bytes. Hence, a text file of 128 bytes could be hidden in a bit-mapped image of 1 kilobyte.

Steps i. Login to a Windows machine in the lab. Username: Administrator Password: (no password) ii. Double click the “Steganography” link on the desktop. iii. Click on Open Jpeg on the menu bar and open a file in the My Pictures folder in My Documents. iv. Create any text file “hello.txt” with some text in the My Pictures folder. v. Click on Hide on the menu bar and give a password “hide” and reenter as required. Then point to the file “hello.txt” that you intend to hide. And lastly, save the image as “hidden.jpg” in the My Pictures folder. vi. Close all open files. The message text in “hello.txt” has been hidden in the jpeg image file “hidden.jpg” vii. Now to retrieve the hidden message, open the file “hidden.jpg” and give the password as necessary. viii. Click on Seek on the menu bar ix. Save the file as hidden “retrieved.txt” into the My Pictures folder; replace if necessary. x. Is the message the same in “hello.txt” and “retrieved.txt” ? xi. What other types files be used to hide text data using stenography? (.....)

xii. What are possibly some useful uses of stenography? (.....)
(.....)

xiii. Close all windows.

Exercise 4: Viewing Microsoft Internet Explorer Cache

Objective The objective of this exercise is to show how the encrypted Internet Explorer cache may be viewed using some freely available tools.

Description Pasco and Galleta are to DOS-based executables that can decrypt the Internet Explorer cache. The use of these tools are demonstrated in this exercise.

Steps i. Login to a Windows machine in the lab. Username: Administrator Password: (no password)

ii. Double click the “Internet Explo...” link on the desktop to open a windows terminal. iii. From the parent folder, open the Internet Explorer cache called “index.dat” using a text editor. At the prompt, enter: notepad data\index.dat.

What is the content like? (.....)

Close notepad window.

iv. Use pasco to decrypt the Internet explorer cache called “index.dat” At the prompt, enter: pasco\pasco data\index.dat > index.txt At the prompt, enter: notepad index.txt

What is the content like? (.....)

Close notepad window.

v. Use galleta to decrypt cookies. At the prompt, enter: galleta.exe data\bassel@advertising[2].txt

What is the result?

(.....)

(.....)

vi. How can Pasco and Galleta be useful?

(.....)

(.....)

Installation Instruction

Install Hex Workshop (run “hw32v423.exe”) a. Download the file “hw32v4423.exe” from the website: <http://www.bpssoft.com/downloads/index.html> b. Create shortcut to desktop (prompts during install)

2. Install MD5Hash (copy folder from CD into c:\forensictools, run setup.exe)

a. Download the zip file “hash.zip” and extract files into a temporary directory.

b. Run the “setup.exe” file to install the MD5Hash executable. c. Create a shortcut to desktop. 3.

Create the following directory structure: a. c:\forensictools\PortRedirection b.

c:\forensictools\Pasco&Galleta c. c:\forensictools\Pasco&Galleta\data d.

c:\temp\forensicdata\original e. c:\temp\forensicdata\modified

4. Arrange data for Hex Workshop

Copy sol.exe (original copy) from the c:\%SystemRoot%\System32\sol.exe into

“c:\temp\forensic data\original as spider.exe” b. Download “spider.zip” and extract spider.exe (modified copy) into “c:\temp\forensic data\modified”

5. Download the following tools for Port Redirection exercise: Quick 'n Easy FTP Server (Freeware download from <http://www.pablosoftwaresolutions.com/html/downloads.html>)

FPIPE zipped file (Freeware download from

http://www.foundstone.com/resources/freetooldownload.htm?file=fpipe2_1.zip)

FPORT (Freeware download from

<http://www.foundstone.com/resources/freetooldownload.htm?file=fport.zip>)

6. Install tools for Port Redirection exercise in the folder “c:\forensictools\PortRedirection”: a.

Copy the executable “FTPServer.exe” file to the folder.

b. Copy the executables “fpipe.exe” and “fport.exe” to the folder. c. Create shortcuts to desktop.

7. Download the following tools for Internet Explorer Cache exercise:
 - a. Download the zip file for “pasco.exe” from <http://www.foundstone.com/resources/freetooldownload.htm?file=pasco.zip>
 - b. Download the zip file for “galleta.exe” from <http://www.foundstone.com/resources/freetooldownload.htm?file=galleta.zip>
8. Install tools and data for Port Redirection exercise to the folder “c:\forensictools\Pasco&Galleta”.
 - a. Copy the executable “pasco.exe” file to the folder.
 - b. Copy the executable “galleta.exe” file to the folder.
 - c. Download the file “ieData.zip” from the site: <http://www.sis.pitt.edu/~lersais/download/IntroSec/lab2/ieData.zip> and extract contents into the folder “c:\forensictools\Pasco&Galleta\data”
 - d. Create shortcuts to desktop.
9. Install JPEG Hide and Seek tool for steganography.
 - a. Download the Steganography tool as zipped file “jphs_05.zip” from the website: <http://linux01.gwdg.de/%7Ealatham/stego.html> and install it.
 - b. Create shortcut to desktop.

SOFTWARE ENGINEERING LAB

Course Objectives

Develop ability to

1. Understand software development principles and reusable technology.
2. Use UML as the standard for software modeling.
3. Understanding the customer and the user.
4. Understand Risk management in all software engineering activities.

Course Outcomes

At the end of this course, student would be able to

- CO1. Differentiate the customer and the user.
 - CO2. Distinguish between various software development models.
 - CO3. Evaluation of alternatives in requirements and design.
 - CO4. Use UML for software modeling.
 - CO5. Communicating effectively using documentation.
 - CO6. Use Risk management in all software engineering activities.
1. Given a problem statement, analyse it using any one of the software process models of your choice for the ATM system project using waterfall process model.

ATM SYSTEM CASE STUDY

The ATM System is the project which is used to access their bank accounts in order to make cash withdrawals. Whenever the user need to make cash withdraws, they can enter their PIN number (personal identification number) and it will display the amount to be withdrawn in the form of 100's 500's and 1000's. Once their withdrawn was successful, the amount will be debited in their account. The ATM System project will be developing in VB.Net and back-end database as Microsoft-Access. VB.Net is the one of the powerful version of Framework and object oriented programming. Hence we use this software in our project.

The ATM will service one customer at a time. A customer will be required to enter ATM Card number, personal identification number (PIN) – both of which will be sent to the database for validation as part of each transaction. The customer will then be able to perform one or more transactions. Also customer must be able to make a balance inquiry of any account linked to the card. The ATM will communicate each transaction to the database and obtain verification that it was allowed by the database. In the case of a cash withdrawal, a second message will be sent after the transaction has been physically completed (cash dispensed or envelope accepted). If the database determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction, showing the date, time, machine location, type of transaction, account(s), amount, and ending and available balance(s) of the affected account (“to” account for transfers).

Adopt the following software development strategy

- Water fall model
- Iterative model
- Rapid-prototyping model
- Spiral model
- Unified Process

Software documentation Standard to follow:

- IEEE standard or DOD-2167A

Milestones in the project:

1. Problem Analysis and Project Planning

Thorough study of the problem – Identify project scope, Objectives, infrastructure, and plan for the project; Document it

2. Software Requirement Analysis

Describe the individual Phases/ modules of the project, Identify deliverables; Document it

3. Data Modeling

Use work products – use case diagram, data flow diagram, Flow chart

4. Software Development and Debugging

Choose programming language of your choice

5. Software Testing

Prepare test plan, perform validation testing, coverage analysis, test case prioritization.

NOTE :

- Each student can adopt different software development life cycle (such as Water fall model, iterative model, spiral model, RAD, prototyping model etc...) and programming language combination so that each student work in unique but still conform to over all deliverable.
- Teams to be formed containing 5 in each to make the software engineering activities effectively with good coordination.
- Any other systems like (Library Management system, hospital management system, course registration system, railway reservation system) can also be done.
- If the problem statement is not mentioned explicitly, first the problem statement can be written, then follow the same flow.

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16CS32L2-IMAGE PROCESSING AND SOFTWARE ENGINEERING LAB
(SOFT CORE – II LAB)

III Year.B.Tech. (CSE) – II Sem

L	T	P/D	C
-	-	3/-	2

IMAGE PROCESSING LAB

Course Objectives:

Develop ability to

1. Understand the fundamental steps in image processing and various components of image processing system.
2. Understand spatial and frequency domain filters for smoothing and sharpening operations on images.
3. Understand morphological operations, segmentation and edge detection on images.
4. Understand the need for and perform image compression.
5. Understand various concepts related to color image processing.
6. Identify the need for and perform object representation and description.
7. Identify the need for and perform image transformations.

Course Outcomes (COs):

After completion of the course, students would be able to

- CO1. Explain the fundamental steps in image processing and various components of image processing system.
- CO2. Apply spatial and frequency domain filters for smoothing and sharpening operations on images.
- CO3. Perform morphological operations, segmentation and edge detection on images.
- CO4. Explain the need for and perform image compression.
- CO5. Explain the various concepts related to color image processing.
- CO6. Explain the need for and perform object representation, description and image transformations.
 1. a. Digitize a continuous signal by sampling and quantization.
b. Generate histogram and implement histogram equalisation, histogram matching.
 2. Implement spatial and frequency domain smoothing and sharpening filters
 3. Implement erosion and dilation operations
 4. Implement edge detection operators
 5. Implement Lossless/Lossy image compressions
 6. Conversion between different colour models
 - a. RGB to HIS and HSI to RGB
 - b. HSI to YCbCr and YCbCr to HSI
 7. Implement following image transforms(both forward and inverse transforms)
 - a. Fourier
 - b. DFT

SOFTWARE ENGINEERING LAB

Course Objectives

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16EN32L1-ADVANCED ENGLISH COMMUNICATION SKILLS LAB

III Year.B.Tech. (CSE) – II Sem

L	T	P/D	C
-	-	3/-	2

Course objectives:

Develop ability to:

1. Improve the students' fluency in English, through a well developed vocabulary and enable them to listen to English spoken at normal conversational speed and respond appropriately in different socio-cultural and professional contexts.
2. Communicate their ideas relevantly and coherently in writing.
3. Prepare them for their placements.

Course outcomes:

At the end of the course, students would be able to:

- CO1. Accomplish fluency in English vocabulary and use it contextually.
- CO2. Develop academic and professional writing skills.
- CO3. Improve or enhance job prospects
- CO4. Inculcate employability skills.

S.NO		NAME OF THE EXERCISE
1.	Activities on Vocabulary Building.	Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations and usage of vocabulary.
2.	Activities on Fundamentals of Inter-personal Communication	Strategies for good Communication and focus on body language-Starting a Conversation-responding appropriately and relevantly- formal & informal conversation, Communication in different situations.
3.	Resilience and Personal Management	Managing stress, time, anger and other emotions, assertiveness and culture shock
4.	Activities on Group Discussion	Dynamics of Group Discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics of evaluation.

5.	Activities on Writing	Writing process, gather information, formatting, editing, types of essays, SOP. Portfolio writing- planning for writing- improving one's writing, brochures and newsletters.
6.	Activities on Interview Skills	Concept and process, Pre-interview planning, opening strategies, answering strategies, interview through Tele-conference & video-conference and Mock interviews, Videos of Mock Interviews.
ADDITIONAL EXERCISES		
1	Cross-Cultural Communication-Accepting and understanding various cultures.	
2	Attitude- towards work, what is a profession?, who is a professional?, what is professionalism? and positive thinking,	

BOOKS RECOMMENDED

1. *Technical communication* by Meenakshi Raman & Sangeetha Sharma, Oxford University Press, 2009.
2. *Advanced Communication Skills Laboratory Manual* by Sudha Rani, D,Pearson Education, 2011.
3. *Technical Communication* by Paul .V. Anderson. 2007. CENGAGE Learning Pvt Ltd., New Delhi.
4. *Business And Professional Communication by Keys for Work place Excellence* by Kelly M Quintanilla& Shawn T. Wahi . Sage South Asia Edition. Sage publication, 2011.
5. *The Basics of Communications: A Relational Perspective* by Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications, 2012.
6. *English Vocabulary in Use* series, Cambridge University Press 2008.
7. *Management Shapers Series* by Universities Press (India) Pvt Ltd., Himayath Nagar Hyderabad, 2008.
8. *Handbook for Technical Communication* by David A Mc Murrey & Jaoanne Buckely, 2012. CENGAGE learning.
9. *Communication Skills* by Leena Sen , PHI Learning pvt ltd, New Delhi 2009.
10. *Handbook for Technical Writing* by David A Mc Murrey & Joanne Buckely CENGAGE learning, 2008.
11. *Job hunting* by Colm Downes , Cambridge University Press, 2008.
12. *Master Public Speaking* by Anne Nicholls, JAICO Publishing House, 2006.
13. *English for Technical Communication for Engineering Students* by Aysha Viswamohan, Tata Mc Graw- Hill, 2009.
14. Books on TOEFL/ GRE/GMAT/CAT/ IELTS by Barron's / DELTA / Cambridge University Press.
15. *International English for Call Centers* by Barry Tomalin and Suhashini Thomas, Macmillanpublishers2009.