ACADEMIC REGULATIONS

COURSE STRUCTURE AND

DETAILED SYLLABUS

INFORMATION TECHNOLOGY

B.TECH 4 YEAR UG COURSE

(Applicable for the batches admitted from 2018-2019)

REGULATION: R18

(I, II, III & IV Year Syllabus)

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS
Bhaskar Nagar, Yenkapally, Moinabad Mandal, R.R. District,
Hyderabad – 500 075, Telangana State, India
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J.B. INSTITUTE OF ENGIEERING & TECHNOLOGY
UGC AUTONOMOUS

Institute Vision & Mission

Vision

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

Mission:

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

DEPARTMENT OF INFORMATION TECHNOLOGY

Department Vision and Mission

Vision

To become a centre of excellence in Information Technology and prepare students as professionals, by carrying high end research to meet the emerging trends to benefit the society.

Mission

- To impart quality education with multidisciplinary applications to solve complex problems concerning the industry.
- To create research environment in Information Technology and prepare students to accept futuristic global challenges by encouraging continuous learning.
- To encourage entrepreneurship for innovation, inculcate sense of social responsibility and ethical values.

DEPARTMENT OF INFORMATION TECHNOLOGY

B.Tech. Information Technology

PEOs and PSOs

Program Educational Objectives (PEOs):	
PEO1	Be a competent software engineer/developer either as an individual or as a team player in IT industry and allied branches providing viable solutions.
PEO2	Initiate life-long learning to acquire new technologies and adapt to the changing needs of IT industry through self-learning for professional development.
PEO3	Exhibit professional excellence through ethics, soft skills and leadership qualities as a responsible citizen with societal interest.

Program Specific Outcomes (PSOs):	
PSO1	Design, Develop, Test and Manage reliable and efficient application software systems as per user requirements.
PSO2	Acquaint with the contemporary trends and issues in industry or research settings by giving innovative novel solutions to existing problems.

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Bhaskar Nagar, Yenkapally, Moinabad, Hyderabad – 500075, Telangana, India

ACADEMIC REGULATIONS FOR B.TECH. REGULAR STUDENTS

WITH EFFECT FROM ACADEMIC YEAR 2018-19 (R-18)

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

J.B.Institute of Engineering and Technology (JBIET) offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2018-19 in the following branches of Engineering:

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

2.0 Eligibility for admission

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

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

3.0 B.Tech. Programme structure

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

Each student shall secure 160 credits (with CGPA ≥ 5) required for the completion of the under graduate programme and award of the B.Tech. degree.

3.2 **UGC/AICTE** specified definitions/descriptions are adopted appropriately for

various terms and abbreviations used in these academic regulations/norms, which are listed below.

3.2.1 Semester Scheme

Each undergraduate programme is divided into 4 academic years (8 semesters) with each semester of 22 weeks of duration (16 weeks for instruction), each semester having 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Promotion System (CBPS) as indicated by UGC and curriculum/course structure as suggested by AICTE are followed.

3.2.2 Credit Courses

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

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

Courses like Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization lab are mandatory courses. These courses will not carry any credits.

3.2.3 Subject Course Classification

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

S. No.	Broad Course Classification	Course Group / Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes Mathematics, Physics and Chemistry subjects
2		ES-Engg Sciences	Includes fundamental engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.

5		Project Work	B.Tech. project or UG project or UG major project or Project Stage I & II
6		Industrial training/ Mini-project	Industrial training/ Summer Internship/ Industrial Oriented Mini-project/Mini-project
7	Elective Courses (EℓC)	PE – Professional Electives	Includes elective subjects related to the parent discipline/department/branch of Engineering.
8		OE – Open Electives	Elective subjects which include inter- disciplinary subjects or subjects in an area outside the parent discipline/department/branch of Engineering.
9		Seminar	Seminar/Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
10	Minor courses	-	1 or 2 Credit courses (subset of HS)
11	Mandatory Courses (MC)	-	Mandatory courses (non-credit)

4.0 Course registration

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

4.2 A student is allowed to register for 160 credits in completion of B.Tech programme. However, they can register for additional credits (above 160 credits). The additional credits scored shall not be considered for award of division and also not considered for calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA). For such extra course(s) registered, a certificate will be issued with a letter grade indicated as a performance measure.

4.3 **Open Electives**: The students have to choose requisite number of open electives (as prescribed in the course structure) from the list of open electives given. However, the student cannot opt for an open elective subject offered by his own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.4 **Professional Electives**: The students have to choose requisite number of professional electives (as prescribed in the course structure) from the list of professional electives given.

5.0 Subjects/ courses to be offered

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

5.2 A subject/ course may be offered to the students, **only if** a minimum of 30 students (1/2 of the section strength) opt for it. The maximum strength of a section is limited to 80 (60 + 1/3 of the section strength).

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

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

6.0 Attendance requirements:

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

The attendance of Mandatory Non-Credit courses should be maintained separately.

6.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned on medical grounds by the committee comprising of HOD of Concerned Department, Class incharge and 2 senior faculty members.

6.3 A stipulated condonation fee is payable for condoning of shortage of attendance. This fee will be informed time to time by the college administration.

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

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

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

7.0 Academic requirements

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

7.1 A student is deemed to have fulfilled the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing course or project if he/she secures not less than 35% of marks (24 out of 70 marks) in the semester end examination and a minimum of 40% of marks in the sum total of the Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) taken together.

7.2 A student is deemed to have fulfilled the minimum academic requirements and earned the credits allotted to Industrial Oriented Mini Project /Summer Internship and seminar if the student secures not less than 40% marks in each of them.

7.3 A student may reappear once for each of the above evaluations, when they are scheduled again.

7.4 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 19 credits out of 38 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 40 credits out of 80 credits i.e., 50% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.

6	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 61 credits out of 122 credits i.e., 50% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

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

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

7.8 A student who fails to earn all the 160 credits as indicated in the program structure within eight academic years from the year of admission shall forfeit his seat in B.Tech Program, unless an extension is given by college Academic council to complete the program for a further period of two years.

8.0 Evaluation - Distribution and Weightage of marks

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

8.2 For theory courses, during the semester there are 2 mid-term examinations (internal exams of 20 marks each), 5 unit tests of 5 marks each and 2 assignments carrying 5 marks each.

8.3 Each mid-term examination will be of 1 hour 20 minutes consisting of Part-A (objective questions) for 10 marks and Part-B (long answer) for 10 marks. The Part-A objective paper is set with 20 bits of multiple choice, fill-in the blanks and

matching type of questions. The Part- B consists of 4 questions each carrying 5 marks and student should answer any two questions.

8.4 Each Unit Test will be of 1 hour duration, consisting of 3 questions from that unit carrying 5 marks each and student should answer any two questions for 10 Marks. These 10 marks are scaled down to 5 for Unit Test marks calculation.

8.5 First mid-term examination is conducted for first 2 units of syllabus and second mid-term examination is conducted for remaining 3 units of syllabus.

8.6 The Continuous Internal Evaluation for theory course shall be made as average of marks obtained in CIE – I and CIE –II as detailed in the table below.

CIE – I	Marks	CIE - II	Marks
MID – I	20	MID - II	20
Best of Unit Test - I and Unit Test - II	5	Average of the best two of Unit Test – III, Unit Test – IV and Unit Test V	5
Assignment – I	5	Assignment - II	5
Total	30	Total	30

8.7 If a student is absent for any mid term examination, may be permitted to apply for makeup examinations within a week after completion of mid-term examinations on medical grounds. A subcommittee with the following composition will look into such cases.

Subcommittee-composition:

S.No	Faculty Member	Designation
1	Concerned Head of the Department	Chairman
2	Faculty nominated by Principal	Member
3	Senior faculty member of the concerned Department	Member
4	Class Teacher of the class	Member

8.7.1 The Semester End Examinations (SEE) will be conducted for 70 marks consisting of two parts viz. i) **Part- A** for 20 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question consisting of ten sub-questions. The first five sub-questions are from each unit and carry 1 mark each. The next five sub- questions are one from each unit and carry 3 marks each.
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an “either” “or” choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

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

8.7.3 For subjects like **Machine Drawing Practice/Machine Drawing**, the SEE is conducted for 70 marks consisting of two parts viz. (i) Part – A for 30 marks. 3 out of 4 questions must be answered, (ii) Part – B for 40 marks. Part – B is compulsory with a single question.

8.7.4 For the Subject **Estimation, Costing and Project Management**, the SEE paper should consist of Part- A, Part-B and Part C. (i) Part – A – 1 out of 2 questions from Unit – I for 25 Marks, (ii) Part – B – 1 out of 2 questions from Unit – II for 15 Marks, (iii) Part – C – 3 out of 5 questions from Units – III, IV, V for 30 Marks.

8.7.5 For subjects **Structural Engineering – I & II (RCC & STEEL),** the SEE will be conducted for 70 marks consisting of 2 parts viz. (i) Part – A for 15 marks and, (i) Part – B for 55 marks. Part – A is a compulsory question consisting of ten sub-questions. The first five sub-questions are from each unit relating to design theory and codal provisions and carry 2 marks each. The next five sub-questions are from each unit and carry 1 mark each. Part – B consists of 5 questions (numbered 2 to 6) carrying 11 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there is either or choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

8.8 For practical subjects there is a continuous internal evaluation during the semester for 30 marks and 70 marks for semester end examination. Out of the 30 marks for internal evaluation, day-to-day work in the laboratory is evaluated for 20 marks and internal practical examination is evaluated for 10 marks conducted by the laboratory teacher concerned. The semester end examination is conducted with an external examiner and the laboratory teacher. The external examiner is selected and appointed by the Principal from the list submitted by Head of the Department.

8.9 For the subject having design and/or drawing, (such as engineering graphics, engineering drawing, machine drawing, machine drawing practice and estimation), the distribution is 30 marks for continuous internal evaluation (20 marks for day-to-day work and 10 marks for internal tests) and 70 marks for semester end examination.

8.10 There is Life Skills and Professional Skills course offered for 2 credits and will be evaluated in IV year I semester as a laboratory course.

8.11 There is summer internship, in collaboration with an industry of their specialization, to be taken up during the vacation after II year II Semester examination and it will be evaluated in III Year I semester. A report to be submitted in prescribed format on the internship carried out by the student. The report will evaluated for 100 marks by the committee consisting of head of the department, and internship coordinator and a senior faculty member of the department. There is no semester end examination for the seminar

8.12 There is an Industry Oriented Mini Project, in collaboration with an industry of their specialization to be taken up during the vacation after III year II semester examinations. Industry Oriented Mini Project is submitted in a report form and presented before the committee in IV year I semester. It is evaluated for 100 marks by the committee consisting of Head of the Department, supervisor of the Industrial Oriented mini project and a senior faculty member of the department.

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

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

8.15 For Project Stage – I, the Project Review committee (PRC) consisting of Head of the Department, project coordinator and two senior faculty members shall evaluate(SEE) the project work for 70 marks and project supervisor (CIE) shall evaluate for 30 marks. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - I or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together..

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

8.16 For Project Stage – II, the external examiner shall evaluate the project work for 70 marks and the project supervisor shall evaluate it for 30 marks. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together.

For conducting viva-voce of project stage – II, Principal selects an external examiner from the list of experts in the relevant branch submitted by the HODs of the College.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

8.17 For mandatory courses of Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization lab, a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course. **These marks should also be submitted along with the internal marks of other subjects.**

8.18 No marks or letter grades is printed in the Mark Statement for mandatory/non-credit courses. Only Pass/Fail is indicated in Grade Card.

9.0 Grading procedure

9.1 Grades will be awarded to indicate the performance of students in each theory subject, laboratory / practicals, seminar, Industry Oriented Mini Project, and project Stage - I & II. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade is given.

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

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

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

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

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

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

Credit Points (CP) = Grade Point (GP) x Credits …. For a course

9.7 A student passes the subject/ course only when **GP ≥ 5 ('C' grade or above).**

9.8 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of credit points (∑CP) secured from all subjects/ courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to **two** decimal places. SGPA is thus computed as

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

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

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

CGPA = { $\sum^{M}_{j=1} C_j G_j$ } / { $\sum^{M}_{j=1} C_j$ } … for all S number of semesters registered

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

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

Illustration of calculation of SGPA:

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

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA up to 3rd semester:

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

CGPA = 518/69 = 7.51

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

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

9.11 SGPA and CGPA of a semester will be mentioned in the semester Memorandum of Grades if all subjects of that semester are passed in first attempt. Otherwise the SGPA and CGPA is mentioned only on the Memorandum of Grades in which sitting he passed his last exam in that semester. However, mandatory courses will not be taken into consideration.

10.0 Passing standards

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

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

11.0 Declaration of results

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

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

% of Marks = (final CGPA – 0.5) x 10

12.0 Award of degree

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

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

12.3 A student with final CGPA > 8.00 (at the end of the under graduate programme), and fulfilling the following conditions - is placed in '**first class with distinction'**.
However, he

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

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

A student not fulfilling any of the above conditions with final CGPA ≥ 8 is placed in **'first class'.**

12.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but < 8.00 are placed in **'first class'.**

12.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.50 but < 6.50, are placed in '**second class'**.

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

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

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

13.0 Withholding of results

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

14.0 Student transfers

14.1 Transfer of students from other colleges or universities are permitted subjected to the rules and regulations of Telanga State Council for Higher Education (Technical Education Department) and JNTUH in vogue.

15.0 Scope

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

15.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.

15.3 The College may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made is applicable to all students with effect from the dates notified by the College authorities.

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

ACADEMIC REGULATIONS FOR B.TECH. (LATERAL ENTRY SCHEME) FROM THE AY 2019-2020

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

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

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

3. The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission. However, he/she is permitted to write the examinations for two more years after six academic years of course work, failing which he/she shall forfeit his/her seat in B.Tech course.

4. The attendance requirement of B. Tech. (Regular) is applicable to B.Tech. (LES).

5. Promotion rule

S. No	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	**(i)** Regular course of study of second year second semester. **(ii)** Must have secured at least 21 credits out of 42 credits i.e., 50% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 42 credits out of 84 credits i.e., 50% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

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

	duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of seat.
9.	If student of the college, who is not a student for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of seat. Person(s) who do not belong to the college will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the student has already appeared including practical

		examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of performance in that subject and all other subjects the student has appeared including practical examinations and UG major project of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 is reported to the Examination Result Processing Committee (ERPC) for further action to award a suitable punishment.	

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J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC AUTONOMOUS

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INFORMATION TECHNOLOGY

COURSE STRUCTURE – R18

I B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F110A	Mathematics – I	3	1-0-0	4
2	F110C	Applied Physics	3	1-0-0	4
3	F112A	Basic Electrical Engineering	3	1-0-0	4
4	F1105	Basic Electrical Engineering Lab	0	0-2-0	1
5	F1104	Applied Physics Lab	0	0-3-0	1.5
6	F1106	Workshop and Manufacturing Practices	1	0-4-0	3
7		Induction Programme			
		Total	**10**	**3-9-0**	**17.5**

I B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F120A	Mathematics – II	3	1-0-0	4
2	F120B	English	2	0-0-0	2
3	F125A	Programming for Problem Solving	3	0-0-0	3
4	F120D	Engineering Chemistry	3	1-0-0	4
5	F123A	Engineering Drawing & Computer Graphics	1	0-4-3	3
6	F1201	English Language and Communication Skills Lab	0	0-2-0	1
7	F1206	Programming for Problem Solving Lab	0	0-4-0	2
8	F1203	Chemistry Lab	0	0-3-0	1.5
		Total	**12**	**2-13-0**	**20.5**

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COURSE STRUCTURE – R18

II B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F215A	Data Structures	3	0-0-0	3
2	F215B	Operating Systems	3	0-0-0	3
3	F216A	Database Management Systems	3	0-0-0	3
4	F210E	Professional Ethics	3	0-0-0	3
5	F210F	Probability and Statistics	3	1-0-0	4
6	F210C	Gender Sensitization	2	0-0-0	0
7	F2161	Database Management Systems Lab	0	0-4-0	2
8	F2151	Data Structures Lab	0	0-3-0	1.5
9	F2152	Operating Systems Lab	0	0-3-0	1.5
		Total	**17**	**1-10-0**	**21**

II B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F225A	Object Oriented Programming through Java	3	0-0-0	3
2	F225B	Digital Logic Design and Computer Organization	3	0-0-0	3
3	F225C	Design and Analysis of Algorithms	3	1-0-0	4
4	F226A	Computer Networks	3	0-0-0	3
5	F226B	Mathematical Foundation for Computer Science	3	0-0-0	3
6	F220D	Biological Sciences	2	0-0-0	2
7	F220F	Environmental Science	2	0-0-0	0
8	F2261	Computer Networks Lab	0	0-3-0	1.5
9	F2251	Object Oriented Programming through Java Lab	0	0-3-0	1.5
		Total	**19**	**0-6-0**	**21**

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COURSE STRUCTURE – R18

III B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F315A	Python Programming	3	0-0-0	3
2	F315C	Software Engineering	3	0-0-0	3
3	F316A	Automata and Compiler Design	3	0-0-0	3
4	F316B	Data Warehousing and Data Mining	3	0-0-0	3
5	F310B	Managerial Economics and Financial Analysis	3	0-0-0	3
6	F3151	Python Programming Lab	0	0-4-0	2
7	F3152	Software Engineering Lab	0	0-3-0	1.5
8	F3162	Data Mining Lab	0	0-3-0	1.5
9	F3163	Summer Internship	0	0-2-0	1
		Total	**15**	**0-12-0**	**21**

III B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1	F326A	Web Technologies	3	0-0-0	3
2	F326B	Linux Programming	3	0-0-0	3
3	F320A	Management Science	3	0-0-0	3
4		Professional Elective – I	3	0-0-0	3
5		Professional Elective – II	3	0-0-0	3
6		Open Elective – I	3	0-0-0	3
7	F3261	Web Technologies Lab	0	0-3-0	1.5
8	F3262	Linux Programming Lab	0	0-3-0	1.5
		Total	**18**	**0-6-0**	**21**

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COURSE STRUCTURE – R18

IV B. Tech – I Semester

Sl. No.	Code	Subject	L	T-P-D	C
1		Professional Elective – III	3	0-0-0	3
2		Professional Elective – IV	3	0-0-0	3
3		Open Elective – II	3	0-0-0	3
4		Open Elective – III	3	0-0-0	3
5	F4101	Life Skills and Professional Skills Lab	0	0-4-0	2
6	F4162	Industry Oriented Mini Project	0	0-4-0	2
7	F4161	Project Stage – I	0	0-8-0	4
		Total	**12**	**0-16-0**	**20**

IV B. Tech – II Semester

Sl. No.	Code	Subject	L	T-P-D	C
1		Professional Elective – V	3	0-0-0	3
2		Professional Elective – VI	3	0-0-0	3
3		Open Elective – IV	3	0-0-0	3
4	F4262	Seminar	0	0-2-0	1
5	F4261	Project Stage – II	0	0-16-0	8
		Total	**9**	**0-18-0**	**18**

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

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

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PROFESSIONAL ELECTIVE SUBJECTS R18

Professional Elective – I

Sl. No.	Code	Subject	L	T-P-D	C
1	F326B	Principles of Programming Languages	3	0-0-0	3
2	F325C	Wireless Networks and Mobile Computing	3	0-0-0	3
3	F325D	Ad hoc Sensor Networks	3	0-0-0	3

Professional Elective –II

Sl. No.	Code	Subject	L	T-P-D	C
1	F325E	Software Testing Methodologies	3	0-0-0	3
2	F325F	Information Retrieval Systems	3	0-0-0	3
3	F325G	Cloud Computing	3	0-0-0	3

Professional Elective – III

Sl. No.	Code	Subject	L	T-P-D	C
1	F416A	Internet of Things	3	0-0-0	3
2	F416B	Distributed Database	3	0-0-0	3
3	F415C	Big Data Analytics	3	0-0-0	3

Professional Elective –IV

Sl. No.	Code	Subject	L	T-P-D	C
1	F415D	Web Services	3	0-0-0	3
2	F416C	Software Process and Project Management	3	0-0-0	3
3	F416D	Software Architecture and Design Pattern	3	0-0-0	3

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PROFESSIONAL ELECTIVE SUBJECTS R18

Professional Elective –V

Sl. No.	Code	Subject	L	T-P-D	C
1	F425A	Database Security	3	0-0-0	3
2	F426A	Information Security	3	0-0-0	3
3	F425C	Data Science Through R	3	0-0-0	3

Professional Elective –VI

Sl. No.	Code	Subject	L	T-P-D	C
1	F425D	Blockchain Technology	3	0-0-0	3
2	F426C	Storage Area Networks	3	0-0-0	3
3	F426D	Android Application Development	3	0-0-0	3

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COURSE STRUCTURE – R18

List of Subjects offered by various Board of Studies

Open Elective – I

S.No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	F32OA	Energy Audit and Green Building	Civil Engineering
2	F32OB	Environmental Impact Assessment	Civil Engineering
3	F32OC	Energy Storage systems	Electrical and Electronics Engineering
4	F32OD	Energy Auditing, Conservation and Management	Electrical and Electronics Engineering
5	F32OE	Automotive Technology	Mechanical Engineering
6	F32OF	Matlab Programming Language	Electronics and Communication Engineering
7	F32OG	Principles of communications	Electronics and Communication Engineering
8	F32OH	Database Management Systems	Computer Science and Engineering
9	F32OI	Operating Systems	Computer Science and Engineering
10	F32OJ	Introduction to Data Structures	Information Technology
11	F32OK	Introduction to web Design	Information Technology
12	F32OL	Internet of things	Electronics and Computer Engineering
13	F32OM	Introduction to Mining Technology	Mining Engineering

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COURSE STRUCTURE – R18

List of Subjects offered by various Board of Studies

Open Elective – II

S.No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	F41OA	Waste Management	Civil Engineering
2	F41OB	Estimation, Quantity Surveying and Valuation	Civil Engineering
3	F41OC	Electric and Hybrid vehicles	Electrical and Electronics Engineering
4	F41OD	Materials in Electrical Systems	Electrical and Electronics Engineering
5	F41OE	Fundamentals of Operations Research	Mechanical Engineering
6	F41OF	Digital systems Using VHDL	Electronics and Communication Engineering
7	F41OG	IC Technology	Electronics and Communication Engineering
8	F41OH	Computer Networks	Computer Science and Engineering
9	F41OI	Python Programming	Computer Science and Engineering
10	F41OJ	Computer Organization	Information Technology
11	F41OK	Human Computer Interaction	Information Technology
12	F41OL	Introduction to Embedded systems	Electronics and Computer Engineering
13	F41OM	Introduction to Surface Mining	Mining Engineering

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COURSE STRUCTURE – R18

List of Subjects offered by various Board of Studies

Open Elective – III

S.No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	F41ON	Elements of CIVIL Engineering	Civil Engineering
2	F41OO	Disaster Management	Civil Engineering
3	F41OP	Electric Costing And Estimation	Electrical and Electronics Engineering
4	F41OQ	Power Plant Engineering	Electrical and Electronics Engineering
5	F41OR	Fundamentals of Robotics	Mechanical Engineering
6	F41OS	Digital systems Using Verilog	Electronics and Communication Engineering
7	F41OT	Advanced Computer Architecture	Electronics and Communication Engineering
8	F41OU	Software Engineering	Computer Science and Engineering
9	F41OV	Cloud Computing	Computer Science and Engineering
10	F41OW	Java Programming	Information Technology
11	F41OX	Software Project Management	Information Technology
12	F41OY	Introduction to Intelligent System	Electronics and Computer Engineering
13	F41OZ	Introduction to Geology	Mining Engineering

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COURSE STRUCTURE – R18

List of Subjects offered by various Board of Studies

Open Elective – IV

S.No.	Code	Name of the Subject	Name of the BOS offering the Subject
1	F42OA	Industrial Waste Water Treatment	Civil Engineering
2	F42OB	Air pollution and Control	Civil Engineering
3	F42OC	Distributed Generation And Micro grid	Electrical and Electronics Engineering
4	F42OD	Renewable Energy Sources	Electrical and Electronics Engineering
5	F42OE	Digital Manufacturing	Mechanical Engineering
6	F42OF	Embedded System Design	Electronics and Communication Engineering
7	F42OG	Software Defined Radio	Electronics and Communication Engineering
8	F42OH	E-commerce	Computer Science and Engineering
9	F42OI	Big Data Analytics	Computer Science and Engineering
10	F42OJ	Computer Forensics	Information Technology
11	F42OK	E-Disaster Management	Information Technology
12	F42OL	Introduction to Neural Networks	Electronics and Computer Engineering
13	F42OM	Introduction to Mine Environment	Mining Engineering

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

(F110A) MATHEMATICS-I
(LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS)
(COMMON TO CE, EEE, ME, ECE, CSE, IT, ECM & MIE)

Course objectives:
The students will :

1. Understand the concept of matrices and solutions of system of linear equations
2. Learn the concept of eigen values and eigen vectors and cayley Hamilton theorem
3. Learn the concept of sequences and series & nature
4. Get an idea to find the solutions of differential equations of first order and first degree
5. Find the solutions of second and Higher order

UNIT – I: MATRICES : (10L)

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method;

System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT – II: EIGEN VALUES and EIGEN VECTORS: (10L)

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix;

Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

UNIT – III : SEQUENCES and SERIES: (10L)

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

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

Alternating Convergent series: Absolute and Conditionally Convergence

UNIT – IV: FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS: (8L)

Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT – V : ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER : (10L)

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type $e^{ax}, \sin ax, \cos ax,$ polynomials in x, $e^{ax}V(x)$ and $x\,V(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. R.K.Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,11th Reprint, 2010.

Course outcomes:

The students will be able to:

1. Solve system of linear equations
2. Analyze the Eigen values and Eigen vectors which come across under linear transformations
3. Find the nature of the given series by different tests.
4. Identify whether the given differential equation of first order is exact or not
5. Solve higher differential equation and apply the concept of differential equation to real world problems

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B.Tech.: IT	L	T-P-D	C
I Year -I Semester	3	1-0-0	4

(F110C) APPLIED PHYSICS
(Common To CSE & IT)

Course objectives:
The students will :

1. Demonstrate the skills in scientific inquiry, problem solving and laboratory techniques.
2. Demonstrate competency and understanding of the concepts found in Quantum Mechanics, Semiconductor physics, Fiber optics and lasers and Electromagnetic theory and a broad base of knowledge in physics.
3. Solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. Study applications in engineering like memory devices, transformer core and electromagnetic machinery.
5. To study semiconductor physics, Fiber optics and lasers and Electromagnetic theory and a broad base of knowledge in physics.

UNIT-I: Quantum Mechanics:
Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II: Electronic Materials:
Classical Free electron theory, Quantum free electron theory, Fermi energy level,Occupation probability, Density of States, Bloch Theorem, Kronig- Penny model, E-K Diagram, Effective mass of Electron, Band Theory of solids, Classification of materials.

UNIT-III: Semiconductor Physics:
Intrinsic and Extrinsic semiconductors, Carrier Concentration in intrinsic and extrinsic Semi conductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination.
Carrier transport: diffusion and drift, p-n junction diode, V-I Characteristic, Diode equation(qualitative treatment), Zener diode , Hall effect, LED, Photo diode and Solar cell.

UNIT-IV: Lasers and Fiber Optics :
Lasers: Introduction, absorption, spontaneous emission, Stimulated emission, calculation of Einstein co-efficient, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor laser, Applications of laser.
Fiber Optics: Introduction, Construction and working principle of Optical fiber, Acceptance angle, Acceptance cone and Numerical aperture, Types of optical fibers, Applications of optical fibers.

UNIT-V: Electromagnetism:
Laws of electrostatics, Electric current and the continuity equation, Ampere's and Faraday's

laws, Maxwell's equations, The wave equation: Plane Electromagnetic waves in vacuum, their Transverse nature, Polarisation, Permittivity and Dielectric constant, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectric.

TEXT BOOKS:

1. B.K. Pandey, S. Chaturvedi Engineering Physics, CengageLearing.
2. Halliday and Resnick, Physics, Wiley.
3. Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - Chand,A textbook of Engineering Physics, Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. SJ.Singh, semiconductor Optoelectronics: Physics and Technology, McGraw-Hill inc. (1995).
3. by Monica Katiyar and Deepak GupthaOnline Course: "Optoelectronic Materials and Devices" on NPTEL.
4. P.K.Palanisamy, "Engineering Physics", Scitech Publications, Fourth edition.

Course outcomes:

The students will be able to:

1. Learn the fundamental concepts on Quantum behaviour of matter in its micro state.
2. Get the knowledge of fundamentals of Semiconductor physics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. Be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.
5. Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

B.Tech.: IT	L	T-P-D	C
I Year -I Semester	3	1-0-0	4

(F112A) BASIC ELECTRICAL ENGINEERING
(COMMON TO CE, ME, CSE, IT & MIE)

Course objectives:
The students will :

1. Introduce the concept of electrical circuits using network laws and theorems.
2. Analyse single phase A.C and three phase A.C circuits.
3. Study and understand magnetic circuits and transformers.
4. Understand the different types of D.C and A.C rotating electrical machine.
5. Understand basic Low Voltage Switchgear, Wiring, Protection and Batteries.

UNIT-I: DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, analysis of simple circuits with DC excitation.
Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT –II: AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor.
Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC series combinations, resonance in series RLC circuit. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: Transformers: Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit.
losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV: Rotating Electrical Machines: D.C Motors - principle of operation, characteristics, speed control and application of series and shunt motor.
Three-phase induction motor - construction, generation of rotating magnetic fields, principle of operation, torque-slip characteristics. Single-phase induction motor - construction, working, torque-speed characteristic.

UNIT –V: Electrical Installations: Components of LT switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, types of wires and cables, earthing.
Types of batteries, important characteristics for batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT BOOKS :

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

RFERENCES:

1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
2. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.0

Course outcomes:

The students will be able to:

1. Illustrate and solve electrical circuits using network laws and theorem.
2. Acquire knowledge about the single phase and three phase electrical circuits.
3. Get exposure of magnetic circuits and transformers.
4. Demonstrate the working principle of electrical machines.
5. Acquire the knowledge on components of low voltage electrical installation.

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UGC AUTONOMOUS

B.Tech.: IT	**L**	**T – P-D**	**C**
I Year -I Semester	**0**	**0 – 2 - 0**	**1**

(F1105) BASIC ELECTRICAL ENGINEERING LAB
(COMMON TO CE, ME, CSE, IT & MIE)

Course objectives:

The students will :

1. Analyze a given network by applying various electrical laws and network theorems
2. Know the response of electrical circuits for different excitations.
3. Calculate, measure and know the relation between basic electrical parameters
4. Analyze the performance of single phase and three phase Transformers.
5. Analyze the performance characteristics of DC and AC electrical machines

Choice of 10-12 experiments from the following

List of Experiments

1. Verification of Ohms Law.
2. Verification of KVL and KCL.
3. Transient response of series RL and RC circuits using DC excitation.
4. Transient response of RLC series circuit using DC excitation.
5. Resonance in series RLC circuit.
6. Calculations and verification of impedance and current of RL, RC and RLC series circuits.
7. B-H loop for single phase transformers.
8. Measurement of voltage, current and real power in primary and secondary circuits of a single phase transformer.
9. Load test on single phase transformer (Calculate Efficiency and Regulation).
10. Three phase transformer: Verification of relationship between voltages and currents (Star-Delta, Delta-Delta, Delta-star, Star-Star).
11. Measurement of active and reactive power in a balanced three-phase circuit.
12. Performance Characteristics ofa DC Shunt Motor.
13. Torque-Speed Characteristics of a DC Shunt Motor.
14. Performance Characteristics of a Three-phase Induction Motor.
15. Torque-speed Characteristics of a Three-phase Induction Motor.

Course outcomes:

The students will be able to:

1. Demonstrate electrical circuits with basic electrical laws.
2. Make use of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Illustrate the basic characteristics of transformers .
5. Test the performance of various electrical machines.

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B.Tech.: IT	**L**	**T – P - D**	**C**
I Year -I Semester	**0**	**0 – 3 - 0**	**1.5**

(F1104) APPLIED PHYSICS LAB
(COMMON TO CSE & IT)

Course objectives:

The students will :

1. Demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Demonstrate competency and understanding of the concepts found in LED, Electric and Electronic materials a broad base of knowledge in physics.
3. Solve Experimental problems that potentially draw an experimental knowledge in multiple areas of physics.
4. Study applications in engineering like Hall effect, in the field of magnetic material.
5. Study applications in engineering like Hall effect, Optical fiber, LASER, Photodiode and Solar cell.

List of Experiments:

Energy gap of P-N junction diode:

1. To determine the energy gap of a semiconductor diode.
2. Solar Cell:
   To study the V-I Characteristics of solar cell.
3. Light emitting diode:
   Plot V-I and P-I characteristics of light emitting diode.
4. Optical fiber:
   Determination of Numerical Aperture.
5. Hall effect:
   To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect:
   To determine work function of a given material.
7. LASER:
   To study the Wave length of LASER Source.
8. Dielectric constant:
   To determine the Dielectric constant of the given material.
9. LCR Circuit:
   To determine the Quality factor of LCR Circuit (Series & Parallel).
10. R-C Circuit:
    To determine the time constant of R-C circuit (Growth and Decay).

Text Books:

1. Dr. Narendra, L. Mathakari, "Experiments in Applied Physics" (Physics Lab Manual 4^{th} edition) ,
2. " Engineering Physics Lab Manual" By Department of Physics JBIET

Course outcomes:

The students will be able to:

1. Learn the experimental concepts on in LED, Electric and Electronic materials.
2. Get the knowledge of fundamentals of Semiconductor physics.

3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. Be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.
5. Lasers and fiber optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.

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

(F1106) WORKSHOP AND MANUFACTURING PRACTICES
(COMMON TO EEE, CSE & IT)

Pre-requisites: None

Course Objectives:
The Students will:

1. Learn fabricating small components using engineering tools and machines.
2. Understand the working principles of maintaining dimensional accuracies and dimensional tolerances in different manufacturing processes.
3. Understand assembly of various components.
4. Understand the Tools used for different trades.
5. Learn machining practices.

(I) WORKSHOP AND MANUFACTURING PRACTICES – 10 Lecture hours

1. Brief introduction to Manufacturing processes : –
   a. machining on lathe, milling and drilling machines,
   b. basic process involved in the casting,
   c. brief process of forging , forming,
   d. metal joining , brief process of gas welding (3 hours)
2. Demo of working of CNC machine (2 hours)
3. Fitting operations & power tools (1 hour)
4. Electric house wiring (1 hour)
5. Carpentry (1 hour)
6. Metal casting (1hour)
7. Welding (arc welding & gas welding), brazing (1hour)

(II) WORKSHOP PRACTICE: 60 hours

1. Machine shop (12 hours) - on Lathe , Milling and drilling
2. Fitting shop (8 hours)
3. Carpentry (8 hours)
4. Electrical house wiring (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)
6. Foundry practices – mould preparation (8 hours)
7. Smithy – Black smithy and Tin smithy (8 hours)

TEXT BOOKS :

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Kalpakjian S. And Steven S. Schmid, “Manufacturing Engineering and Technology”, 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu,”Manufacturing Technology – I” Pearson Education, 2008.

REFERENCES:

1. Roy A. Lindberg, “Processes and Materials of Manufacture”, 4th edition, Prentice Hall India, 1998.
2. Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course outcomes:

The students will be able to:

1. Design components with their own hands.
2. Acquire practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
3. Develop small components of their interest by assembly
4. Identify the tools used in workshop & different trades
5. Analyze the performance machining works using the required machines and tools

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UGC AUTONOMOUS

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

(F120A) MATHEMATICS-II
(ADVANCED CALCULUS)
(COMMON TO CE, EEE, ME, ECE, CSE, IT, ECM & MIE)

Course objectives:
The students will :

1. Geometrical approach to the mean value theorems and their application to the mathematical problems & Evaluation of improper integrals using Beta and Gamma functions
2. Finding maxima and minima of function of two and three variables
3. Evaluation of multiple integrals and their applications
4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to line, surface and volume integrals

UNIT – I: CALCULUS: (10L)

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT – II: MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS): (8L)

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

UNIT – III: MULTIVARIABLE CALCULUS (INTEGRATION): (10L)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallel piped).

UNIT – IV : VECTOR DIFFERENTIATION: (10L)

Vector point functions and scalar point functions. Gradient, Divergence and Curl.
Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT – V : VECTOR INTEGRATION: (10L)

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

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. R.K.Jain& S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 9th Edition, Pearson, Reprint, 2010.

Course Outcomes:

The students will be able to:

1. Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions.
2. Find the extreme values of functions of two variables with/ without constraints.
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped.
4. Compute partial derivatives, Derivatives of vector valued functions and gradient functions
5. Evaluate the line, surface and volume integrals and converting them from one to another

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

(F120B) ENGLISH
(COMMON TO EEE, ME, ECE, CSE, IT & MIE)

Course objectives:
The students will :

1. Understand the concept of Raman Effect and concept in LSRW skills.
2. Acquire the knowledge in ancient architecture in India and Vocabulary
3. Learn how denim jeans were manufactured.
4. Know practice of healthy eating.
5. Know how to change their fortune.

UNIT –I:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.
Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT – II:
'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Synonyms and Antonyms, Homophones, Homonyms, and Homographs.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, and Job Application with Resume.

UNIT – III :
'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
Reading: Sub-skills of Reading- Skimming and Scanning
Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence and Essay Writing

UNIT – IV:

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

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion -Précis Writing.

UNIT – V :

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

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

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

TEXT BOOKS:

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

REFERENCES:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

Course outcomes:

The students will be able to:

1. Find the nature of diffraction and use LSRW skills in his day to day life conversations.
2. Implement in the construction field.
3. Design different models in manufacturing jeans.
4. Discuss balanced eating habits with everyone.
5. Implement in their own life.

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

(F125A) PROGRAMMING FOR PROBLEM SOLVING
(COMMON TO CE, ME, CSE, IT & MIE)

Course objectives:
The students will :

1. Learn the fundamentals of computers.
2. Understand the various steps in program development.
3. Understand the syntax and semantics of C programming language.
4. Learn the usage of structured programming approach in solving problems.
5. Gain the knowledge on searching and sorting methods.

UNIT – I:INTRODUCTION TO PROGRAMMING :

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems.

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, program design and structured programming.

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments

Bitwise operations: Bitwise AND, OR, XOR and NOT operators Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops. I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

UNIT – II: ARRAYS, STRINGS, STRUCTURES AND PREPROCESSOR:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.

UNIT – III: POINTERS AND FILE HANDLING IN C:

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type.

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

UNIT – IV : FUNCTION AND DYNAMIC MEMORY ALLOCATION:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries.

Recursion: Simple programs such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types.

UNIT – V : INTRODUCTION TO ALGORITHMS:

Basic searching algorithms (linear and binary search techniques),

Basic sorting algorithms (Bubble, Insertion, Quick, Merge and Selection sort algorithms) Basic concept of order of complexity through the example programs

TEXT BOOKS:

1. Reema Thareja , Programming in C, Oxford university press.
2. B.A. Forouzan and R.F. Gilberg, C Programming and Data Structures, Cengage Learning, (3rdEdition)

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
3. Stephen G. Kochan, Programming in C, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, McGraw Hill, 4thEdition
5. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

Course outcomes:

The students will be able to:

1. Design the algorithms/flowcharts to C programs.
2. Write the code test a given logic in C programming language.
3. Decompose a problem into functions and to develop modular reusable code.
4. Make use arrays, pointers, strings and structures to write C programs.
5. Apply searching and sorting algorithms.

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

(F120D) ENGINEERING CHEMISTRY
(COMMON TO CE, ME, CSE, IT & MIE)

Course objectives:
The students will :

1. Know the suitability of water for domestic and industrial purposes.
2. Bring the adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
3. Understand the principles of electrochemistry and corrosion.
4. Acquire knowledge of chemical reactions those are used in the synthesis of molecules.
5. Include the importance of spectroscopic techniques and molecular energy levels.

UNIT – I: ATOMIC STRUCTURE AND THEORIES OF BONDING:
Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2, F_2, CO and NO.
Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT – II: WATER AND ITS TREATMENT:
Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complex metric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization.
Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems

UNIT – III : ELECTROCHEMISTRY AND CORROSSION:
Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation, determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery).
Corrossion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – techniques of coating-hot dipping, cementation and electroplating of Copper.

UNIT – IV: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS:
Principles of spectroscopy, selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy.
Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to

Magnetic resonance imaging.

UNIT – V: REACTION MECHANISM AND SYNTHESIS OF DRUG MOLECULES:

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions.Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule.

Oxidation reactions: Oxidation of alcohols using KMnO4 and chromic acid. Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

TEXT BOOKS:

1. Engineering Chemistry by P. C. Jain & M. Jain; DhanpatRai Publishing Company (P) Ltd., New Delhi.
2. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
3. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N. E. Schore, 5th Edition.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Physical Chemistry, by P.W. Atkins
6. Engineering Chemistry (NPTEL Web-book), by B.L.Tembe, Kamaluddin and M.S. Krishnan.

REFERENCES:

1. Engineering Chemistry(NPTEL web book) by B.L. Tembe, Kamaluddin and M.S.Krishnan
2. Stereochemistry of organic compounds by D.Narsipuri published by New age international publishers.

Course Outcomes:

The students will be able to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbital's .
2. Understand the suitability of water for domestic and industrial purposes.
3. Apply their knowledge in solving related engineering problems.
4. Synthesize drug molecules.
5. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

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

(F123A) ENGINEERING DRAWING&COMPUTER GRAPHICS (Theory and Lab)
(COMMON TO CE, EEE, CSE, IT & ECM)

Pre-requisites: None
Course objectives:
The students will :

1. Learn a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
2. Prepare to communicate effectively.
3. Learn to use the techniques, skills, and modern engineering tools necessary for engineering practice.
4. Learn Projections of Solids.
5. Learn computer-aided drawings.

UNIT – I: INTRODUCTION TO ENGINEERING DRAWING (2 Lecture classes and 8 Practical's): Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only);
Cycloid, Epicycloids, Hypocycloid and In volute.

UNIT – II: ORTHOGRAPHIC PROJECTIONS AND PROJECTIONS OF POINTS, LINES AND PLANES (2 Lecture classes and 12 Practical's): Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes;
Projections of planes inclined to the Planes- Draw simple annotation, dimensioning and scale.

UNIT – III: PROJECTIONS OF REGULAR SOLIDS AND SECTIONAL VIEWS OF RIGHT REGULAR SOLIDS (2 Lecture Classes And 12 Practical's): Projections of regular solids - Prism, Cylinder, Pyramid, Cone – Auxiliary Views;
Draw the sectional views of geometrical solids.

UNIT – IV: ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS(2 Lecture classes and 12 Practical's): Principles of Isometric projection – Isometric Scale, Isometric Views, Conversion of Isometric Views to Orthographic Views and Vice-versa.

UNIT – V: OVERVIEW OF COMPUTER GRAPHICS (2 Lecture classes and 16 Practical's): Drafting Software: Computer Aided Drafting (CAD) – Drafting Software – Manual Drafting vs Auto CAD Drafting. Auto CAD commands: Starting Auto CAD - Auto CAD commands – (Generation of Points, Lines, Curves and Polygons) - Editing and Modifications.
Drafting Settings - Dimensioning and Text - Geometrical Constructions. Projection of Points - Straight Lines - Plane surfaces – Solids - Isometric projections
Note: CAD Lab facility is required for this unit.
(Only theory Question to be set from this Unit for Examinations)

TEXT BOOKS :

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. K. Venugopal& V. Prabhu Raja (2011), Engineering Drawing + Auto CAD, New Age International Publishers. Fifth Edition.
3. CAD Software Theory and User Manuals

REFERENCES:

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
2. Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication.

Course outcomes:

The students will be able to:

1. Understand engineering drawing and its place in society.
2. Exposed to the visual aspects of lines and planes.
3. Expose visualization of solids.
4. Expose representation of 3D objects through isometric and orthographic views.
5. Use modern tools for engineering graphics.

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B.Tech : IT	**L**	**T-P-D**	**C**
I Year -II Semester	**0**	**0-2-0**	**1**

(F1201) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(COMMON TO EEE, ME, ECE, CSE, IT & MIE)

Course objectives:

The students will :

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

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

SYLLABUS:

English Language and Communication Sills Lab (ELCS) will have two parts:

a) Computer Assisted Language Learning (CALL) Lab:

b) Interactive Communication Skills (ICS) Lab:

Exercise – I:

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II:

CALL Lab:

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

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

ICS Lab:

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

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

Exercise – III:

CALL Lab:

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

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

ICS Lab:

Understand: How to make Formal Presentations.

Practice: Formal Presentations.

Exercise – IV:
CALL Lab:
Understand: Listening for General Details.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise – V:
CALL Lab:
Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: Interview Skills.
Practice: Mock Interviews.

Computer Assisted Language Learning (CALL) Lab:
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students. System Requirement (Hardware component): Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
i) Computers with Suitable Configuration
ii) High Fidelity Headphones

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

Course outcomes:

The students will be able to:

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

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

(F1206) PROGRAMMING FOR PROBLEM SOLVING LAB
(COMMON TO CE, ME, CSE, IT & MIE)

Course objectives:
The students will :

1. Work with an IDE to create, edit, compile, run and debug programs
2. Analyze the various steps in program development.
3. Develop programs to solve basic problems by understanding basics concepts in C like operators, control statements etc.
4. Develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
5. Write programs using the Dynamic Memory Allocation concept,files.

1. SIMPLE NUMERIC PROBLEMS:

a) Write a program for find the max and min from the three numbers.

b) Write the program for the simple, compound interest.

c)Write program that declares Class awarded for a given percentage of marks, where mark<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >=70% = Distinction. Read percentage from standard input.

2. EXPRESSION EVALUATION:

a) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

b) Write a program that finds if a given number is a prime number

c) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

d) Write a C program to find the roots of a Quadratic equation

3. ARRAYS AND POINTERS AND FUNCTIONS:

a) Write a C program to find the minimum, maximum and average in an array of integers.

b) Write a C program to find Addition of Two Matrices

c) Write a C program to find Multiplication of Two Matrices

d) Write C programs that use both recursive and non-recursive functions

e) Write a program for reading elements using pointer into array and display the values using array.

4.Files:

a) Write a C program to display the contents of a file to standard output device.

b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

c) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.

5. Strings:

a) Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

b) Write a C program to count the lines, words and characters in a given text.

6. Sorting and Searching:

a) Write a C program for using binary search method.

b) Write a C program for linear search.

c) Write a C program that implements the Bubble sort method.

d) Write a C program that implements the Insertion sort method.

e) Write a C program that implements the Quick sort method.

f) Write a C program that implements the Merge sort method.

ADDITIONAL PROGRAMS (Given to Students as Assignment):

1) Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
   a. 5 x 1 = 5
   b. 5 x 2 =10
   c. 5 x 3 =15
2) Write a program that shows the binary equivalent of a given positive number between 0 to 255.
3) Write a C program to find the sum of individual digits of a positive integer and test given
   Number is palindrome.
4) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5) Write a C program to calculate the following, where x is a fractional value.
   1-x/2+x^2/4-x^3/6.
6) Write a C program to read in two numbers, x and n, and then compute the sum of this Geometric progression:1+x+x^2+x^3+….+x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
7) Write a C program to find the minimum, maximum and average in an array of integers.
8) Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
9) Write a C program that uses functions to perform the following:
   (a) Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
   (b) To find the factorial of a given integer.
   (c) To find the GCD (greatest common divisor) of two given integers.
10) Write a C program that does the following:

    (a)It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using a to i function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function). The

program should then read all 10 values and print them back.

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

11) Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
12) Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
13) Write a C program that uses functions to perform the following operations:
(a)To insert a sub-string in to a given main string from a given position.

(b) To delete n Characters from a given position in a given string.

14) Write a C program to construct a pyramid of numbers as follows:

```
1          *          1          1        *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3        * * *
                                 4 4 4 4    * *
                                              *
```

15) Write a C program that sorts a given array of names.

Reference Books:

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

Course outcomes:

The students will be able to:

1. Formulate the algorithms for simple problems
2. Examine syntax errors as reported by the compilers
3. Define and manipulate data with arrays, strings and structures
4. Make use pointers of different types, functions
5. Create, read and write to and from simple text and binary files

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B.Tech : IT	**L**	**T-P-D**	**C**
I Year -II Semester	**0**	**0-3-0**	**1.5**

(F1203) CHEMISTRY LAB

(Common To CE, ME, CSE, IT & MIE)

Course objectives:

The students will :

1. Estimate the hardness and chloride content in water to check its suitability for drinking purpose.
2. Determine the rate constant of reactions from concentrations as a function of time.
3. Measure the physical properties like adsorption and viscosity.
4. Synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.
5. Measure the conductance and EMF values of solutions.

Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conduct metric titrations
4. Estimation of Acetic acid by Conduct metric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using KMnO4
7. Estimation of amount of Cu^{+2} by Colorimetry
8. Estimation of amount of $KMnO_4$ by Colorimetry
9. Synthesis of Aspirin and Paracetamol
10. Determination of acid value of coconut oil
11. Thin layer chromatography calculation of R_f values. egortho and para nitro phenols
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n- butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

REFERENCES:

1. B.D. Khosla, A. Gulati and V. Garg ,Senior practical physical chemistry, B (R. Chand & Co., Delhi)
2. K.K. Sharma and D. S. Sharma , An introduction to practical chemistry, (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in engineering chemistry – S.S. Dara

Course outcomes:

The students will be able to:

1. Determine the parameters like hardness and chloride content in water.
2. Estimate the rate constant of a reaction from concentration – time relationships.
3. Determine the physical properties like adsorption and viscosity.
4. Calculate of R_f values of some organic molecules by TLC technique.
5. Determine the partition coefficient of a organic compound in two immissible liquids.

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

(F215A) DATA STRUCTURES
(Common to CSE, IT & ECM)

Course objectives:
The students will :

1. Define the basic data structures like linked list.
2. Understand the fundamentals and applications of linked list, stacks and queues.
3. Classify different types of tree data structures
4. Understand the concepts of graph data structures.
5. Know the fundamentals of basic searching, sorting and pattern matching algorithms.

UNIT - I:

Basic concepts - Algorithm Specification, 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.
Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II:

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

UNIT - III:

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Binary Heap-Properties, Max and Min Heap, Operations-Insertion and Deletion.
Search Trees-Binary Search tree, Tree traversals, AVL tree – operations, B-tree – operations, B+ trees, Red Black tree.

UNIT - IV:

Graphs-Terminology, sequential and linked representation, graph traversals : Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.
Searching and Sorting - Linear Search, Binary Search, Insertion Sort, Selection Sort, Merge Sort, Quick sort, Heap Sort.

UNIT - V:

Hashing-Hash table, Hash table representations, hash functions, collision resolution techniques-separate chaining, open addressing-linear probing, quadratic probing, double hashing, Re hashing, Extendible hashing,
Pattern matching: Introduction, Brute force, the Boyer –Moore algorithm, Knuth-Morris-Pratt algorithm.

Textbooks:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

References:

1. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
2. Design methods and analysis of Algorithms, SK Basu, PHI.
3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press.

Course outcomes:

The students will be able to:

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linked list.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

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

(F215B) OPERATING SYSTEMS
(Common to CSE & IT)

Course objectives:
The students will:

1. Know the basic concepts related to operating systems and learn in detail about process management.
2. Describe concurrency control of processes like critical-section problems and its solution and understand memory management functions of operating systems.
3. Understand principles of deadlock and the concepts of file system interface.
4. Explain various file system implementation and mass storage management functions of operating systems.
5. Understand Protection and security aspects of operating systems and is also exposed to the advanced operating systems.

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

UNIT - II:
Concurrency:
Process Synchronization, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples, Atomic Transactions.
Memory Management:
Swapping, Contiguous Memory Allocation, Paging, Page-Table Structure, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Frames Allocation, Thrashing.

UNIT - III:
Principles of Deadlock:
System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.
File System:
File System Interface, File Concepts, Access Methods and Directory Structure, File System Mounting, File Sharing and Protection.

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

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

UNIT - V:
Protection & Security:
Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection. Security Problem, Program Threats, System and Network Threats Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to protect Systems and Networks, Computer-Security Classifications, Case Studies: UNIX, Linux and Windows.
Advanced Operating Systems:
Distributed Operating Systems, Multi-Processor Operating Systems, Real-Time Operating Systems and Mobile Operating Systems.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Course outcomes:
The students will be able to:

1. Contrast and compare differing structures for operating systems including process management.
2. Apply different CPU scheduling algorithms and various Memory management techniques.
3. Illustrate the use of Bankers algorithm for deadlock avoidance and File system organization.
4. Demonstrate various mass storage management techniques.
5. Analyze different aspects of protection and security concepts.

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

(F216A) DATABASE MANAGEMENT SYSTEMS

(Common to CSE & IT)

Course objectives:

The students will:

1. Understand the architecture and functioning of database management systems as well as associated tools and techniques.
2. Understand and apply the principles of data modeling using entity relationship and develop a good database design.
3. Understand the use of structured query language (SQL) and its syntax.
4. Apply normalization techniques to normalize a database.
5. Understand the need of database processing and learn techniques for controlling the consequences of concurrent data access.

UNIT - I:

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

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

UNIT - II:

Introduction to the Relational Model

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

Relational Algebra

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

UNIT - III:

Form of Basic SQL Query

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

Schema refinement

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

UNIT - IV:

Transaction Concept

Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability– Implementation of Isolation – Testing for serializability- Lock – Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

Recovery and Atomicity

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

UNIT - V:

Data on External Storage

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

Advanced Database Management System

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

Text Books:

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

Reference Books:

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

Course outcomes:

The students will be able to:

1. Describe basic concepts of database system.
2. Design a data model and schemas in RDBMS.
3. Use RDBMS for developing industry applications.
4. Be competent in use of structured query language SQL.
5. Analyze functional dependencies for designing a robust database.

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

(F210E) PROFESSIONAL ETHICS

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

Course objectives:

The students will :

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

UNIT - I: Introduction to Ethics

Corporate Governance – importance of Corporate Governance, Ethics & CSR(Corporate Social Responsibility)……..Indian and western thoughts on ethics.

Value education, dimensions of ethics, goal setting importance of morality and ethics, basic ethical principles, moral developments theories, classification of ethical theories.

UNIT - II: Professional and professionalism

Introduction to profession, professional associations, professional's roles and professional risks.

Professional accountability, successful professional, ethics and profession.

Engineering as social experimentation, engineering ethics, roles of engineers, professional responsibilities, professional rights. Professional etiquettes- Dress code, Telephone call, Email writing.

UNIT - III: Ethical codes and audits

Introduction, need for ethical codes, sample codes, corporate codes, limitations of the codes.

Need for Ethical Audit, Sustainability, Ethical standards, Ethical audit.

UNIT-IV : Human values and ethical living

Introduction, terminology, domains of learning, human values, attitudes, Behaviour values, attitudes and professionals.

Needs of life, harmony in life, what is ethical living, case studies.

UNIT-V: Global issues and safety

Introduction, current scenario, business ethics, environmental ethics, computer ethics, media ethics, war ethics, bio-ethics, research ethics, intellectual property right.

Safety and risk, assessment of risk, risk and cost, engineers responsibility for safety, risk benefit, analysis, risk cause and management, case studies, providing for safe exit, ethical issues of safety.

REFERENCES:

1. Professional ethics by R. Subramanian, Oxford press.
2. Text book on Professional ethics and human values by R.S.Nagarajan, New age international.
3. Professional ethics and human value by D.R.Kiran, Tata McGraw Hills education.
4. Ethics in engineering by Mike W. Martin and Roland Schinzinger, Tata McGraw Hills

education.

5. Fundamental of Ethics by Edmund G Seebauer and Robert L.Barry, Oxford university press.

Course outcomes:

The students will be able to:

1. Ensure understanding essentials of human values and ethical living through basic ethical and moral theories.
2. Have awareness on professionalism, professional responsibilities, professional etiquettes.
3. Help understanding of ethical codes and audit.
4. Lay strong foundations in human values through domains of learning, ethical living through case studies.
5. Develop various solutions in solving of global issues and for its safety and sustainability.

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

(F210B) PROBABILITY AND STATISTICS

(Common to CSE & IT)

Course objectives:

The students will:

1. Learn basic properties of probability and random variables.
2. Understand the types of hypothesis and hypothesis testing.
3. Demonstrate t-distribution, f-distribution and chi-square distribution.
4. Identify relationship between the variables and fitting of curve to the given data.
5. Use queuing models and characteristics.

UNIT-I :

PROBABILITY

Random variables-Definitions of Random variables (Discrete and continuous).Distributions-Binomial, Poisson and normal distributions.

Related properties-Sampling distributions –Sampling distribution of means (σ known and Unknown)

UNIT-II:

TESTING OF HYPOTHESIS

Tests of hypothesis point estimations – interval estimations-Large samples-Null hypothesis – Alternate hypothesis-type I & type II- errors – critical region.

Confidence interval for mean testing of single variance-Difference between the means.

UNIT-III:

SMALL SAMPLES

Confidence interval for the t- distribution – Tests of hypothesis- t- distribution.

F- distribution, χ^2 distribution- Test of Hypothesis.

UNIT-IV:

CORRELATION & REGRESSION:

Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation

CURVE FITTING:

Fitting of straight line -second degree curve- exponential curve-power curve by method of Least squares

UNIT-V:

QUEUING THEORY:

Queue description, characteristics of a queuing model, Poisson process, concept of Birth and death process.

Steady state solutions of (M/M/1: ∞ /FIFO) and (M/M/1: N/FIFO) (Concepts and problem solving).

TEXT BOOKS:

1. Grewal B.S, "Higher Engineering Mathematics", Khanna publications, 42nd edition 2012
2. Engineering Mathematics by B.V.Ramana, Tata McGrawhill Publishing company Ltd New Delhi, 5th edition, 2011

REFERENCES:

1. Probability and Statistics by G.Shankar Rao, I.K.International Publications.
2. KREYSZIG. E, "Advanced Engineering Mathematics" JohnWiley & Sons Singapore, 10th edition, 2012.
3. Veerarajan.T " Engineering Mathematics-I", Tata McGrawhill Publishing Co.New Delhi, 5th edition, 2006.

Course outcomes:

The students will be able to:

1. Classify the types of random variables and calculate mean and variance.
2. Recognize where the binomial distribution could be appropriate model and find mean and variance.
3. Understand the foundation for classical inference involving confidence interval and hypothesis testing.
4. Calculate the correlation and regression to the given data.
5. Describe the queuing system, mean arrival and service rates.

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

(F210C) GENDER SENSITIZATION
(An Activity-based Course)
(Common to CSE, ECE, EEE, ECM, &IT)

- ✓ **Mandatory Course as per AICTE/UGC**

Course Objectives:
The students will:

1. Develop students sensibility with regard to issues of gender in contemporary India.
2. Provide a critical perspective on the socialization of men and women.
3. Introduce students to information about some key biological aspects of genders.
4. Expose the students to debates on the politics and economics of work.
5. Help students reflect critically on gender violence.
6. Expose students to more egalitarian interactions between men and women.

Unit-I: UNDERSTANDING GENDER AND BIOLOGY
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.

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.

Unit – II: GENDER AND LABOUR
Housework: 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. Additional Reading: Wages and Conditions of Work.

Unit – III: 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. Additional Reading: New Forums for Justice.
Thinking about Sexual Violence (Towards a World of Equals: Unit -11)
Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

Text Books:
All the Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha,Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Course Outcomes:

The students will be able to:

1. Develop a better understanding of important issues related to gender in contemporary India.
2. Sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. To attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. To develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

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

(F2161) DATABASE MANAGEMENT SYSTEMS LAB

(Common to CSE & IT)

Course objectives:

The students will :

1. Familiarize with the nuances of database environments towards an information-oriented data-processing oriented framework.
2. Gain a good formal foundation on the relational model of data present sql and procedural interfaces to sql comprehensively.
3. Gain an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design and to motivate the students to relate all these to one or more commercial product environments as they relate to the developer tasks.
4. Present the concepts and techniques relating to query processing by sql engines and present the concepts and techniques relating to ODBC and its implementations.
5. Introduce the concepts of transactions and transaction processing and to present the issues and techniques relating to concurrency and recovery in multi-user database environments.

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

- Reservations and Ticketing

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

The above process involves many steps like

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

complete "Database System" to Roadway Travels.

Examples are given at every experiment for guidance to students.

Experiment – 1.

E-R Model

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

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

Example:

Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

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

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

Note:

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

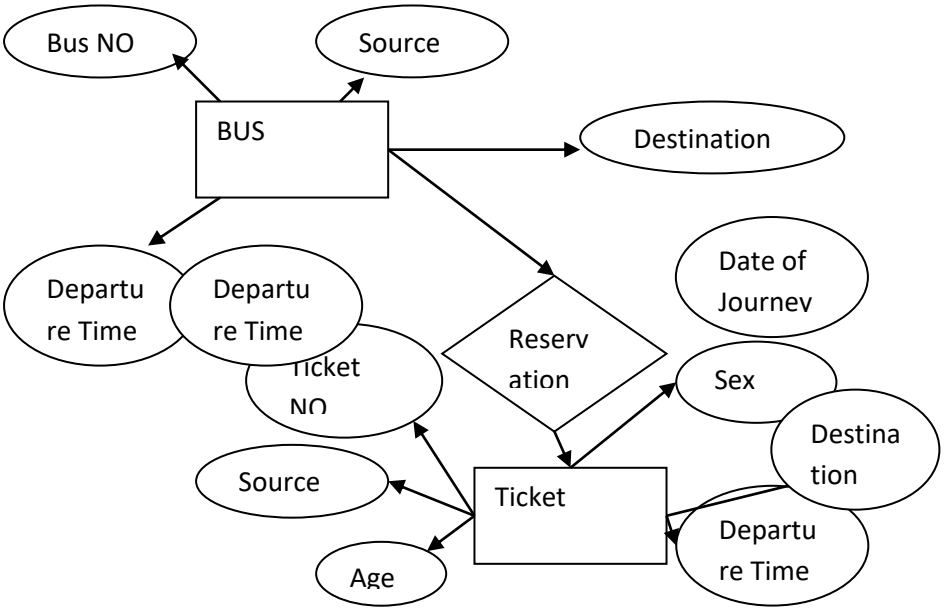
Experiment – 2.

Concept design with E-R Model

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

Example:

E-R diagram for bus



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

Experiment – 3.

Relational Model

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

Example:

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

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

Note:

The student is required to submit a document by Represent relationships in a tabular fashion

to the lab teacher.

Experiment – 4.

Normalization

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

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

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

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

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

Experiment - 5.

Installation of Mysql and Practicing DDL and DML commands

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

Example for creation of a normalized “Passenger” table.

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

Similarly create all other tables.

Note: Detailed creation of tables is given at the end.
Insert data into the above tables.

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

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

Inserting values into "Bus" table

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

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');
Insert into Passenger values (45, 90,'ram', 30,'M','abc12');
Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');
Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');
Few more Examples of DML commands

Select * from Bus; (selects all the attributes and display)
UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

Experiment 6. Querying
In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

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

Experiment – 7. Querying (continued...)
You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN),

GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation

tables. Hint: Use UNION Operator.

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

Experiment – 8.

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

Experiment – 9. Querying

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

Experiment – 10. Procedures

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

Eg: CREATE PROCEDURE myProc()
BEGIN
SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;
End;

Text Books:

Introduction to SQL,Rick F.Vander Lans,Pearson education.

Reference Books:

1. Oracle PL/SQL Programming, Steven Feuerstein,SPD.
2. SQL & PL/SQL for Oracle 10g,Black Book, Dr.P.S.Deshpande,Dream Tech.

Oracle Database ll g PL/SQL Programming, M.Laughlin.TMH.

Course outcomes:

The students will be able to:

1. Understand, appreciate and effectively explain the underlying concepts of database technologies.
2. Design and implement a database schema for a given problem-domain.
3. Normalize a database.
4. Populate and query a database using SQL DML/DDL commands.
5. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.

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B.Tech : IT	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**1.5**

(F2151) DATA STRUCTURES LAB
(Common to CSE, IT & ECM)

Course objectives:
The students will :

1. Define the basic data structures like linked list.
2. Understand the fundamentals and applications of linked list, stacks and queues.
3. Classify different types of tree data structures
4. Understand the concepts of graph data structures.
5. Know the fundamentals of basic searching, sorting and pattern matching algorithms.

Experiment 1:
Write a C program that uses functions to perform the following operations on singly linked list:

I) Creation II) Insertion III) Deletion IV) Traversal V) merge two single linked lists

Experiment 2:
Write a C program that uses functions to perform the following operations on doubly linked list.

I) Creation II) Insertion III) Deletion IV) Traversal

Experiment 3:
Write a C program that implement stack operations using

I) Arrays II) Linked Lists

Experiment 4:
I) Write a C program to convert infix expression to postfix expression using stack
II) Write a C program to evaluate postfix expression

Experiment 5:
I) Programs using recursion
II)Write a C program to convert infix expression to prefix expression using stack

Experiment 6:
Write a C program to implement Linear queue using
I) Arrays II) Linked Lists

Experiment 7:
Write a C program to perform following operations on a circular Queue
I) insertion II) deletion III) search and count

Experiment 8:
Write a C program to perform following operations on a circular DeQueue
I)insertion II) deletion III) search and count

Experiment 9:
I) Write a C Program to implement binary tree traversals
II) Write a C Program to implement AVL tree operations

Experiment 10:
I) Implementation of a Graph representation using Adjacency Matrix
II) Write a C program to implement graph traversals.

Experiment 11:
I)Write a C program to implement Linear search
II) Write a C program to implement Binary Search

Experiment 12:
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
I) Bubble sort II) Selection sort III) Insertion Sort

Experiment 13:
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
I) Merge sort II) Quick sort

Experiment 14:
I)Write a C Program to Implement the Hashing technique
II)Write a C Program to Implement the KMP Pattern Searching Algorithm

Text Books:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

Reference Books:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, E. Balagurusamy, TMH.

Course outcomes:
The students will be able to:

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linked list.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

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B.Tech : IT	**L**	**T-P-D**	**C**
II Year -I Semester	**0**	**0-3-0**	**1.5**

(F2152) OPERATING SYSTEMS LAB

(Common to CSE & IT)

Course objectives:
The students will :

1.Describe CPU scheduling algorithms.
2.Understand the file allocation and file organization strategies.
3.Understand banker's algorithm for deadlock prevention and avoidance.
4.Explain various memory management and page replacement algorithms.
5.Discuss paging and allocation of frames.

Experiment 1: Simulate the following CPU scheduling algorithms
a) FCFS
b) SJF

Experiment 2: Simulate the following CPU Scheduling algorithms
a) Round Robin
b) Priority

Experiment 3: Simulate all file allocation strategies
a) Sequential
b) Linked
c) Indexed

Experiment 4: Simulate MVT and MFT.

Experiment 5: Simulate the following File Organization Techniques
a) Single level directory
b) Two level directory

Experiment 6: Simulate the Hierarchical File Organization Technique

Experiment 7: Simulate the following Disk scheduling algorithms
a) FCFS
b) SSTF
c) SCAN
d) C-SCAN

Experiment 8: Simulate Bankers Algorithm for Dead Lock Avoidance.

Experiment 9: Simulate Bankers Algorithm for Dead Lock Prevention.

Experiment 10: Simulate all page replacement algorithms
a) FIFO
b) LRU
c) LFU

Experiment 11: Simulate Paging Technique of memory management.

Experiment 12: Simulate on Allocation of Frames.

REFERENCE BOOKS:

1. Operating System Concepts-Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th Edition, John Wiley.
2. Operating Systems- A Concept based Approach- D.M.Dhamdhere, 2nd Edition, TMH.
3. Principles of Operating Systems- Naresh Chauhan, Oxford Higher Education.

4. Operating System A Design Approach-Crowley, TMH.
5. Modern Operating Systems-Andrew S Tanenbaum, 2nd Edition Pearson, PHI.

Course outcomes:

The students will be able to:

1. Apply different CPU scheduling algorithms.
2. Implement different directory structures.
3. Analyze deadlock prevention and avoidance algorithms.
4. Demonstrate various page replacement algorithms.
5. Practice various disk scheduling algorithms.

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

(F225A) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to CSE, IT & ECM)

Course objectives:
The students will :

1. Familiarize with constructors and string handling functions
2. Explain inheritance and polymorphism
3. Be familiar with packages and interfaces
4. Be familiar with exception handling and multithreading
5. Be familiar with applet programming, event handling and scripting.

UNIT – I:

Introduction: OOP concepts, history of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program.

Classes and Objects: concepts of classes, objects, constructors, methods, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion.
String handling: String, String Buffer, String Tokenize.

UNIT – II:

Inheritance: base class object, subclass, member access rules, super uses, using final with inheritance, method overriding, abstract classes
Interfaces: defining an interface, implementing interface, differences between classes and interfaces and extending interfaces.

Packages: Defining, creating and accessing a package, importing packages, access control, exploring package - java.io

UNIT – III:
Exception handling: concepts of exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of-try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Multithreading: differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT – IV:

Applets: concepts of applets, differences between applets and applications, life cycle of applet, types of applets, creating applets, passing parameters to applets.

Event Handling: events, event sources, event classes, event listeners, delegation event model, handling mouse and key board events, adapter classes. The AWT class hierarchy, user interface components-labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists

UNIT – Layout manager: layout manager types-border, grid, flow, card and grid bag.

Swing: Introduction, limitations of AWT, components, containers,
Exploring swing- JApplet, JFrame and JComponent, Icons and Labels, Text fields, buttons – The JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees and Tables.

TEXT BOOKS:

1. Java The complete reference, 8th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, up dated edition, T.Budd, Pears on education.

REFERENCE BOOKS :

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

Course outcomes:

The students will be able to:

1. Familiar with constructors and string handling.
2. Understand inheritance and polymorphism.
3. Understand packages and interfaces.
4. Understand exception handling and multithreading.
5. Understand applet programming.

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

(F225C) DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE & IT)

Course objectives:

The students will :

1. Know about on time and space complexity and learning asymptotic notations
2. Understand union and find algorithms, connected components and bi-connected components.
3. Gain knowledge in divide and conquer methods.
4. Familiar with greedy method and dynamic programming.
5. Understand the back tracking and can application.

UNIT - I:

Introduction

Algorithm, Pseudo Code for expressing Algorithms, Performance Analysis: Space Complexity, Time Complexity, asymptotic Notations: Big-oh Notation, Omega Notation, Theta Notation, Little-oh Notation.

Disjoint Sets: Disjoint Set Operations, Union and Find Algorithms, Spanning Trees, Connected Components and Biconnected Components.

UNIT - II:

Divide and Conquer

General Method, Applications: Binary Search, Quick Sort, Merge Sort, Stassen's Matrix Multiplication.

Greedy Method

General Method Applications: Job Sequencing with Deadlines, 0/1 Knapsack Problem, Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms, Single Source Shortest Path Problem, Huffman Codes.

UNIT - III:

Dynamic Programming

General Method, Principle of Optimality, Applications: Multistage Graphs, Matrix Chain Multiplication, Optimal Binary Search Trees, 0/1 Knapsack Problem.

All Pairs Shortest Path Problem, Travelling Sales Person Problem, Reliability Design.

UNIT - IV:

Backtracking

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

UNIT - V:

Branch and Bound

General Method, Applications: Travelling Sales Person Problem, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution.

NP-Hard and NP-Complete Problems: Basic Concepts, Non-Deterministic Algorithms, NP-Hard and NP-Complete Classes, Cook's Theorem.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Course outcomes:

The students will be able to:

1. Gain knowledge on time complexity and space complexity and learn asymptotic notations such as big oh, omega, and theta notations.
2. Understand union and find algorithms, connected components and bi-connected components.
3. Master divide and conquer method and can apply this to solve some sorting and searching problems.
4. Be familiar with greedy method and dynamic programming can apply these to solve verity of problems.
5. Gain knowledge on back tracking and can apply this to solve n-queens problem, sum of subsets problem, graph coloring problem and Hamiltonian cycles problems.

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

(F226A) COMPUTER NETWORKS

(Common to CSE & IT)

Course objectives:

The students will :

1. Recognize various layering approaches for networking and understand the functionalities of physical layer.
2. Identify the data link layer protocols, multi access protocols, Ethernet technologies and various internetworking devices.
3. Examine design issues of network layer, services provided to above layer and routing, and congestion control protocols.
4. Examine IP protocol, addressing, various protocols like CIDR, ICMP,ARP and RARP of internet Layer and examination of transport layer services.
5. Examine Transport layer protocols like TCP, UDP, RPC and various congestion controlling mechanisms, including application layer services, protocols like HTTP, FTP, E-Mail etc.

UNIT - I:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

UNIT - II:

Data Link Layer: design issues, Framing, Error Detection and Error Correction, Block Coding, Hamming Distance, CRC, Flow control and error Control.

Protocols: Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols..

Connecting Devices: Repeaters, Hubs, Switches, Gateways and Bridges - Learning and Spanning tree bridges.

Multi Access protocols- Random access - . ALOHA, CSMA, CSMA/CD and CSMA/CA, Controlled access, Channelization. Ethernet IEEE 802.3, IEEE 802.5, IEEE 802.11

UNIT - III:

Network Layer: Network layer design issues, Store and forward packet switching, connection less and connection oriented network services.

Internetworking: Protocols-IPV4 and IPV6, Logical Addressing-IPV4, IPV6,Tunnelling and Packet Fragmentation.

Address Mapping: ARP, RARP, DHCP, ICMP and IGMP.

Routing Algorithms: Shortest Path Finding and Distance Vector Routing Algorithms.

UNIT - IV:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), The TCP Connection Establishment, The TCP Connection Release.

Crash recovery, The TCP sliding window, The TCP congestion control, Improving Quality of Service Techniques: Leaky Bucket Algorithm.

UNIT - V:

Application Layer: Introduction, services, Application layer paradigms.

Applications: DNS, WWW, HTTP, FTP, E-MAIL, TELNET, SNMP, SSH.

TEXT BOOKS:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCES BOOKS:

1. "Computer Networks", 5E, Peterson, Davie, Elsevier
2. "Introduction to Computer Networks and Cyber Security", Chawan - HwaWu, Irwin, CRC Publications.
3. "Computer Networks and Internets with Internet Applications", Comer .

Course outcomes:

The students will be able to:

1. Demonstrate the networking concepts, various Layering approaches and their functionalities.
2. Understand the protocols of Data Link layer, how a medium can be shared among multiple devices, Ethernet technologies and internetworking devices used.
3. Work on fragmentation, assigning of logical address and judge on routing, congestion.
4. Demonstrate the working of IP Protocol, other protocols of internet layer and services of transport layer.
5. Explain the transport layer and application layer protocols, their working.

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

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

(F226B) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSE & IT)

Course objectives:

The students will :

1. Know the basic terminology of functions, relations and sets and to demonstrate the knowledge of their associated operations.
2. Understand the principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
3. Know how to solve advanced mathematical problems, apply various methods of mathematical proof, and communicate solutions in writing.
4. Select graph theory basics in solving computer science 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.

Algebraic structures:

Algebraic systems Examples and general properties, Semi groups and monoids, groups, sub groups, homomorphism, Isomorphism.

UNIT - III:

Elementary Combinatorics:

Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems,

The principles of Inclusion – Exclusion: The principles of Inclusion – Exclusion. Pigeon hole principles and its application.

UNIT - IV:

Generating Functions: Generating Functions, Function of Sequences Calculating Coefficient of generating function,

Recurrence relations: solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

UNIT - V:

Graph Theory:

Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs.

Applications of Graph Theory: Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text Books:

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics by RK Bisht, HS Dhami, Oxford University Press.

Reference Books:

1. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.
2. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi.Pearson Education
3. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.

Course outcomes:

The students will be able to:

1. Apply logic expressions for a variety of applications.
2. Visualize data numerically and/or graphically.
3. Choose mathematical principles and logic design.
4. Use the notions of propositions and predicate formulae, satisfiability and formal proof.
5. Apply logical reasoning to solve a variety of problems to build an expert system.

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B.Tech : IT	**L**	**T-P-D**	**C**
II Year - II Semester	**2**	**0-0-0**	**2**

(F220D) BIOLOGICAL SCIENCES

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

Course objectives:

The students will :

Students will be introduced to the basics of biology such as cell structure and functions, inheritance & evolution, systems of human life, basic concepts of genetics, and an introduction to microbiology.

UNIT - I:

Basic Biology: Introduction, Living organisms.

Functions of Cell organelles: Cell structure and Organelles, Organogenesis.

UNIT - II:

Human Anatomy: Systems of Life-Digestion, Respiration, Cirulatory Systems.
Excretion, Reproduction, and Nervous systems.

UNIT - III:

Biochemistry: Diet and Nutrition- Macro (Carbohydrates, proteins, lipids) - and Micronutrients (vitamins).
Minerals: Essential minerals and their role; deficiency symptoms and their role; deficiency symptoms.

UNIT - IV:

Microbiology: Micro organisms-Classification of Microorganisms.
Advantages and disadvantages of microorganisms: Beneficial and harmful effects of Bacteria, Fungi and Viruses.

UNIT - V:

Genetics: Basic principles of Mendel, molecular genetics, structure and function of genes and chromosomes.
Gene expressions: Transcription and Translation, gene expression and regulation

Text Books:

1. P K Gupta ,"Elements of Biotechnology", RASTOGI Publications
2. Dr RC Dubey ,"Advanced Biotechnology", S Chand Publications.

Reference Books:

1. "Cell biology",Rastogi Publications
2. Microbiology,PELCZAR
3. Biotechnology,U.sathyanarayana

Course outcomes:

The students will be able to:

1. Acquire the Knowledge of basic biology.
2. Acquire the Knowledge of Human Biological Systems.

3. Acquire the knowledge of Nutrients.
4. Acquire knowledge of Microorganisms.
5. Acquire the knowledge gene expression.

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B.Tech : IT	**L**	**T-P-D**	**C**
II Year- II Semester	**2**	**0-0-0**	**0**

(F220E) ENVIRONMENTAL SCIENCES
(Common to CSE,ECE,ECM,EEE&IT)

Course objectives:
The students will :

1. Know the importance of Environment is a key to the future of mankind.
2. Understand the Global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues.
3. Study of environmental studies encourages students to explore the social, aesthetic, ethical, scientific, and technical aspects of environmental issues.
4. Apply modeling to understand the behavior make predictions for future and plan management in view of changing environmental conditions.

UNIT - I:

Ecosystems & Natural Resources, Biodiversity: Concept, Classification of Resources: Water resources, Land resources, land degradation, Forest resources, Mineral resources, Energy resources.

Concept of ecosystem: Classification of ecosystem, Functions of ecosystem. Biodiversity, Level, values, hotspots of biodiversity, Threats To Biodiversity, Conservation Of Biodiversity.

UNIT - II:

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

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

UNIT - III:

Environmental Policy, Legislation, Rules And Regulations : Environmental Protection Act: Air (Prevention and control of pollution) Act-1981, Water (Prevention and control of pollution) Act-1974, Forest Conservation Act .

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

TEXT BOOKS:

1. TEXT BOOK OF ENVIRONMENTAL Science and Technology by M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao.
3. Introduction to Environmental Studies by K.Mukkanti
4. Text book of Environmental studies by Kaushik & Anubha kaushik

REFERENCE BOOKS:

1. Tata McgrawHill : Introduction to Environmental Studies by Benny Joseph
2. Environmental Studies by Erach Bharucha 2005, University Grants Commission,

University Press.

Course outcomes:

The students will be able to:

1. Understand the importance of natural resources and use them efficiently and knowing how to conserve biodiversity
2. Imply environment plan in developing in any sort of environmental projects.
3. Apply the environmental legislation in every walk of life and reserve the natural resources for future generations in sustainable manner.

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B.Tech : IT	**L**	**T-P-D**	**C**
II Year - II Semester	**0**	**0-3-0**	**1.5**

(F2251) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, IT & ECM)

Course objectives:
The students will :

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

Experiment 1:
Write java programs that implement the following
a) Constructor b) Parameterized constructor
c) Method overloading d) Constructor overloading.

Experiment 2:
a) Write a Java program that checks whether a given string is a palindrome or not.
Ex: MADAM is a palindrome.
b) Write a Java program for sorting a given list of names in ascending order.
c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use String Tokenizer class of java.util

Experiment 3:
Write java programs that uses the following keywords
a) this b) super
c) static d) final

Experiment 4:
a) Write a java program to implement method overriding
b) Write a java program to implement dynamic method dispatch.
c) Write a Java program to implement multiple inheritance.
d) Write a java program that uses access specifiers

Experiment 5:
a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
c) Write a Java program that displays the number of characters, lines and words in a text file

Experiment 6:
a) Write a Java program for handling Checked Exceptions.
b) Write a Java program for handling Unchecked Exceptions

Experiment 7:

a)Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.

b)Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

Experiment 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

Experiment 9:

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

Experiment 10:

a) Write a Java program for handling mouse events.

b) Write a Java program for handling key events.

Experiment 11:

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num 2.

The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exception in a message dialog box.

Experiment 12:

a) Write a java program that simulates 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 l Light is on when the program starts.

b) Write a Java program that allows the user to draw lines, rectangles and ovals

Experiment 13:

Create a table in Table.txt file such that the first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component

TEXT BOOKS:

1. Java;the complete reference,8th editon ,Herbert Schildt, TMH.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited

Course outcomes:

The students will be able to:

1. Write java programs using arithmetic operators, control statements, type conversion, constructors and string handling.

2. Write java programs for inheritance and polymorphism.
3. Write java programs for creation of user defined packages and interfaces.
4. Write java programs for exception handling and multithreading.
5. Write java programs for creation of applets.

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

(F315A) PYTHON PROGRAMMING
(Common to CSE & IT)

Course objectives:
The students will :

1. Learn how to design and program Python applications.
2. Learn how to use lists, tuples, and dictionaries in Python programs.
3. Learn how to identify Python object types, Components, decision statements, pass arguments in Python.
4. Learn how to build and package Python modules for reusability, design object oriented programs with Python classes,use class inheritance in Python for reusability.
5. Learn how to use exception handling in Python applications for error handling

UNIT - I:

Programming paradigms: Structured programming vs object oriented programming, OOPs fundamentals- class, object, abstraction, encapsulation, polymorphism, and inheritance; Introduction to Python Getting started to Python- an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements Values and types, Variables and keywords, statements, evaluating expressions, operators and operands, order of operations, composition.

Functions: function calls, type conversion, type coercion, pre-defined functions, composition, user define functions, flow of execution, passing parameters, function parameters and scope. Conditionals and recursion modulus operator, Boolean expression, logical operators, conditional execution, alternative execution, chained and nested conditionals, return statement; Recursion, infinite recursion.

UNIT - II:

Python data structures: Strings Creating, initializing and accessing the elements; String operators, comparing strings using relational operators; String functions and methods.

Lists: Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending, updating and deleting elements; List operations; List functions and Methods, list parameters, nested lists, Matrices.

Dictionaries

Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, dictionary operations traversing, appending, updating and deleting elements, Dictionary functions and methods.

Tuples: Mutability and tuples, Immutable concept, creating, initializing and accessing the elements in a tuple, Tuple functions. Set: operations and methods, Frozenset: operations and methods

UNIT - III:

Object oriented programming using Python: creating python classes, classes and objects: user defined compound types, attributes, instances as arguments, instances as return values, objects are mutable, copying, Access modifiers, classes and functions: pure function, modifiers;

Exceptions: raising exceptions, handling exceptions, exception hierarchy.

UNIT - IV:

Classes and methods: object oriented features, optional arguments, initialization method, operator overloading and polymorphism.

Inheritance: Basic Inheritance: extending built-ins, overriding and super; Multiple inheritance: the diamond problem, different sets of arguments.

UNIT - V:

Files handling and Exceptions: Text files, writing variables, Directories, Pickling;

Database Programming in Python: Connection module, connect MySQL Data base, perform DDL, DML and DQL operations.

Advanced Topics in Python, Machine learning, Numeric and scientific library

Text Books:

1. Python 3 Object Oriented Programming, Dusty Phillips, Packet Publishing, 2010.
2. Programming in Python 3 - A complete Introduction to the Python Language- Second Edition, Mark Summer fiels, Addison-Wesley 2010.

Reference Books:

1. Programming Python- 4th Edition, Mark Lutz, O'Reilly, 2011.
2. Object-Oriented Programming in Python, Michael H, Goldwasser, David Letscher, Pearson Prentice Hall, 2008.

Course outcomes:

The students will be able to:

1. Describe to design and program Python applications.
2. Analyze and conversion of to use lists, tuples, and dictionaries in Python programs.
3. Explain the concept to identify Python object types, Components, decision statements, pass arguments in Python.
4. Apply decision for building and package Python modules for reusability, design object-oriented programs with Python classes, use class inheritance in Python for reusability.
5. Design and develop Python applications with database connectivity.

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

(F315B) SOFTWARE ENGINEERING

(Common to CSE & IT)

Course objectives

The students will:

1. Analyze basic Software engineering methods.
2. Describe software engineering layered technology and Process frame work.
3. Design software architecture and UML modeling.
4. Recognize testing approaches such as unit testing and integration testing.
5. Demonstrate software evolution and related issues such as version and risk management.

UNIT - I:

Introduction to Software Engineering: The evolving role of Software, changing nature of Software, Software Myths. A Generic view of process: Software engineering- A layered technology, a process framework,

The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models. Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System Analysis Models: Context models, behavioral models, data models, object models, structured methods

UNIT - III:

Design Engineering: Design process and Design quality, Design concepts, the design model. Creating an architectural design: Software architecture, Data design, Introduction to UML, Importance of modeling, Principle of modeling, Concepts of modeling and architecture.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process

and Products: Software Measurement, Metrics for software quality.

UNIT - V:

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.
Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering A Practitioner's Approach, Roger S Pressman, 6th edition. McGraw-Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS:

1. The Unified Modeling Language, User Guide by Grady Booch, James Rambaugh, Ivar Jaccobson.
2. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
3. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008

Course outcomes
The students will be able to:

1. Apply software engineering principles and techniques.
2. Evaluate requirements for a software system.
3. Apply the process of analysis and design using the object-oriented approach.
4. Write test cases for different requirement and implement testing.
5. Evaluate different version and risk management.

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

(F316A) AUTOMATA AND COMPILER DESIGN

Course Objectives:
The students will :

1. Illustrate different phases of compilation.
2. Describe the steps and algorithms used by language translators and features.
3. Enumerate top down and bottom up parsing techniques used in compilation process.
4. Learn the syntax directed translation and type checking and learning the effectiveness of optimization.
5. Develop algorithms to generate code for a target machine.

UNIT – I

Formal Language and Regular Expressions: Languages, Definition Language regular expressions, Finite Automata-DFA, NFA.

Conversions: Conversion of regular expression to NFA, NFA to DFA, Applications of Finite Automata to lexical analysis-lex tools.

UNIT – II

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

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

UNIT – III

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

Type checking: Type checking, type conversions, equivalence of type expressions, overloading of functions and operations. Context sensitive features- Chomsky hierarchy of languages and recognizers

UNIT – IV

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

Code optimization: Principal sources of optimization of basic blocks, peephole optimization, flow graphs, data flow analysis of flow graphs.

UNIT – V

Code generation: Machine dependent code generation, object code forms, generic code generation algorithm, register allocation and assignment using DAG representation of Block.

TEXT BOOKS:

1. Compilers Principles, Techniques & Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffery D. Ullman, Pearson Addison Wesley Education, Second Edition.
2. Modern Compiler Implementation in C, Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS:

1. Lex & yacc , John R. Levine, Tony Mason, Doug Brown, O"reilly
2. Modern Compiler Design, Dick Grune, Henry E. BAL, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler, Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.
5. Systems Programming and Operating Systems, D

Course Outcomes:

The students will be able to:

1. Analyze phases of compilation, particularly lexical analysis, parsing, semantic analysis and code generation.
2. Construct parsing tables for different types of parsing techniques.
3. Classify the Semantic Analysis and Intermediate code generation phase.
4. Apply code optimization techniques to different programming languages.
5. Generate object code for natural language representations.

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

(F316B) DATA WAREHOUSING AND DATA MINING

Course Objectives:
The students will :

1. Identify the scope and essentiality of data warehousing and data mining.
2. Discuss data warehouse with dimensional modeling and implement the association rule mining algorithms.
3. Explain different data mining techniques such as classification and prediction.
4. Discuss about various clustering techniques and complex data types.
5. Develop research interest towards advances in data mining.

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining

Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Attribute-Oriented Induction.

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis.

UNIT III

Classification: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods.

Prediction: Simple linear regression, Logistic Regression, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods.

UNIT IV

Cluster Analysis Introduction: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multi relational Data Mining.

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Applications and Trends in Data Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

TEXT BOOK:

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

REFERENCE BOOKS:

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining,K.P.Soman,S.Diwakar,V.Ajay,PHI,2008.

Course Outcomes:

The students will be able to:

1. Apply data mining techniques such as characterization, comparison, association, classification.
2. Apply data warehousing and association rule mining techniques.
3. Apply various classification and prediction techniques.
4. Compare and contrast various clustering techniques for better organization and retrieval of data.
5. Demonstrate knowledge on mining complex types of data.

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

(F310B) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to EEE,IT,CE)

Course Objectives:
The students will :

This course is intended to familiarize the students with the basics of management's concepts, production and cost analysis concepts, trends in economic environment and financial accounting topics.

UNIT I

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

UNIT II

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

UNIT III

Types of Markets & Economic Environment:
Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.
Pricing-Objectives and Policies of Pricing. Methods of Pricing. Trends in economic Environment: Inflation, GDP, Introduction to GST, Interest rates.

UNIT IV:

Introduction to Financial Accounting
Accounting concepts and Conventions - Introduction IFRS - Double - Entry Book Keeping, Journal, Ledger, Trial Balance.
Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments)

UNIT V:

FINANCIAL ANALYSIS
Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.
Du Pont Chart analysis. Theoretical concept of Fund Flow Statements.

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey&Chrystel, Economics, Oxford University Press, 2012.
4. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2014.
5. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2014.
6. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2014.

Course Outcome:

The students will be able to:

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

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B.Tech : IT	**L**	**T-P-D**	**C**
III Year - I Semester	**0**	**0-4-0**	**2**

(F3151) PYTHON PROGRAMMING LAB
(Common to CSE & IT)

Course objectives:
The students will :

1. Implement Basic input /output operations with various Data Types supported by python.
2. Develop functions for code reusability and experiment string manipulation operations with the use of inbuilt functions.
3. Create a python program for experimenting list, tuple and dictionary.
4. Demonstrate Class and objects to make use of object oriented programming concepts.
5. Implement File handling operations to access the contents of file.

Experiment 1.

i. Write a python program to obtain user input data (int, float, string) and display.
ii. Write a python program to find the roots of a quadratic equation
iii. Write a python program to perform arithmetic operations (+, -, *, /, %) for given input values and printout the result values.

Experiment 2.

i. Write a python programs that use both recursive and non-recursive functions to find the factorial of a given integer
ii. Operators and Operands in Python: (Arithmetic, relational and logical operators), operator precedence, Expressions and Statements.
iii. (Assignment statement); Taking input (using raw input () and input ()) and displaying output (print statement); Putting Comments.

Experiment 3.

i. Write python programs to perform operation on Strings using following functions: len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitile, partition, replace, join, split, count, decode, encode, swapcase.
ii. Enter the details of 5 students and display the details sequentially.

Experiment 4.

i. Write python programs to perform List operators: (joining, list slices)
ii. Write python programs to perform List functions: len, insert, append, extend, sort, remove, and reverse, pop.
iii. Write python programs to check whether the string is palindrome or not?

Experiment 5.

i. Write python programs to perform Tuple functions: cmp(), len(), max(), min(), tuple()
ii. Write python programs to check whether the word is present in the tuple or not?
iii. Write python programs to Take a string as (“1234567890”) and create a pair {(1,2),(3,4),(5,6),(7,8),(9,0)} using tuple.

Experiment 6.

i. Write python programs to perform Dictionary functions & Methods: cmp, len, clear(),

get(), has_key(), items(), keys(), update(), values() .

ii. Write python programs to Create a list of animal using dictionary variable "animal" and find out if the specific animal present in the list or not?

Experiment 7.

i. Write a python program to create a class, its objects and accessing attributes.

ii. Create a Customer class and check the balance and withdraw and deposit some amount.

Experiment 8. Write a python script to implement exception handling.

i. Check whether the input no is integer or not.

ii. Handel the exceptions that are come at the time of division.

Experiment 9. Write a python script to perform inheritance.

Experiment 10. Write a python script to perform various FILE handling operations.
Open, close, read, write, copy.

Experiment 11.

i. Write a python script to connect to the database and perform DDL operations.

ii. Create table, insert data into table and display the table data.

Experiment 12. Write a python script to connect to the database and perform various DML and DQL operations.

Text Books:

1. Programming in Python 3- A complete Introduction to the Python Language- Second Edition, Mark Summer fiels, Addison-Wesley 2010.
2. Programming Python- 4th Edition, Mark Lutz, O'Reilly, 2011.

Reference Books:

Object-Oriented Programming in Python, Michael H, Goldwasser, David Letscher,

Pearson Prentice Hall, 2008

Course outcomes:

The students will be able to:

1. Apply Basic input /output operations for working with different data types in python.
2. Design functions for achieving code reusability and string manipulations.
3. Create a python program for list, tuple dictionary.
4. Demonstrate Class and objects.
5. Implement File handling operations.

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B.Tech : IT	**L**	**T-P-D**	**C**
III Year – I Semester	**0**	**0-3-0**	**1.5**

(F3152) SOFTWARE ENGINEERING LAB
(Common to CSE & IT)

Course objectives:

The students will :

1. Analyze problem statement and develop software requirement sheet for system.
2. Describe the functional oriented diagrams: Data flow diagram.
3. Design test plan document and specification of a system.
4. Describe the test cases for web application.
5. Demonstrate the use of selenium with different browsers.

Experiment 1.

Write down the problem statement for a suggested system of relevance

Experiment 2.

Do requirement analysis and develop software requirement specification sheet for any system.

Experiment 3.

Draw the E-R diagram for the suggested system

Experiment 4.

To perform the function-oriented diagram: Data Flow Diagram (DFD)

Experiment 5.

Create a test plan document for any application (e.g. Library Management System).

Experiment 6.

Study the specifications of ATM System and Write functional test cases

Experiment 7. Study the specification of different type of insurance policies, write the functional test case.

Experiment 8.

Write the test cases for any Web application.

Experiment 9.

a) Write the test cases for java program using relational operators.
b) Write the test cases for java program using string compressions.

Experiment 10.

a) Write the test cases for java program using multi-dimensional array.
b) Write the test cases for java program using method overloading.

Experiment 11.

Write a program to launch selenium tool with different browsers

Experiment 12.
Study any Web Application using Selenium ID.

Course outcomes:

The students will be able to:

1. Apply software principles and techniques for software requirement specification.
2. Design data flow diagram.
3. Apply different test plan cases.
4. Write programs for various testing scenarios.
5. Use selenium for web applications.

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B.Tech : IT	**L**	**T-P-D**	**C**
III Year - I Semester	**0**	**0-3-0**	**1.5**

(F3162) DATA MINING LAB

Course Objectives
The students will :

1. Understand the concept of the credit data set.
2. Discuss to perform data mining tasks using a data mining toolkit (such as open source WEKA).
3. Express the practical exposure on implementation of well known data mining tasks.
4. Examine to real life data sets for analysis and prediction.
5. Predict the performance evaluation of data mining algorithms in a supervised and an unsupervised setting.

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 Error! Hyperlink reference not valid. Excel Error! Hyperlink reference not valid. version of the German credit data. (Down load from web) 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.
(Turn in your answers to the following tasks)

Experiment 1: Study thoroughly the credit assessement problem.

Experiment 2: List all the categorical (or nominal) attributes and the real-valued attributes separately.

Experiment 3: What attributes do you think might be crucial in making the credit assessement? Come up with some simple rules in plain English using your selected attributes.

Experiment 4: 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.

Experiment 5: 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?

Experiment 6: Is testing on the training set as you did above a good idea? Why or Why not?

Experiment 7: One approach for solving the problem encountered in the previous question is using cross-validation? Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

Experiment 8: 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.

Experiment 9: 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 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

Experiment 10: 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)?

Experiment 11: 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?

Experiment 12: 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?

Experiment 13: 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).

Experiment 14: Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

TEXT BOOK:

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

REFERENCE BOOKS:

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI,2008.

Course Outcomes

The students will be able to:

1. Apply data mining process and important issues around data cleaning, pre-processing and integration.
2. Use various kinds of data mining tools.
3. Examine principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.
4. Show practical experience using data mining techniques on real world data sets.
5. Show hands-on experience working with all real data sets.

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

(F326A) WEB TECHNOLOGIES

Course objectives:
The students will :

1. Get the best technologies for solving web client/server problems.
2. Solve and use JavaScript for dynamic effects and form input entry.
3. Recognize appropriate client-side or server-side applications.
4. Receive ability to adapt to changing web development and design skills and solid understanding of common design trends.
5. Provide web application development software tools i.e. AJAX, PHP and xml etc. and identify the environments currently available on the market to design web sites.

UNIT – I:
Basic Tags of HTML: Introduction HTML5, new HTML5 Form input Types. Cascading Style Sheets.
Introduction to javascript: Declaring variables, functions, event handlers (onClick , onsubmit etc). Form validation.

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

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

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

UNIT – V:

Introduction to PHP: Downloading, installing, configuring PHP, The anatomy of a PHP Page. Basic Security Guidelines, Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions; Switching Flow, Loops.

Code Blocks and Browser Output, Objects, Strings Processing, Form processing, Connecting to database, using cookies, dynamic contents.

Text books:

1. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book
2. Web Technologies, Uttam K Roy, Oxford Press.

Reference books:

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

Course outcomes:

The students will be able to:

1. Analyze and able to develop a dynamic webpage by the use of java script
2. Solve to write a server side java application called JSP to catch form data sent from client, process it and store it on database.
3. Recognize a good grounding of web application terminologies, internet tools, other web services.
4. Conduct modern protocols and systems used on the web (such as HTML, HTTP, URLS, CSS, XML)
5. Design and construct an interactive web site(s) with regard to issues of usability, accessibility and internationalization.

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

(F326B) LINUX PROGRAMMING

Course Objectives:
The students will :

1. Know the basic concept of Linux scripting.
2. Control the resources with various commands.
3. Understand File systems and File structures.
4. Understand the usage of inter process communications (IPC).
5. Understand the concepts of multithreaded programming and socket programming.

UNIT - I

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

UNIT- II

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution.

Shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT - III

Files: File Concept, File System Structure, I-nodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls(File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs.

UNIT - IV

Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication: Introduction to IPC, Pipes and FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory.

Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores. Shared Memory- Kernel support for shared memory, UNIX system V APIs for

shared memory, semaphore and shared memory example.

UNIT -V

Multithreaded Programming: Differences between threads and processes, Thread structure and uses, Threads and Lightweight Processes, POSIX Thread APIs, Creating Threads, Thread Attributes, Thread Synchronization with semaphores and with Mutexes, Example programs.

Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

TEXT BOOKS:

1. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH
2. Unix System Programming using C++, T.Chan, PHI.(UNIT III to UNIT VIII)

REFERENCE BOOKS:

1. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Linux System Programming, Robert Love, O'Reilly, SPD.
   Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.

Course Outcomes:

The students will be able to:

1. Analyze all the Linux utilities, and implement shell scripting.
2. Express pipes and redirection, Linux environment, traps, signals, filter parameters, filter options and Regular Expressions.
3. Describe the basic Linux process structure and the Linux file system.
4. Define Inter-process Communication using pipes, shared memory, semaphores and Messages.
5. Design various client server applications using TCP or UDP protocols.

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

(F320A) MANAGEMENT SCIENCE

Course Objectives
The students will :
This course is intended to familiarize the students with the framework for the managers and leaders in understanding and making decisions related to planning & organizational structure, Operations management, Marketing management, Human resource Management.

UNIT I
Introduction to Business & Management
Types of Business – Sole proprietorship, partnership, Joint stock company, public enterprises and their types, Changing Economic environment, LPG.Nature and Importance of Management, Functions of Management.

Taylor's Scientific Management Theory, Fayol's Principles of Management, Douglas McGregor's Theory X and Theory Y, Systems Approach to Management. 7's frame work, Contingency theory.

UNIT II
Planning & Organizational Structures
Types of planning, nature of planning, levels of planning, planning process, Vision, mission, Objectives of organization. Departmentation, Decentralization, Centralization and Recentralization.

Types of Organization structures - Line organization, Line and staff organization, functional organization, Committee organization, Matrix organization, Cellular Organization, Virtual Organization, Team structure, lean and flat organization structure and their merits, demerits and suitability.

UNIT III
Operations Management & Project Management
Types of Plant Layout-Methods of production Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: $\overline{X}$ chart, R chart, c chart, p chart, Quality, Deming principles

EOQ, ABC Analysis, VED Analysis. TQM, JIT, BPR, Six Sigma. Project management (PERT/CPM): Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path,.

UNIT IV
Human Resources Management
Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Promotion, Performance Appraisal, Grievance Handling and Welfare Administration.

Job Evaluation and Merit Rating, Bench marking (Human Resource) Compensation.Leadership & Motivation- Leadership styles, Motivation- Maslow's Theory, ERG theory, Herzberg's Two factor theory, Groups & Teams.

UNIT V

Marketing Management

Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, New product development, Services marketing, Characteristics of services, Services Mix.

Channels of distribution, Retailing and Basics of Rural Marketing, Digital Marketing, Virtual Marketing, Logistics & Supply chain management.

REFERENCE BOOKS:

1. Principles of Management by James A.F. Stoner, Publisher: Pearson Education; Second edition (2010)
2. Kotler Philip & Keller Kevin Lane: Marketing Management, Publisher: Pearson; 15 edition (15 September 2015)
3. Production and Operations Management, Publisher: PHI; 3 edition (6 February 2012) R. Panneerselvam (Author)
4. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.
5. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.
6. Rao, P. Subba. Essentials of Human Resource Management and Industrial Relations: Text, Cases and Games. Himalaya Publishing House, 2010.
7. Ramaswamy Namakumari: Marketing Management. Publisher: Mc Graw Hill India; 5 edition (2013)

Course Outcomes:

The students will be able to:

1. Evolve a strategy for a business or service organization.
2. Planning and types of organizational structures for a given context.
3. Carry out production operations through Work study and SQC.
4. Understand the Human resource concepts in detail.
5. Analyze markets, competition and pricing strategies, Basics of rural marketing, virtual marketing, Logistics & Digital marketing.

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PRINCIPLES OF PROGRAMMING LANGUAGES
(Professional Elective-I)
(Common to CSE& IT)

Course Objectives
The students will :

1. Discuss the background for choosing appropriate programming languages for certain classes of programming problems.
2. Explain how to solve the principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language.
3. Recognize Increase the capacity to express programming concepts and choose among alternative ways to express things.
4. Discuss principle to design a new programming language.
5. Explain the use of debuggers and related tools.

UNIT I :

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

UNIT II :

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

UNIT III :

Subprograms and Blocks: Fundamentals of sub-programs, Scope of life time of varaibles, static and dynamic scope, design issues of subprograms and operations, local referencing environments, parameter passing methods.

Overloaded sub-programs, generic sub-programs, parameters that are sub-program names, Design issues: Design issues for functions user defined overloaded operators, co routines.

UNIT IV :

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design

issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95. Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

UNIT V:

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study: Python- Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Absraction, Separate Compilation, Module Library.

TEXT BOOK:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education, 2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, rp-2007.

REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A. B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003.
3. LISP Patric Henry Winston and Paul Horn Pearson Education.

Course Outcomes:

The students will be able to:

1. Analyze semantic issues associated with function implementations, including variable binding, scoping rules, parameter passing, and exception handling.
2. Solve the implementation techniques for interpreted functional languages.
3. Show design issues of object-oriented and functional languages.
4. Illustrate with language abstraction constructs of classes, interfaces, packages, and procedures.
5. Demonstrate how to design and construct with using functional languages, be exposed to using logic languages.

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WIRELESS NETWORKS AND MOBILE COMPUTING
(Professional Elective-I)

Course Objectives:
The students will :

1. Understand Wireless Application Standards & Protocols.
2. Discuss the components and important developments in Wireless Communication Networks.
3. Discuss both theoretical and practical issues of mobile computing.
4. Describe the MANET's and its routing protocols.
5. Understand design consideration for wireless networks.

UNIT I

Wireless Transmission: Frequencies for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular system.
(Wireless) Medium Access Control (MAC): Motivation for a Specialized MAC (Hidden and Exposed Terminals, Near and Far Terminals), SDMA, FDMA, TDMA, CDMA, MAC Protocols for GSM.

UNIT II

Wireless LAN: IEEE 802.11, Personal Area Network, IEEE 802.15.1 and IEEE 802.15.4 (Bluetooth and ZigBee), Ad-hoc and Sensor network-Introduction, Characteristics of MANET and Applications.
Mobile Computing: Types of Networks, Architecture for Mobile Computing, 3-tier Architecture

UNIT III

Mobile Computing Environment:
Design Considerations for Mobile Computing, Smart Client Architecture, The Client: User Interface, Data Storage, Performance, Data Synchronization, Messaging. The Server: Data Synchronization, Enterprise Data Source, Messaging.
GSM: Mobile Services, System Architecture, Radio Interface, Protocols, Localization and Calling, Handover, Security, and New Data Services.

UNIT IV

Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.
Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

UNIT V

Mobile OS and Building Mobile Internet Applications: Mobile Operating Systems: WinCE, Palm OS, Symbian OS, Linux, Proprietary OS Client Development: The development process, Need analysis phase, Design phase, Implementation and Testing phase, Deployment phase, Development Tools, Device Emulators.
Thin client: Architecture, the client, Middleware, messaging Servers, Processing a Wireless request, Wireless Applications Protocol (WAP).

TEXT BOOKS:

1. Mobile Communications‖, Jochen Schiller, Addison-Wesley, Second Edition, 2004
2. Mobile Computing, Raj Kamal, Oxford University Press ,2007
3. Martyn Mallik: Mobile and Wireless Design Essentials, Wiley, 2003

REFERENCE BOOKS:

1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML—, Reza Behravanfar, Cambridge University Press, Oct2004.
2. Handbook of Wireless Networks and Mobile Computing‖, Stojmenovic and Cacute, Wiley, 2002

Course Outcomes:

The students will be able to:

1. Apply the concepts of wireless computing as compared to the conventional wire-based computing.
2. Illustrate the Framework and Principles related to wireless communications.
3. Analyze the operation of a range of commonly used wireless communication technologies.
4. Apply the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities.
5. Explain the design consideration for deploying the wireless network infrastructure.

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

Ad hoc SENSOR NETWORKS
(Professional Elective-I)

Course Objectives
The students will :

1. Understand the application, issues and challenges of MANET's.
2. Recognize the various routing protocols in MANET's.
3. Estimate the sensing , communication range and its energy consumption of wireless sensor networks.
4. Classify the security issues of wireless sensor networks.
5. Understand the security issues in wireless sensor networks.

UNIT-I: Introduction to Ad Hoc Wireless Networks
Cellular and Ad Hoc Wireless Networks, Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs.
Routing in MANETs: Classification of Routing Protocols, Topology-based versus Position-based Approaches, Topology based Routing Protocols, Position based Routing, Other Routing Protocols.

UNIT-II: Data Transmission in MANETs
The Broadcast Storm, Multicasting, Geocasting, TCP over Ad Hoc Networks-TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc.
Security in MANETs: Security in Ad Hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

UNIT-III: Basics of Wireless Sensors and Applications
The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications. Sensor Node Hardware

UNIT-IV: Data Retrieval in Sensor Networks
Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT-V: Security in WSNs
Security in Wireless Sensor Networks, Key Management in Wireless Sensor Networks, Secure Data Aggregation in Wireless Sensor Networks.
Introduction to Vehicular Ad Hoc Networks, Introduction to Wireless Mesh Networks

TEXT BOOK:

1. Ad Hoc and Sensor Networks: Theory and Applications, Carlos de Morais Cordeiro and Dharma Prakash Agrawal, World Scientific Publications / Cambridge University Press, 2006.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005.

REFERENCE BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy and B. S. Manoj, Pearson Education, 2004.

2. Guide to Wireless Ad Hoc Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2011.
3. Guide to Wireless Sensor Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2012.

Course Outcomes

The students will be able to:

1. Demonstrate the application, issues and challenges of MANET's.
2. Apply the various routing protocols when ever required.
3. Identify the sensors and know its energy consumption and communication range.
4. Show how data retrieval is done in sensor networks.
5. Predict and deal with the security issues of WSNs.

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

SOFTWARE TESTING METHODOLOGIES
(Professional Elective-II)
(Common to CSE & IT)

Course Objectives
The students will :

1. Explain various software testing issues and solutions in software unit test, integration, regression, and system testing.
2. Discuss how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
3. Explain the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
4. Recognize software test automation problems and solutions.
5. Identify how to write software testing documents, and communicate with engineers in various forms.

UNIT-I:
Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.
Basics concepts of path testing: predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II:
Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domain and interface testing, domains and testability.

UNIT-III:
Paths, Path products and Regular expressions: Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT-IV:
Logic Based Testing: Overview, decision tables, path expressions, kv charts, specifications. State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V:
Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.
Regression testing, Rapid testing, Performance testing of a data base application and HTTP connection for website access.

TEXT BOOK:
1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD (Oreille)
Software Testing in the Real World – Edward Kit, Pearson

Course Outcomes

The students will be able to:

1. Analyze and design test cases using black box testing technique which includes decision tables domain testing and transition testing.
2. Analyze and design test cases for a white box testing technique which includes path testing, data flow graphs and matrix representation for a given problem.
3. Compute the path product and construct Regular Expression which is used to i identify the alternate paths from source node to destination node for any application.
4. Solve how to run test script wizard and Execute how to do performance testing using testing tools including Winrunner and JMeter respectively.
5. Demonstrate the importance of testing and its role in need of software development.

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

INFORMATION RETRIEVAL SYSTEMS
(Professional Elective-II)
(Common to CSE & IT)

Course Objectives
The students will :

1. Describe the difference between information retrieval and database management systems.
2. Describe the domain of Information Retrieval is concerned with the extraction of relevant information from large collections of documents.
3. Select applications to proprietary retrieval systems as well as www, digital libraries and commercial recommendation systems.
4. Understand the main principles and methods underlying the domain of Information retrieval.
5. Discuss recent developments in IR such as collaborative filtering and Latent Semantic Indexing.

UNIT I
Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.
Information Retrieval System Capabilities: Search, Browse, Miscellaneous.

UNIT II
Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction. Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.
Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

UNIT III
Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.
User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

UNIT IV
Information Visualization: Introduction, Cognition and perception, Information visualization technologies. Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.
Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT V
Multimedia Information Retrieval: Models and Languages, Data Modeling, Query Languages, Indexing and Searching.

Libraries: Libraries and Bibliographical systems, online IR system, OPACs, Digital Libraries.

TEXT BOOK:

1. Information Storage and Retrieval systems Theory and Implementation Second Edition
2. Modern Information Retrival by Ricardo Baeza-Yates, Pearson Education, 2007.

REFERENCE BOOKS:

1. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frider, 2nd Edition, Springer.
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
3. Modern Information Retrival By Yates Pearson Education.

Course Outcomes

The students will be able to:

1. Use different information retrieval techniques in various application areas.
2. Apply IR principles to locate relevant information large collections of data.
3. Analyze performance of retrieval systems when dealing with unmanaged data sources.
4. Choose clustering and searching techniques for different database systems.
5. Choose retrieval systems for web search tasks.

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

CLOUD COMPUTING
(Professional Elective-II)
(Common to CSE & IT)

Course Objectives
The students will :

1. Acquaint students with a fundamental understanding of the Cloud Computing and strategies in the new economy.
2. Provide a fundamental understanding of different types of cloud computing applications.
3. Provide insights to implement virtualization techniques.
4. Understand the design of cloud and its architecture.
5. Outlines the categories and multimedia in Cloud Computing.

UNIT-I:

Principles of Parallel and Distributed Computing: Introduction to cloud computing, Cloud computing Architecture.

Cloud services and platforms. Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and Mapreduce.

UNIT-II:

Cloud Platforms in the Industry: Understanding Scientific Applications for Cloud Environments.

Cloud applications, Healthcare and education, Scientific Applications, Business and Consumer Applications.

UNIT-III:

Virtualization, cloud virtualization technology, deep dive: cloud virtualization, Migrating in to cloud computing.

Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems.

UNIT-IV:

Enterprise cloud computing Paradigm, Federated cloud computing Architecture.

SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

UNIT-V:

Cloud management, Organizational Readiness and change management in the cloud age.

Cloud Security, Data security in the cloud, Legal Issues in the Cloud , Achieving Production Readiness for the cloud Services.

TEXT BOOKS:

1. Cloud Computing: Raj Kumar Buyya , James Broberg, andrzej Goscinski, 2013 Wiley
2. Cloud computing: Dr Kumar Saurab Wiley India 2011.

REFERENCE BOOKS:

1. Cloud Computing: Arshdeep Bahga, Vijay Madisetti, 2014, University Press.
2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola,selvi-2013.

Course Outcomes:

The students will be able to:

1. Understand the basic concepts of Cloud Computing and different elements.
2. Analyze and apply the concepts of cloud.
3. Examine the essential processes of an Cloud Computing system.
4. Analyze the impact of Cloud Computing on organizations and strategy.
5. Understands the infrastructure and multimedia concepts.

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UGC AUTONOMOUS

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

INTRODUCTION TO DATA STRUCTURES
(Open Elective-I)

Course Objectives:
The students will :

1. Describe the appropriate data structure like linked list to solve problems in real world.
2. Explain the implementation of linear and non linear data structure mechanisms.
3. Discuss the various techniques of tree data structure.
4. Describe graph data structure.
5. Explain several searching and sorting Techniques.

UNIT - I:
Data Structures-Introduction to Data Structures, abstract data types, Introduction to Linear and Non Linear data structures. Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list.

Circular linked list implementation, Doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II:
Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation.

Queues-operations, array and linked representations. Circular Queue operations, Dequeue, applications of queue.

UNIT - III:
Trees – Definition, Binary tree representation, Binary search tree, binary Tree traversals.

AVL tree – operations, Red Black tree.

UNIT - IV:
Graphs-Terminology, sequential and linked representation.
Graph traversals: Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

UNIT - V:
Searching – Big O Notation,Linear Search and Binary Search.
Sorting-Bubble sort, Insertion Sort, Selection Sort, Merge Sort and Quick sort.

TEXT BOOKS:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

REFERENCES BOOKS:

1. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
2. Design methods and analysis of Algorithms, SK Basu, PHI.

3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press.

Course Outcomes:

The students will be able to:

1. Analyze and apply appropriate data structures for solving computing problems.
2. Use linear and non-linear data structures like stacks, queues, trees and graphs.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting Techniques.

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

INTRODUCTION TO WEB DESIGN
(Open Elective-I)

Course Objectives
The students will :

1. Know regarding internet related technologies.
2. Understand the current industry support for web technologies.
3. Explain the basic concepts of CSS.
4. Visualize the basic concepts of PHP.
5. Understand PHP functions and Methods.

UNIT-I

Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Audience requirement.

Web Design Principles: Basic principles involved in developing a web site, Planning process , Five Golden rules of web designing, Designing navigation bar ,Page design, Home Page Layout, Design Concept.

UNIT-II

Introduction to HTML: What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags, HTML Tables, HTML Forms.

Elements of HTML: Introduction to elements of HTML, working with Text Working with Lists, Tables and Frames, working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT-III

Introduction to Cascading Style Sheets: Concept of CSS, Creating Style Sheet and types of CSS, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties).

CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Colors, Creating page Layout and Site Designs.

UNIT-IV

Introduction to PHP: Downloading, installing, configuring PHP, The anatomy of a PHP Page. Basic Security Guidelines, Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions; Switching Flow, Loops.

Code Blocks and Browser Output, Objects, Strings Processing, Form processing, Connecting to database, using cookies, dynamic contents.

UNIT-V

Introduction to Web Publishing or Hosting : Creating the Web Site, Saving the site, Working on the web site.

Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites.

TEXT BOOKS:

1. Dietel and Dietel : —Internet and World Wide Web - How to Program‖, 5th Edition, PHI/Pearson Education, 2011
2. Web Technologies: HTML,CSS, XML,Php Black Book.

REFERENCE BOOKS:

1. Chris Bates, —Web Programming, building internet applications‖, 2ndEdition, WILEY, Dreamtech, 2008.
2. HTML 5 in simple steps Kogent Learning Solutions Inc, Dreamtech Press
3. Beginning CSS: Cascading Style Sheets for Web Design Ian Pouncey, ichard York Wiley India

Course Outcomes:

The students will be able to:

1. Develop the application of the HTML for document structure.
2. Develop the skills in analyzing the usable of a website.
3. Create dynamic webpage, using PHP.
4. Using PHP to manipulate Files.
5. Develop the concept of web publishing

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UGC AUTONOMOUS

B.Tech : IT	**L**	**T-P-D**	**C**
III Year – II Semester	**0**	**0-3-0**	**1.5**

(F3261) WEB TECHNOLOGIES LAB

Course objectives:
The students will :

1. Use the fundamental concepts and features of java programming language.
2. Recognize the basic principles of object oriented programming which includes inheritance, polymorphism, encapsulation and abstraction and also arrays, data and text file operations.
3. Gain interaction, communication and collaboration, (2) knowledge creation, (3) ease of use and flexibility, and (4) writing and technology skills
4. Execute and incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek.
5. Demonstrate an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Experiment 1. Create HOME PAGE for an online book store

Experiment 2. Login page for an online book store

Experiment 3. Create CATOLOGUE PAGE

Experiment 4.
Create registration form with the following fields Name, Password, confirm password, E-mail id, Phone number, Sex, Date of birth, Address

Experiment 5.
Write JavaScript to validate the following fields of the above registration modify web page appearance using CSS

Experiment 6.
Write an XML file which will display all your subjects Books information such as title, author, isbn, name of the publisher. Create a DTD, XML Schemas to validate this XML document. Create CSS, XSL do display XML data

Experiment 7. Install XAMPP and JOOMLA or Word Press and test.

Experiment 8.
Write Servlet Program to read data submitted from Registration form and store it into the MySql database.

Experiment 9.
Write a user validation web application to read username and password submitted by the user and return successful login if the data matches, otherwise failure login.

Experiment 10.
Write a PHP program to store current date-time in a COOKIE and display the “Last visited on‟ date-time on the web page upon reopening of the same page.

Experiment 11.
Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on we page.

Experiment 12.
Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

Course outcomes:
The students will be able to:

1. Execute dynamic html with java script, methods in JAVASCRIPT, functions iN JAVASCRIPT, events ,Solve JAVASCRIPT, MARKUP elements, style sheets, validation, accessibility, standards, and browsers upon completion.
2. Develop hand-coded web pages using current MARKUP standards.
3. Identify, formulate, and solve engineering problems recognize.
4. Design and conduct experiments, as well as to analyze and interpret data.
5. Apply web application development software tools i.e. AJAX, PHP and xml etc. and Identify the environments currently available on the market to design web sites.

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B.Tech : IT	**L**	**T-P-D**	**C**
III Year - II Semester	**0**	**0-3-0**	**1.5**

(F3262) LINUX PROGRAMMING LAB

Course Objectives
The students will :

1. Know about the Linux environment.
2. Understand the fundamentals of shell scripting/programming.
3. Describe various system calls and their usage.
4. Discuss about the Zombie process, Inter Process Communication.
5. Apply the various Linux system calls for writing C programs to implement IPC.

Note: Use Bash for Shell scripts.

Experiment 1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

Experiment 2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Experiment 3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

Experiment 4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

Experiment 5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

Experiment 6. Write a shell script to list all of the directory files in a directory.

Experiment 7. Write a shell script to find factorial of a given integer.

Experiment 8. Write an awk script to count the number of lines in a file that do not contain vowels.

Experiment 9. Write an awk script to find the number of characters, words and lines in a file.

Experiment 10. Write a c program that makes a copy of a file using standard I/O and system calls.

Experiment 11. Implement in C the following Unix commands using System calls

A . cat B. ls C. mv

Experiment 12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

A. File type. B. Number of links.
C. Time of last access. D. Read, Write and Execute permissions.

Experiment 13. Write a C program to emulate the Unix ls –l command.

Experiment 14. Write a C program to list for every file in a directory, its inode number and file name.

Experiment 15. Write a C program that demonstrates redirection of standard output to a file.Ex: ls > f1.

Experiment 16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

Experiment 17. Write a C program to create a Zombie process.

Experiment 18. Write a C program that illustrates how an orphan is created.

Experiment 19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l | sort

Experiment 20. Write C programs that illustrate communication between two unrelated processes using named pipe.

Experiment 21. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.

Experiment 22. Write a C program that receives the messages (from the above message queue as specified in (21)) and displays them.

Experiment 23. Write a C program that illustrates suspending and resuming processes using signals.

Experiment 24. Write a C program that implements a producer-consumer system with two processes. (using Semaphores).

Experiment 25. Write client and server programs(using c) for interaction between server and client processes using Unix Domain sockets.

Experiment 26. Write client and server programs(using c) for interaction between server and client processes using Internet Domain sockets.

Experiment 27. Write a C program that illustrates two processes communicating using shared memory.

TEXT BOOKS:

1. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
2. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
4. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
   Sed and Awk, O.Dougherty&A.Robbins,2nd edition,SPD.

REFERENCE BOOKS:

1. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Linux System Programming, Robert Love, O'Reilly,SPD.
3. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.

Course Outcomes

The students will be able to:

1. Use Linux environment efficiently.
2. Solve problems using bash for shell scripting.
3. Apply Linux commands and to develop Shell Scripts.
4. Create various processes and communication between them.
5. Configure and manage simple network services on Linux system.

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B.Tech : IT	**L**	**T-P-D**	**C**
IV Year – I Semester	**3**	**0-0-0**	**3**

INTERNET OF THINGS
(Professional Elective-III)
(Common to CSE &IT)

Course Objectives

The students will :

1. Understand the current vision of the Internet of Things and its impact on the world.
2. Classify basic concepts of IoT and M2M & IoT system management.
3. Describe concepts of python language and different python packages.
4. Explain how to design IoT Physical devices with built-ins of python Programs.
5. Identify the advanced concepts of IoT physical servers, cloud offerings.

UNIT-I:

Introduction to Internet of Things –Introduction, Definition and Characteristics of IoT,
Physical Design of IoT – Things inIoT, IoT Protocols, Logical Design of IOT- IoT Functional Blocks, IoTCommunication Models, IoT Communication APIs
IoT Enabling Technologies – Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems.
Domain Specific IoTs – Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

UNIT-II:

IoT and M2M – Introduction, M2M, Difference between IOT and M2M,SDN and NFV for IoT-Software Defined Networking, Network Function Virtualization,
IoT System Management with NETCONF-YANG- Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Network Operator Requirements, NETCONF, YANG, NETOPEER.

UNIT-III:

IoT Systems-Logical Design Using Python-Introduction, Installing Python, Data types and Data Structures, Control Flow, Functions, Modules, Packages, File handling, Date/Time Operations, Classes.
Python Packages of Interest for IoT- JSON, XML, HTTPLib, URLLib, SMTPLib.

UNIT-IV:

IoT Physical Devices and Endpoints – What is an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry PI-Interfaces (Serial, SPI, I2C),Programming Raspberry Pi with Python-Controlling LED, Interfacing an LED and Switch and interfacing a light sensor with Raspberry Pi.

UNIT-V:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage Models and communication APIs.
WAMP-AutoBahn for IoT,Xively Cloud for IoT, Python web application framework Designing a RESTful web API.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti,

Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

References:

Internet of Things by Jeeva Bose 1st edition, Khanna publishing

Course Outcomes

The students will be able to:

1. Analyze current vision of the Internet of Things and its impact on the world.
2. Demonstrate basic concepts of IoT and M2M & IoT system management.
3. Practice the concepts of python language using different python packages.
4. Design IoT Physical devices using python Programming.
5. Categorize advanced concepts of IoT physical servers, cloud offerings.

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

DISTRIBUTED DATABASES
(Professional Elective-III)

Course Objectives:

The students will:

1. Acquire knowledge on parallel and distributed databases and its applications
2. Discuss the topics included in distributed DBMS architecture and design; query processing and optimization.
3. Understand the Management of Distributed Transactions and Concurrency Control.
4. Explain Distributed transaction management and reliability; parallel and object database management systems.
5. Understand the Homogeneous and Heterogeneous Distributed database systems.

UNIT I

Distributed Databases: An Overview

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases,

Distributed Database Design:

A Framework for Distributed Database Design, The Design of Database fragmentation, The allocation of Fragments.

UNIT II

Translation of Global Queries to Fragment Queries: Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

Optimization of Access Strategies: A Framework for Query Optimization, Join Queries, General Queries.

UNIT III

The Management of Distributed Transactions: A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

Concurrency Control: Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT IV

Reliability: Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart.

Distributed Database Administration: Catalog Management in Distributed Databases, Authorization and Protection.

UNIT V

Distributed Database Systems: Commercial Systems, Tandem's ENCOMPASS Distributed Database System IBM's Inter System communication.

Other Homogeneous Distributed Database Systems: DDM: A Distributed Database Manager

Based on Adaplex, Distributed-INGRES.

Heterogeneous Distributed Database Systems: Problems of Heterogeneous Distributed Databases, MULTIBASE.

TEXT BOOKS:

1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez ,Pearson Education, 2nd Edition.

References:

Distributed database management systems- A practical approach,Saeed K Rahimi, Frank S Haug, Wiley Publication, 2010, ISBN 978-0-470-40745-5

Course Outcomes:

The students will be able to :

1. Explain the techniques used for data fragmentation, replication, and allocation during the distributed database design process.
2. Evaluate simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer.
3. Explain how the two-phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.
4. Describe distributed concurrency control based on the distinguished copy techniques and the voting methods
5. Apply the knowledge in various types of Distributed Database Systems.

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IV Year – I Semester	**3**	**0-0-0**	**3**

BIG DATA ANALYTICS

(Professional Elective-III)

(Common to CSE & IT)

Course objectives:

The students will :

1. Understand the basics of Big Data and Big data Platform.
2. Attain the knowledge of Big Data analytics, Approaches and Tools.
3. Describe Map Reduce fundamentals and HDFC File system.
4. Differentiate between Hadoop and RDBMS concepts.
5. Apply analytics on Structured and Unstructured Data.

UNIT-I

Big Data Analytics : What is big data, History of Data Management ; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics:What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools

UNIT-II:

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT-III:

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop

Introduction of HDFS: Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS.

UNIT-IV:

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors;

HDFC (Hadoop Distributed File System): HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN

UNIT-V:

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools

TEXT BOOKS:

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book™ , DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012

Course Outcomes:

The students will be able to:

1. Know the basics of Big Data and its environment.
2. Achieve the knowledge of Big Data analytics Tools and its Approaches.
3. Define MapReduce fundamentals and HDFC Architecture.
4. Distinguish between Hadoop and RDBMS concepts.
5. Illustrate analytics on Structured and Unstructured Data.

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WEB SERVICES

(Professional Elective – IV)
(Common to CSE & IT)

Course objectives:
The students will :

1. Evaluate distributed computing and Core distributed computing technologies
2. Describe the architecture and characteristics of web service.
3. Describe xml document structure and Core fundamentals of SOAP.
4. Define Web services technologies: WSDL, UDDI.
5. Illustrate security mechanism and overview of : .Net and J2EE,SOA.

UNIT-I:
Evolution emergence of Web Services-Evolution of distributed computing, Core distributed computing technologies–client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

Introduction to Web Services–The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT-II:
Web Service Architecture –Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services.

Describing Web Services –WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT-III:
Brief Over View of XML -XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation.

SOAP : Simple Object Access Protocol- Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures -SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT-IV:
Registering and Discovering Services -The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification

Service Addressing and Notification-Referencing and addressing Web Services, Web Services Notification.

UNIT-V:

Securing SOA and Web Services:SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards.

Semantics and Web Services:The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management: Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India
2. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.

REFERENCE BOOKS:

1. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.
2. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
3. Building web Services with Java, 2 nd Edition, S. Graham and others, Pearson Education.

Course Outcomes:

The students will be able to:

1. Describe distributed computing technologies — client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM.
2. Analyze Web Services Architecture.
3. Memorize Fundamentals of SOAP .
4. Explain Web Services and service discovery mechanisms, UDDI.
5. Describe Web Services Interoperability and Web Services Security.

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SOFTWARE PROCESS AND PROJECT MANAGEMENT

(Professional Elective-IV)

(Common to CSE & IT)

Course objectives:
The students will:

1. Discuss the software process maturity and conventional software project management principles.
2. Discuss the key phases of project management and their key skills.
3. Understand the ability to assess and plan project schedule and assign resources
4. Select an appropriate project development methodology among various alternating processes.
5. Identify project risks, understand the responsibilities, monitor and track project deadlines and the capability to work in a team environment.

UNIT-I

Software Process Maturity: Software Maturity Framework, Principles of Software Process Change, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

Process Reference Models: PCMM, PSP, TSP.

Conventional Software Management: Conventional Software Management Performance.

UNIT-II

Evolution of Software Economics: Software Economics

Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality.

The old way and the New way: The principles of Conventional Software Engineering, Principles of Modern Software Management.

Life Cycle Phases: Engineering and Production stages, Inception, Elaboration, Construction, Transition phases.

UNIT-III

Artifacts of the Process: The Artifact Sets, Management Artifacts, Engineering Artifacts,

Model Based Software Architectures: A Management Perspective and Technical Perspective.

Work Flows of the Process: Software Process Workflows, Iteration Workflows.

Checkpoints of the Process: Major Milestones, Minor Milestones, Periodic Status Assessments.

UNIT-IV

Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating, Iteration planning Process.

Project Organizations and Responsibilities: Line-Of-Business Organizations, Project Organizations.

Process Automation: Automation Building Blocks.

UNIT-V

Project Control and Process Instrumentation: The Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations.

Tailoring the Process: Process Discriminants.

Future Software Project Management: Modern Project Profiles, Next Generation Software Economics.

Case Study: The Commands Centre Processing and Display System-Replacement (CCPDS-R).

TEXT BOOKS:

1. Managing the Software Process, Watts S. Humprey, Pearson Education.
2. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005

COURSE OUTCOMES:

The students will be able to:

1. Describe the Software Process Maturity and explain the conventional s/w management principles.
2. Understand and discuss the key phases of project management and the key skills associated with each.
3. Explain the concept of workflows and checkpoints of the processes.
4. Discuss the responsibilities in the project organization.
5. Distinguish between conventional project and modern project profiles.

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SOFTWARE ARCHITECTURE AND DESIGN PATTERN

(Professional Elective-IV)

(Common to CSE & IT)

Course Objectives

The students will :

1. Understand that design patterns are standard solutions to common software design problems.
2. Discuss to know how to use systematic approach that focus and describe that describe abstract systems of interaction between classes ,objects and communication flow.
3. Understand the architecture evaluation and design decision making.
4. Understand how to apply these patterns on various platforms.
5. Understand the responsibilities for developing software.

UNIT I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures: Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from one system to many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT III

Introduction to design patterns: Patterns, Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.

Design pattern catalog: Creational and Structural patterns Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, fly weight.

UNIT IV

Behavioral patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

UNIT V

Case Studies: A-7E –A case study in utilizing architectural structures, The World Wide Web -a case study in interoperability.

Air Traffic Control –a case study in designing for high availability, Celsius Tech –a case study in product line development,

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

REFERENCE BOOKS:

1. Software Architecture in Practice, Len Bass, Paul Clements, Rick Kazman.
2. Documenting Software Architectures: Views and Beyond Paul Clements, Felix Bachmann, Len Bass, David Garlen, James Ivers, Reed Little, Robert Nord, Judith Stafford

Course Outcomes

The students will be able to:

1. Apply a deeper knowledge of the principles of Object Oriented Design.
2. Show the knowledge of the design patterns that are common in software applications.
3. Illustrate the knowledge of these patterns that are related to object –oriented design.
4. Analyze various architectural patterns
5. Apply the Knowledge for developing a software.

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COMPUTER ORGANIZATION
(Open Elective-II)

Course Objectives:
The students will :

1. Understand the basic operations of the computer system.
2. Know the functioning of CPU and the control unit.
3. Analyze various algorithms for arithmetic operations in the computer.
4. Understand different hierarchical memory systems including cache memory and virtual memory.
5. Recognize different ways of communicating with input/output devices and standard I/O interfaces.

UNIT-I :
Basic structures of Computers: Computer Types, Functional unit, Basic operational concepts, Bus structures, software, Performance, multiprocessors and multi computers.
Data Representation: Fixed point representation, Floating point representation, Error detection codes.

UNIT-II:
Register Transfer and Micro operations: Register transfer language, Register transfer, Bus and memory transfers, Arithmetic micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
Basic computer organization and Design: Instruction codes, computer registers, computer instructions, Timing and control, instruction cycle.

UNIT-III:
Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

UNIT-IV:
The Memory System: Basic concepts, Semiconductor RAM memories, Read-Only memories, speed, Size and Cost, Cache memories, performance considerations, Virtual memories, Secondary storage.

UNIT-V:
Input/output Organization: Accessing I/O Devices Interrupts, Interrupt hardware, Enabling and disabling interrupts, Direct memory access, Buses, interface circuits, Standard I/O interfaces.

TEXT BOOKS:

1. ComputerOrganization-CarlHamacher,ZvonkoVranesic,SafwatZaky,VthEdition,McGraw Hill.
2. Computer System Architecture-M.MorisMano, IIIrdEdition, Pearson/PHI

REFERENCE BOOKS:

1. Computer organization and architecture-William stallings, SixthEdition, Pearson/PHI

2. Structures Computer Organization-Andrew S.Tanebaum,4th Edition PHI/Pearson.

Course Outcomes:

The students will be able to:

1. Illustrate basic operations of the computer system.
2. Apply knowledge of CPU and the control unit.
3. Apply various algorithms for arithmetic operations in the computer.
4. To classify different memory systems.
5. Produce knowledge on input/output organization.

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HUMAN COMPUTER INTERACTION
(Open Elective-II)

Course Objectives:
The students will :

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Design, implement and evaluate effective and usable graphical computer interfaces.
3. Describe and apply core theories, models and methodologies from the field of HCI.
4. Apply HCI principles, guidelines, methods, and techniques for human-centred information systems development.
5. Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT III

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT V

Software tools – Specification methods, interface – Building Tools. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia

REFERENCE BOOKS:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg,

Pearson Education

2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

Course Outcomes:

The students will be able to:

1. Explain the human, Computer components functions regarding interaction with computer
2. Describe the key design principles for user interfaces.
3. Apply an interactive design process and universal design principles to designing HCI systems.
4. Use Paradigms, HCI in the software process.
5. Implement Interaction design basics.

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JAVA PROGRAMMING
(Open Elective-III)

Course Objectives:
The students will :

1. Describe with constructors and string handling functions.
2. Explain Inheritance and Polymorphism.
3. Discuss Exception handling and Multithreading.
4. Review Applet Programming, Event Handling and scripting.
5. Discuss Collection frame work in java and Files.

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, data types, 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 stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection,
String handling: String, StringBuffer, StringTokenizer.

UNIT – II

Inheritance - Inheritance hierarchies, super and sub classes, 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-Defining, 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, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.
Multithreading - 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

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 to applets, applet security issues.

UNIT – V

Collection Framework in Java – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties
Files – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.
Connecting to Database - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

TEXT BOOKS:

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Java The complete reference, 8th editon, Herbert Schildt, TMH.

REFERENCE BOOKS :

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

Course Outcomes:

The students will be able to:

1. Apply constructors and string Handling.
2. Demonstrate Inheritance and Polymorphism.
3. Choose Exception handling and Multithreading.
4. Practice applet Programming Solve Event Handling.
5. Choose Collection frame work and files.

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SOFTWARE PROJECT MANAGEMENT

(Open Elective-III)

Course Objectives:

The students will:

1. Discuss the conventional and contemporary software project management principles.
2. Discuss the key phases of software project management and their key skills.
3. Understand the ability to assess and plan project schedule and assign resources.
4. Select an appropriate project development methodology among various alternating processes.
5. Identify project risks, understand the responsibilities, monitor and track project deadlines and the capability to work in a team environment.
6. Be familiar with different methods and techniques used for software project management.

UNIT-I

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of Software Economics: Software Economics.

Improving Software Economics: Reducing software product size, Improving software processes, Improving team effectiveness, Improving automation, Achieving required quality.

UNIT-II

The old way and the New way: The principles of conventional software engineering, Principles of modern software management.

Life Cycle Phases: Engineering and Production stages, Inception, Elaboration, Construction, Transition phases.

Artifacts of the Process: The artifact sets, Management artifacts, Engineering artifacts, Programmatic artifacts.

UNIT-III

Model Based Software Architectures: A Management perspective and Technical perspective.

Work Flows of the Process: Software process workflows, Iteration workflows.

Checkpoints of the Process: Major milestones, Minor milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process.

UNIT-IV

Project Organizations and Responsibilities: Line-of-business organizations, Project organizations.

Process Automation: Automation building blocks.

Project Control and Process Instrumentation: The seven core metrics, Management indicators, quality indicators, life cycle expectations, pragmatic software metrics.

UNIT-V

Future Software Project Management: Modern project profiles, next generation software economics, modern process transitions.

Tailoring the Process: Process discriminants.

Case Study: The command centre processing and display system-replacement (CCPDS-R)

TEXT BOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005
2. Software Project Management, Joel Henry: Pearson Education

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005

Course Outcomes:

The student is able to:

1. Describe the conventional s/w management and explain how to improve s/w economics
2. Understand and discuss the key phases of project management and the key skills associated with each.
3. Explain the concept of workflows and checkpoints of the processes.
4. Discuss the responsibilities in the project organization.
5. Distinguish between conventional project and modern project profiles.

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DATABASE SECURITY
(Professional Elective -V)
(Common to CSE & IT)

Course Objectives:
The students will :

1. Understand and implement security models and algorithms in database security.
2. Study the various security mechanisms.
3. Study different software design for data security
4. Learn the statistical database protection system.
5. Study the various protection models for new generation database systems.

UNIT-I:
Introduction
Introduction to Databases Security Problems in Databases Security Controls Conclusions
Security Models -1.
Introduction Access Matrix Model Take-Grant Model Action Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT-II:
Security Models -2
Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion.
Security Mechanisms
Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

UNIT-III:
Security Software Design
Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

UNIT-IV:
Statistical Database Protection & Intrusion Detection Systems
Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls Evaluation
Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT-V:
Models for The Protection of New Generation Database Systems -1
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-oriented, Systems SORION Model for the Protection of Object-Oriented Databases

Models for The Protection of New Generation Database Systems -2
A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

TEXT BOOKS:

1. Database Security and Auditing, Hassan A. Afyouni, India Edition, CENGAGE Learning,2009.
2. Database Security, Castano, Second edition, Pearson Education.

REFERENCE BOOK:

Database security by alfredbasta, melissazgola, CENGAGE learning

Course Outcomes:

The students will be able to:

1. Demonstrate the knowledge gained through solving problems to define security models in database security.
2. Evaluate the different security mechanisms over operating system.
3. Enlist various software designs for database security.
4. Design and implement statistical database protection system.
5. Describe the developing areas of new generation database system with different protection models.

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INFORMATION SECURITY
(Professional Elective-V)

Course objectives:
The students will :

1. Define about security goals, security attacks, security services and security mechanism.
2. Describe conventional encryption algorithms& public-key encryption algorithms, digital Signature and issues of key Management
3. Explain authentication application & discuss how PGP and S/MIME can provide security services for e-mail.
4. Discuss IP security, Web Security.
5. Discuss system level security issues include threats, Intruders, Intrusion detection system and firewalls.

UNIT-I:
Introduction: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.
Understanding Attacks: Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT-II:
Symmetric Encryption and Message Authentication: Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution .
Public-Key Cryptography and Message Authentication: Approaches of Message Authentication, Secure Hash Functions and HMAC Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management.

UNIT-III:
Authentication Applications: Kerberos, X.509 Directory Authentication Service.
Electronic Mail Security: Pretty Good Privacy (PGP) and Secure /Multipurpose Internet Mail Extension (S/MIME)

UNIT-IV:
IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.
Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT-V:
Network Management Security: Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

System Security: Intruders, Viruses and related threats. Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson

Course outcomes:

The students will be able to:

1. Analyze the security goals, security attacks, security services and security mechanism, cryptography.
2. Compare how conventional encryption algorithms &public key cryptography can be used to ensure the Identity of the sender of an encrypted message.
3. Identify authentication application & discuss how PGP and S/MIME can provide security services for e-mail.
4. Identify IP security, Web security using Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
5. Apply system level security includes threats, Intruders, Intrusion detection System and Firewalls.

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

DATA SCIENCE THROUGH R

(Professional Elective-V)

Course objectives:

The Student will :

1. Know about the fundamental concepts of Data Science.
2. Explore Data Analysis and the Data Science Process and Linear Regression.
3. Investigate the various methods of Data Analysis.
4. Understand the Basics of R Environment.
5. Develop the Data Science analysis using R programming and Data Visualization.

UNIT-I:

Introduction

What is Data Science? - Big Data VS Data Science, Datafication, Current landscape of perspectives and Skill sets needed.

Statistical Inference, Populations and samples, Statistical modelling, probability distributions, fitting a model.

UNIT-II:

Exploratory Data Analysis and the Data Science Process

Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA, The Data Science Process.

Linear Regression:

Simple Linear Regression, Multiple Linear Regression, other Considerations in the Regression Model, The Marketing Plan, Comparison of Linear Regression with K-Nearest Neighbors.

UNIT-III:

Classification: An Overview of Classification, Why Not Linear Regression?, Logistic Regression, Linear Discriminant Analysis, A Comparison of Classification Methods.

Resampling Methods: Cross- Validation and The Bootstrap.

UNIT-IV:

The R Environment: Command Line interface, R Studio, Installing R Packages.

Basics of R: Basic math, variables, data types, vectors, calling function, missing data, data frames, lists, matrices, arrays.

Reading data into R: Reading CSVs, Excel Data.

Statistical Graphs: Base Graphs, ggplot2. Writing R functions, control statements – if and

else, switch, compound tests, for loops, while loops.

UNIT-V:

Group manipulation: Apply Family, aggregate, plyr, data.table.
Data Reshaping: cbind, rbind, joins reshape2. **Strings:** paste, sprint, extracting text, regular expressions.
Doing math and simulations in R: **Math Functions**: Calculating a Probability, cumulative sums and products, minima and maxima, calculus, sorting, set operations.
Simulation Programming in R: Built-in-Random Variable generators, obtaining the same random stream in repeated runs, an example to a combinatorial simulation.

TEXT BOOK:

1) 1. Gareth James, Daniela Witten, Trevor Hatie, Roberst Tibhirani , "An Introduction to Statistical Learning-with Applications in R ",
2) Jared P. Lander, R for Everyone, Addison Wesley Data & Analytics Series, Pearson, 2014.

REFERENCE BOOKS:

1) 1 Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.
2) Mark Gardener, "Beginning R: The statistical programming language", 2012.
3) Norman Matloff, The Art of R Programming, No Strach Press, San Francisco 2011

Course outcomes:
The Student will be able to:

1. Analyze the fundamental concepts of Data Science.
2. Evaluate the Data analysis and Data Science Process and Linear Regression.
3. Analyze the various methods of Data Analysis.
4. Apply the Basics of R in its Environment.
5. Evaluate the Data Science analysis using R programming and Data Visualization.

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IV Year – II Semester	**3**	**0-0-0**	**3**

BLOCKCHAIN TECHNOLOGY

(Professional Elective-VI)

(Common to CSE & IT)

Course objectives:

The students will :

1. Learn the fundamentals of Blockchain Technology.
2. Understand the History of Money and working with Bitcoin.
3. Understand usage of cryptography in Block Chain Technology.
4. Create smart account and decentralized Systems.

UNIT-I:

Introduction: History, what is block chain, the structure of block chains, types of block chain. Block chain applications, block chain lifecycle. Limitations and challenges of block chain.

UNIT – II:

Crypto currencies: Cryptography, the science behind crypto currencies, Symmetric key cryptography, cryptography hash functions, MAC and HMAC,asymmetric key cryptography. Diffie-Hellman key exchange, symmetric vs asymmetric key cryptography, game theory Nash equilibrium, prisoners dilemma, byzantine Generals' problem, zero-sum games.

UNIT-III:

Bitcoin: History of Money, working with Bitcoins, the Bitcoin Block chain.
Bitcoin network, bitcoin scripts, Full nodes vs SPVs, Bitcoin wallets.

UNIT – IV:

Ethereum: Ethereum as Next-Gen Blockchain, Design Philosophy of Ethereum, Ethereum Blockchain, Ethereum Accounts, Trie Usage, RLP Encoding.
Ethereum Transaction Message structure, Ethereum smart contracts, Ethereum Virtual Machine, Ethereum Eco System.

UNIT – V:

Block chain application development, Interacting with bitcoin blockchain, interacting programmatically with ethereum for sending transactions, creating smart account, executing smart contract functions, decentralised application structure. Building an ethereum Dapp

Text Books:

1. Beginning Block chain: A Beginner's Guide to Building Block chain Solutions by Bikramaditya Singhal, Gautam Dhameja , Priyansu Sekhar Panda.
2. Block chain Technology Explained: The Ultimate Beginner’s Guide About Block chain Wallet,Mining, Bitcoin, Ethereum, Litecoin, Zcash, Monero, Ripple, Dash

Reference Books:

1. Block chain Technology: Introduction to Block chain Technology and its impact on Business Ecosystem
2. Block chain: Bitcoin, Ethereum & Block chain: Beginners Guide to Understanding the Technology Behind Bitcoin & Cryptocurrency

Course outcomes:

The students will be able to:

1. Understated the block chain Technology and limitations.
2. Analyze the history of money and working with Bitcoin and Bitcoin wallets.
3. Use cryptography in bitcoin transactions.
4. Understand the Design philosophy of Block Chain Technology and Virtual Machine.
5. Develop Decentralized applications and Building ethereumDapp.

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IV Year – II Semester	**3**	**0-0-0**	**3**

STORAGE AREA NETWORKS
(Professional Elective-VI)

Course Objectives:

The students will:

1. Directly assess the technical capabilities of a variety of storage technologies in light of business and technical needs.
2. Design storage configurations that effectively meet scalability, security, resilience, and availability requirements.
3. Develop and implement migration strategies for growing business storage needs and network capabilities.
4. Discuss Fibre Channel protocol basics and identify key differences between various Fibre Channel topologies.
5. Describe and discuss IP convergence in the SAN and its implications.

UNIT I:

Introduction to Storage Technology: Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage.

Storage system environment: Core elements of a data center infrastructure, role of each element in supporting business activities.

UNIT II:

Storage Systems Architecture: Hardware and software components of the host environment, Key protocols and concepts used by each component , Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

Data Protection: Concept of RAID and its components , Different RAID levels and their suitability for different application environments, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system.

UNIT III:

Introduction to Networked Storage: Evolution of networked storage, Architecture, components, and topologies of FC-

SAN, NAS, and IP-SAN: Benefits of the different networked storage options understand the need for long-term archiving solutions and describe how CAS fulfills the need, understand the appropriateness of the different networked storage options for different application environments.

UNIT IV:

Introduction to Business Continuity: Information Availability & Monitoring & Managing Datacenter List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to

mitigate these failures.

Backup and Recovery: Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center.

UNIT V:

Securing the Storage Infrastructure: Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain.

Storage Virtualization: Virtualization technologies, block-level and file-level virtualization technologies and processes.

TEXT BOOKS:

1. EMC Corporation, Information Storage and Management, Wiley.
2. Robert Spalding, “Storage Networks: The Complete Reference“, Tata McGraw Hill, Osborne, 2003.

REFERENCE BOOKS:

1. EMC Corporation, Information Storage and Management, Wiley,
2. Robert Spalding, “Storage Networks: The Complete Reference“, Tata McGraw Hill, Osborne, 2003.
3. Marc Farley, “Building Storage Networks”, Tata McGraw Hill, Osborne, 2001.

Course Outcomes:

The students will be able to:

1. Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, CAS.
2. Define information security and identify different storage virtualization technologies.
3. Develop techniques for evaluating policies for LUN masking, file systems.
4. Define backup, recovery, disaster recovery, business continuity, and replication.
5. Describe processes and technologies for identifying, analyzing, and mitigating security risks in storage infrastructure.

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IV Year – II Semester	**3**	**0-0-0**	**3**

ANDROID APPLICATION DEVELOPMENT

(Professional Elective-VI)

(Common to CSE & IT)

Course Objectives:

The students will :

1. Understand Android platform and its architecture.
2. Learn activity creation and Android UI designing.
3. Familiarized with Intent, Broadcast receivers and Internet services.
4. Know how to work with SQLite Database and content providers.
5. Integrate multimedia, camera and Location based services in Android Application.

UNIT – I:

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT – II:

Android User Interface: Measurements – Device and pixel density independent measuring units Layouts – Linear, Relative, Grid and Table Layouts User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling – Handling clicks or changes of various UI components Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT – III:

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity, Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT – IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT – V:

Advanced Topics: Alarms – Creating and using alarms Using Internet Resources – Connecting to internet resource, using download manager

Location Based Services: Finding Current Location and showing location on the Map, updating location

TEXT BOOKS :

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCES BOOKS:

Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

Course Outcomes:

The students will be able to:

1. Describe Android platform, Architecture and features.
2. Design User Interface and develop activity for Android App.
3. Use Intent, Broadcast receivers and Internet services in Android App.
4. Design and implement Database Application and Content providers.
5. Use multimedia, camera and Location based services in Android App.

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IV Year II- Semester	**3**	**0-0-0**	**3**

COMPUTER FORENSICS
(Open Elective-IV)

Course objectives:

The students will :

1. Understand Computer forensics fundamentals.
2. Analyze various computer forensics technologies.
3. Know the principles of effective digital forensics investigation techniques.
4. Identify methods for data recovery.
5. Understand the methods for preservation of digital evidence.

UNIT I

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by computer Forensics Specialists.
Types of Computer Forensics Technology: Types of Military Computer Forensics Technology, Types of Law Enforcement - Computer Forensic Technology - Types of Business Computer Forensics Technology. Computer Forensics Evidence and Capture: Data Recovery Defined- Data Back-up and Recovery- The Role of Back-up in Data Recovery- The Data Recovery Solution.

UNIT II

Evidence Collection and Data Seizure: Why Collection Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence- Volatile Evidence- General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The chain of Custody.
Duplication and preservation of Digital Evidence: Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting Preserving Computer Forensics Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation.

UNIT III

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data – hiding techniques, performing remote acquisitions.
Network Forensics: Network Forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honey net project.

UNIT IV

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

software tools, computer forensics hardware tools, validating and testing forensics software.

UNIT V

E-Mail investigations: Exploring the role of E-mail in investigation, exploring the role of the client and server in E-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

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

TEXT BOOKS

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

REFERENCE BOOKS

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

Course Outcomes:

The students will be able to:

1. Utilize a systematic approach to computer investigations, various forensic tools, and collect digital evidence.
2. Perform digital forensics analysis upon Windows, MAC and LINUX operating systems, email investigations.
3. Analyze and carve image files both logical and physical.
4. Explain guidelines for investigation reporting.
5. Apply the implications of anti-forensics to the digital forensics investigator.

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B.Tech : IT	**L**	**T-P-D**	**C**
IV Year - II Semester	**3**	**0-0-0**	**3**

E-DISASTER MANAGEMENT
(Open Elective-IV)

Course Objectives
The students will :

1. Explain various disasters and their impacts.
2. Identify different storage virtualization technologies and their benefits.
3. Understand and articulate business continuity solutions including, backup technologies, and local and remote replication.
4. Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archival solution – CAS.
5. Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions.

UNIT - I:
Introduction to Disasters: Information Availability, Causes of Information Unavailability, Measuring Information Availability.
Consequences of Downtime; Failure Analysis, Single Point of Failure, Fault Tolerance, Multipathing Software.

UNIT II:
Backup and Recovery: Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations.
Backup Methods, Backup Process, Backup and Restore Operations, Backup Topologies, Backup in NAS Environments, Backup Technologies.

UNIT - III:
Local Replication: Source and Target, Uses of Local Replica, Data Consistency, Local Replication Technologies, Restore and Restart Considerations Creating Multiple Replicas, Management Interface.
Remote Replication: Modes of Remote Replication, Remote Replication Technologies Network Infrastructure.

UNIT - IV:
Securing the Storage Infrastructure: Storage Security Framework, Risk Triad, Assets, Threats, Vulnerability. Storage Security Domains, Securing the Application Access Domain.
Securing the Management Access Domain, Securing Backup, Recovery, and Archive (BURA), Security Implementations in Storage Networking SAN , NAS, IP SAN.

UNIT - V:
Monitoring the Storage Infrastructure: Parameters Monitored, Components Monitored, Monitoring Examples, Alerts, Storage Management Activities, Availability management, Capacity management , Performance management ,Security Management.
Reporting, Storage Management Examples, Storage Infrastructure Management Challenges, Developing an Ideal Solution, Storage Management Initiative, Enterprise Management Platforms.

Text Books:

1. Information Storage and Management: Storing, Managing, and Protecting Digital Information, Ganesh Rajaratnam,EMC Education Services. Wiley Publications.
2. Executive Guide to Preventing Information Technology Disasters By Richard Ennals. Springer.

Reference Books:

1. Information Management & Computer Security, Port Elizabeth Technikon, Port Elizabeth, MCB UP Ltd.
2. Information Security Management Systems, Godesberger Allee, BSI.

Course Outcomes

The students will be able to:

1. Apply important storage technologies and their features such as availability, replication, scalability and performance.
2. Use different storage virtualization techniques.
3. Illustrate virtual servers and storage between remote locations.
4. Use storage networking technologies and data security implementations.
5. Use the knowledge of Disaster Management Phases.

Open Elective – I

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

ENERGY AUDIT AND GREEN BUILDING
(Open Elective-I)

COURSE OBJECTIVES:

The Student Will:

1. Create awareness about the principles of green building technology and to have insight about the criteria for rating systems along with the established Indian codes and guidelines.
2. Establish a clear understanding of various renewable and non-renewable sources of energy along with their carbon footprints and enumerates the process of performance testing including building modeling and energy analysis.
3. Discuss about the energy efficient green building materials and to have understanding on the cost-effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
4. Give details on the principles of sustainable development in green building design.
5. Describe the best green building practices adopted along with cost/benefit and life-cycle analysis of green buildings.

UNIT-1

Sources of Energy:

Renewable and Non-renewable sources of energy - Coal, Petroleum, Nuclear, Wind, Solar, Hydro, Geothermal sources, potential of these sources, hazards, pollution with reference to Global scenario, demand and supply in India, Global efforts to reduce carbon emissions, Performance testing. Building modeling- Energy analysis, Metering, Monitoring.

Carbon emission: Forecasting, Control of carbon emission, Air quality and its monitoring carbon footprint, Environmental issues, Minimizing carbon emission, Energy retrofits and Green Remodels.

UNIT-II

Green Building Materials: Sustainable Materials, Depletion of natural resources for preparation of building materials, renewable and recyclable resources, energy efficient materials, Embodied Energy of Materials. Green cement, Biodegradable materials, Smart materials, Manufactured Materials, Volatile Organic Compounds (Voc's), Natural Non-Petroleum Based Materials, Recycled materials, Renewable and Indigenous Building Materials, Engineering evaluation of these materials.

Green Building Planning and Specifications: Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures, Green Strategies for Building Systems, Alternative Construction Methods, Energy Conservation Measures in Buildings, Waste and Water management and Recycling by Sustainable Facilities, Heating, Ventilation and Air Conditioning, Passive Solar and Daylight, Plumbing and its Effect on Energy Consumption

UNIT -III

Concept of Green Buildings: Green building - Definition, Features, Necessity, Initiatives, Green buildings in India, Green building Assessment – Green Building Rating Systems

(BREEAM, USGBC, LEED, IGBC,TERI-GRIHA, GREEN STAR),Criteria for rating, Energy efficient criteria ,environmental benefits economic benefits, health and social benefits, Major energy efficiency areas for building, Contribution of buildings towards Global Warming. Life cycle cost of buildings, Codes and Certification Programs.

UNIT-IV

Design of Green Buildings; Sustainable sites, Impact of construction on environment, Life cycle assessment, Principles of sustainable development in Building Design, Design on Bioclimatic and solar passive architecture, Considerations of energy consumption, water use, and system reliability, indoor air quality, noise level, comfort, cost efficiency in building design, Advanced Green building technologies and innovations

UNIT-V

Construction of Green Buildings: Energy efficient construction, Practices for thermal efficiency and natural lighting. Ecofriendly water proofing; Energy conservation building codes building rating, Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking, Green Project Management Methods and Best Practices, Cost/benefit analysis of green buildings, Life-cycle analysis of green buildings, Case studies of rated buildings (new and existing)

TEXT BOOKS:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkata Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPONPress
3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
4. Green Buildings (McGraw hill publication): by Gevorkian

REFERENCES:

1. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
2. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider, W. W. Norton & Company Publisher.
3. Understanding Green Building Materials, Traci Rose Rider, W. W. Norton & Company Publisher.

Course Outcomes:

The student will be able to:

1. Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.
2. Identify various Renewable and Non-renewable sources of energy along with their carbon footprints and comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.
3. Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

4. Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.
5. Summarize on the building codes, relevant legislation governing the consumption of resources and emission of environmental pollutants by buildings and be familiar with IGBC green building certification procedure.

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

ENVIRONMENTAL IMPACT ASSESSMENT
(Open Elective-I)

Course Objectives:

The Students will

1. To impart knowledge on Environmental management and environmental impact assessment.
2. To provide a basic understanding of the EIA process as it is used for research, planning, project or program evaluation, monitoring and regulatory enforcement.
3. To outline the impacts on soil, wetlands, flora, fauna, historical structures and the other socioeconomic environment.
4. To introduce students to the legal, economic, social, administrative and technical process preparing and evaluating environmental impact documents.
5. To assess the air and water quality parameters; predict the impacts and their mitigation measures.

UNIT - I:

Basics concepts of EIA: Initial environmental examination, elements of EIA, factors affecting EIA, impact evaluation and analysis, preparation of environmental base map, classification of environmental parameters.

EIA Methodologies: Introduction, Criteria for the selection of EIA methodology, EIA methods, Ad-hoc methods, matrix methods, network method, Environmental Media Quality Index Method (EMQI), Environmental media quality index method, overlay methods, cost/benefit analysis.

UNIT - II:

Impact of developmental activities and land use: Introduction and methodology for the assessment of soil and groundwater, delineation of study area, identification of of activities. Assessment of impact of developmental activities on vegetation and wildlife, environmental impact of deforestation- causes and effects of deforestation.

UNIT - III:

Procurement of relevant soil quality, impact prediction, assessment of impact significance, identification and incorporation of mitigation measures.

EIA of surface water, air and biological environment: Methodology for the assessment of impacts on surface water environment, air pollution sources, generalized approach for assessment of air pollution impact.

UNIT - IV:

Environmental audit and environmental legislation, objectives of environmental audit, types of environmental audit, audit protocel, stages of environmental audit onsite activities, evaluation of audit data and preparation of audit report, post audit activities.

UNIT - V:

Environmental protection Act, The water Act, The air Act (prevention and control of pollution Act), motor act, wild life act. Case studies of preparation of EIAs for various industries.

Text Books:

1. Environmental impact assessment methodologies, by Y.Anjaneyulu, B.S.Publication, Sultan bazaar Hyderabad.
2. Environmental impact assessment, by Alan Gilpin, Cambridge University Press
3. Environmental pollution Control by Dr. H S Bhatia – Galgotia Publications Pvt Ltd, Delhi.
4. Environmental Impact Assessment and Management Publisher, Daya Author: B Hoisetti, A Kumar

Course Outcomes:

The Students will be able to

1. Explain different methodologies for environmental impact prediction and assessment.
2. Understand the elements of environmental impact assessments and processes by which they apply.
3. Carry out scoping and screening of developmental projects for environmental and social assessments.
4. Evaluate EIA reports.
5. Plan EIAs and environmental management plans

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

ENERGY STORAGE SYSTEMS
(OPEN ELECTIVE - I)

Course Objectives:

The Students will

1. To enable the student to understand the need for energy storage, devices and technologies.
2. To understand the emerging needs for Electric Energy storage
3. To analyze the features of various Energy storage Systems
4. To integrate the Energy storage systems with batteries.
5. To understand the behavior of different configurations of Energy storage Systems

UNIT – I: Electrical Energy Storage Technologies
Characteristics of electricity - The roles of Electric Energy Storage - High generation cost during peak- demand periods - Need for continuous and flexible supply - Long distance between generation and consumption- Congestion in power grids - Transmission by cable

UNIT – II: Needs For Electrical Energy Storage
Emerging needs for Electric Energy Storage – Utilization of more renewable energy - less fossil fuel - Smart Grid uses - The roles of electrical energy storage technologies - The roles from the viewpoint of a utility, from the viewpoint of consumers, from the viewpoint of generators of renewable energy.

UNIT – III: Features of Energy Storage Systems
Classification of Electric Energy Storage systems - Mechanical storage systems - Pumped hydro storage (PHS) - Compressed air energy storage (CAES) - Flywheel energy storage (FES) - Electrochemical storage systems - Secondary batteries - Flow batteries - Chemical energy storage, -Hydrogen (H2) - Synthetic natural gas (SNG).

UNIT – IV: Types of Electrical Energy Storage Systems
Electrical storage systems - Double-layer capacitors (DLC) - Superconducting magnetic energy storage (SMES) - Thermal storage systems - Standards for Electric Energy Storage - Technical comparison of EES technologies.

UNIT – V: Applications
Present status of applications - Utility use (conventional power generation, grid operation & service) - Consumer use (uninterruptable power supply for large consumers) - New trends in applications - Renewable energy generation - Smart Grid - Smart Micro grid, Smart House - Electric vehicles - Management and control hierarchy of storage systems - Internal configuration of battery storage systems - External connection of EES systems - Aggregating EES systems and distributed generation (Virtual Power Plant) - Battery SCADA - Aggregation of many dispersed batteries.

TEXT BOOKS:

1. Energy Storage Benefits and Market Analysis' by James M. Eyer, Joseph J. Iannucci and Garth P. Corey.
2. The Electrical Energy Storage by IEC Market Strategy Board

REFERENCE BOOKS:

1. Jim Eyer, Garth Corey: Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Jim Eyer, Garth Corey, Sandia National Laboratories, Feb 2010.

Course Outcomes:

The Students will be able to

1. Understand the concepts of energy storage devices
2. Analyze the characteristics of energy from various sources and need for storage
3. Classify various types of energy storage and various devices used for the purpose
4. Apply the same concepts to real time problems.
5. Differentiate the features of Energy Storage Systems.

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

ENERGY AUDITING, CONSERVATION AND MANAGEMENT
(OPEN ELECTIVE - I)

Course Objectives:
The Students will

1. To understand the need of Energy Audit and Energy Conservation Schemes.
2. To know the necessity of conservation of energy.
3. To generalize the methods of energy management.
4. To illustrate the factors to increase the efficiency of electrical equipment.
5. To detect the benefits of carrying out energy audits.

UNIT-I:Basic Principles of Energy Audit: Energy Audit-
Definitions, Concept, Types of audit, Energy index, Cost index, Pie charts, Sankeydiagrams, Load profiles, Energy conservation schemes- Energy audit of industries- Energy savingpotential, Building energy audit

UNIT-II:Energy Management
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.

UNIT-III:Energy Efficient Motors
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

UNIT-IV:Power Factor Improvement, Lighting and Energy Instruments
Power factor – Methods of improvement, Location of capacitors, Pf with non linear loads, Effect ofharmonics on power factor, Power factor motor controllers - Good lighting system design andpractice, Lighting control , Lighting energy audit - Energy instruments-Wattmeter, Data loggers,Thermocouples, Pyrometers,Lux meters, Tongue testers,Application of PLC's.

UNIT-V:Economic Aspects and Analysis
Economics analysis-Depreciation methods, Time value of money, Rate of return, Present worthmethod, Replacement analysis, Life cycle costing analysis- Energy efficient motors-Calculation ofsimple payback method, Net present worth method- Power factor correction, Lighting -Applications of life cycle costing analysis, Return on investment.

TEXT BOOKS:

1. W.R. Murphy & G. Mckay, “Energy Management”, Butter worth, Heinemann Publications, Second Edition, 2009.
2. Paul o’ Callaghan, “Energy Management”, Tata Mc-Graw Hill Book Company- First Edition, 1998.
3. W.C.Turner, “Energy Management Hand Book”, CRC Press, First Edition, 2004.

REFERENCES:

1. John .C. Andreas, “Energy Efficient Electric Motors”, CRC Press, Third Edition, 1992.
2. Great Britain, “Energy Management and Good Lighting Practice: Fuel Efficiency- Booklet Volume 12-EEO, 1989.

Course Outcomes

The Students will be able to

1. Analyze energy audit of industries.
2. Predict management of energy systems.
3. Sequence the methods of improving efficiency of electric motor.
4. Analyze the power factor and to design a good illumination system.
5. Determine pay back periods for energy saving equipment.

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

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

AUTOMOTIVE TECHNOLOGY

(OPEN ELECTIVE - I)

Course Objectives:
The Student will

1. Provide an overview on automobile engineering
2. Learn different fuels and advanced control systems
3. Study the concepts and drive train configurations of electric and hybrid electric vehicles
4. Understand use of intelligent vehicle technologies like navigation in automobiles
5. Provide awareness of safety security and regulations

UNIT-I

Structural systems of automobile– chassis and body, power unit, transmission system, Steering System, Suspension System, Braking System.

Other systems of automobile- Ignition systems, Fuel System, Cooling System, Electrical System.

UNIT –II

Fuels: Types of Fuels-Gasoline fuels, CNG, Biofuels, advantages and limitations.

Advanced Engine Controls: Concept of an electronic engine control system, electronic fuel injection - throttle body fuel injection, multi-point fuel injection, gasoline direct injection, common rail direct injection, electronic ignition control.

UNIT –III

Fuel Cell and Solar Vehicles: Fuel cell vehicle – Operating principle, types of fuel cells, fuel cell options for fuel cell vehicle and fuel cell hybrid vehicle. Solar vehicle - Solar photovoltaic cell, solar array, solar car electrical system and drive train.

Electric and Hybrid Vehicles: Electric vehicles - Layout of an electric vehicle, performance, energy consumption, advantage and limitations. Hybrid electric vehicles - Concepts, types of hybrid drive train architecture, merits and demerits.

UNIT-IV

Telematics Systems: Global positioning system, geographical information systems, navigation system.

Comfort Systems: Automotive vision system, adaptive cruise control system, active suspension system, power steering and power windows.

UNIT-V

Safety and Security Systems: Active and passive safety, airbags, seat belt tightening system, collision warning systems, anti-lock braking systems, traction control system, electronic immobilizers, remote keyless entry, smart card system, number plate coding.

Emission and noise control regulations- Pollution standards, National and international – Pollution Control – Techniques – Noise Pollution & control.

TEXT BOOKS:

1. William B Riddens, "Understanding Automotive Electronics", 5th edition, Butter worth Heinemann Woburn,1998.
2. Mehrdad Ehsani, Yimin Gao, Sebastien E. Gay and Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 2005.
3. Kripal Singh, "Automobile Engineering", Standard Publishers Distributors, Vol. 1, & Vol. 2, 2007

REFERENCES:

1. Automotive Hand Book" Robert Bosch, SAE, 5th edition, 2000.
2. Ljubo Vlacic, Michel Parent and Fumio Harashima, "Intelligent Vehicle Technologies", Butterworth-Heinemann publications, Oxford, 2001.
3. Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003.
4. "Navigation and Intelligent Transportation Systems – Progress in Technology", Ronald K Jurgen, Automotive Electronics Series, SAE, USA, 1998.

Course outcomes:

The student will be able to:

1. Outline the overview of automobile engineering
2. Identify the different fuels and advanced control systems
3. Develop the concepts and drive train configurations of electric and hybrid electric vehicles
4. Apply the use of intelligent vehicle technologies like navigation in automobiles
5. Aware of safety security and regulations

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

MATLAB PROGRAMING LANGUAGE

(Open Elective I)

Course Objectives:

The Student will

1. understand the basic principles of programming and of implementing mathematical concepts in MATLAB.
2. write numerical algorithms with MATLAB Programming language.
3. evaluate the computational results using graphical representations.
4. gain knowledge about advanced MATLAB Programming methods.
5. gain knowledge on Simulink used in MATLAB.

Unit-I : **Introduction To MATLAB**

Historical Background, Applications, Scope of MATLAB, Importance of MATLAB for Engineers, Features, MATLAB Windows (Editor, Work Space, Command History, Command Window).

Operations with Variables, Naming and Checking Existence, Clearing Operations, Commands, Data types, Operators.

Unit-II: **Data Flow in MATLAB**

Vectors, Matrix Operations & Operators, Reshaping Matrices, Arrays, Colon Notations, Numbers, Strings, Functions, File Input-Output, Importing and Exporting of data.

Unit-III: MATLAB Programming

Conditional Statements, Loops, Writing Script Files, Error Correction, Saving Files, Worked out Examples.

Unit-IV: **MATLAB Advanced**

Plotting, Graphics, Creating Plot & Editing Plot, GUI (Graphical User Interface).

Matlab- Algebra, Calculus, Differential, Integration, Polynomials, solving a system of linear equations.

Unit-V: SIMULINK

Introduction, Importance, Model Based Design, Tools, Mathematical Modeling, Converting Mathematical Model into Simulink Model, Running Simulink Models, Importing Exporting Data, Solver Configuration, Masking Block/Model.

TEXT BOOKS:

1. Getting Started With Matlab: A Quick Introduction For Scientists And Engineers (English) by Rudra Pratap, OXFORD University Press.
2. MATLAB Programming by Y. Kirani Singh, B.B. Chaudhuri, PHI Publication.

REFERENCE BOOKS:

1. MATLAB® Programming For Engineers, Fourth edition by Stephen J. Chapman.
2. Applied Numerical Methods Using MATLAB 1st Edition by Won Y. Yang , Wenwu Cao, Tae-Sang Chung, John Morris.

Course Outcomes:

The student will be able to

1. translate mathematical methods to MATLAB code.
2. generalize results and represent data visually.
3. apply computer methods for solving a wide range of engineering problems.
4. utilize computer skills to enhance learning and performance in other engineering and science courses.
5. acquire knowledge of Advanced Matlab programming methods and Simulink.

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

PRINCIPLES OF COMMUNICATIONS

(Open Elective I)

Course Objectives:

The Students will

1. provide the basic concepts of communication systems.
2. gain knowledge about Amplitude modulation and Angle Modulation.
3. study sampling and pulse modulation methods.
4. study and compare different binary digital modulation techniques.
5. understand the basic concepts of information theory.

UNIT – I: Introduction

Block diagram of Electrical communication system, Radio communication: Types of communications, Analog, pulse and digital types of signals, Noise – Types of noise, sources of noise, calculation of noise in Linear systems and noise figure.

UNIT – II: Amplitude Modulation

Need for modulation, Types of Amplitude modulation, AM, DSB SC, SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM: Diode detector, Product demodulation for DSB SC & SSB SC. Angle Modulation: Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

UNIT – III: Pulse Modulations

Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Divison Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT – IV: Digital Communication

Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison. Digital Modulation: ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

UNIT – V: Information Theory

Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shanon-Fano and Huffman coding Error control coding: Introduction, Error detection and correction codes, block codes, convolution codes.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

REFERENCE BOOKS:

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2nd Ed. 2004.

Course Outcomes:

The Students will be able to

1. illustrate the main concepts of analogue and digital communication systems.
2. analyze and design an AM and FM modulator/demodulator.
3. explain, discuss, and compare different binary digital modulation techniques.
4. distinguish different types of noise and explain the effects of noise on communication system.
5. use the basic concepts of information theory.

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DATA BASE MANAGEMENT SYSTEMS

(Open Elective-I**)**

Course objectives:

The Students will:

1. Understanding of the architecture and functioning of database management systems as well as associated tools and techniques.
2. Understand and apply the principles of data modeling using entity relationship and develop a good database design.
3. Understand the use of structured query language (SQL) and its syntax.
4. Apply normalization techniques to normalize a database.
5. Understand the need of database processing and learn techniques for controlling the Consequences of concurrent data access.

UNIT - I:

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

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

UNIT - II:

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

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

UNIT - III:

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

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

UNIT - IV:

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability– Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

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

UNIT - V:

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

Advanced Database Management System- Introduction to Distributed Database- Reference Architecture, fragmentation, Allocation, Joins

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Course outcomes:

The Students will be able to:

1. Describe basic concepts of database system.
2. Design a data model and schemas in RDBMS.
3. Use RDBMS for developing industry applications.
4. Be competent in use of structured query language sql.
5. Analyze functional dependencies for designing a robust database

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

OPERATING SYSTEMS

(Open Elective-I)

Course objectives:
The Students will :

1. Know the purpose and different types of operating systems.
2. Describe process management and CPU scheduling algorithms.
3. Understand file and directory structures.
4. Understand deadlock prevention and avoidance
5. Explain various memory management and page replacement algorithms.

UNIT - I:

Operating System Overview- Overview of Computer Operating Systems, Operating System Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating System Structures, Operating System Services and Systems Calls, Operating Systems Generation.

Process Management- Process Concepts, Threads, Scheduling-Criteria, Algorithms Evaluation, Thread Scheduling.

UNIT - II:

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

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

UNIT - III:

Principles of Deadlock- System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

Introduction to File System- File System Interface, File Concepts, Access Methods and Directory Structure, File System Mounting, File Sharing and Protection.

UNIT - IV:

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

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

UNIT - V:

Protection and Security- Goals of Protection, Principles of Protection, Domain of Protection Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection. Security Problem, Program Threats, System and Network Threats Cryptography as a Security Tool, User Authentication, Computer-Security Classifications.

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Course outcomes:

The Students will be able to:

1. Demonstrate the different operating systems.
2. Apply different CPU scheduling algorithms.
3. Analyze different directory structures.
4. Use deadlock prevention and avoidance algorithms
5. Illustrates the behavior of semaphores and monitors.

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

INTRODUCTION TO DATA STRUCTURES
(Open Elective-I)

Course Objectives:
The Students will :

1. Describe the appropriate data structure like linked list to solve problems in real world.
2. Explain the implementation of linear and non linear data structure mechanisms.
3. Discuss the various techniques of tree data structure.
4. Describe graph data structure.
5. Explain several searching and sorting Techniques.

UNIT - I:
Data Structures-Introduction to Data Structures, abstract data types, Introduction to Linear and Non Linear data structures.Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list. Circular linked list implementation, Doubly linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT - II:
Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation. Queues-operations, array and linked representations. Circular Queue operations, Dequeue, applications of queue.

UNIT - III:
Trees – Definition, Binary tree representation, Binary search tree, binary Tree traversals.
AVL tree – operations, Red Black tree.

UNIT - IV:
Graphs-Terminology, sequential and linked representation.
Graph traversals: Depth First Search & Breadth First Search implementation. Spanning trees, Prims and Kruskals method.

UNIT - V:
Searching – Big O Notation, Linear Search and Binary Search.
Sorting-Bubble sort, Insertion Sort, Selection Sort, Merge Sort and Quick sort.

TEXT BOOKS:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

REFERENCES BOOKS:

1. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
2. Design methods and analysis of Algorithms, SK Basu, PHI.
3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Universities Press.

Course Outcomes:

The Students will be able to:

1. Analyze and apply appropriate data structures for solving computing problems.
2. Use linear and non-linear data structures like stacks, queues, trees and graphs.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting Techniques.

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

INTRODUCTION TO WEB DESIGN
(Open Elective-I)

Course Objectives

The Students will :

1. Know regarding internet related technologies.
2. Understanding of the current industry support for web technologies.
3. Explain the basic concepts of CSS.
4. Visualize the basic concepts of PHP.
5. Understanding PHP functions and Methods

UNIT-I

Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Audience requirement.

Web Design Principles: Basic principles involved in developing a web site, Planning process , Five Golden rules of web designing, Designing navigation bar ,Page design, Home Page Layout, Design Concept.

UNIT-II

Introduction to HTML: What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags, HTML Tables, HTML Forms.

Elements of HTML: Introduction to elements of HTML, working with Text Working with Lists, Tables and Frames, working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT-III

Introduction to Cascading Style Sheets: Concept of CSS, Creating Style Sheet and types of CSS, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties).

CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Colors, Creating page Layout and Site Designs.

UNIT-IV

Introduction to PHP: Downloading, installing, configuring PHP, The anatomy of a PHP Page. Basic Security Guidelines, Variables, Data Types, Operators and Expressions, Constants, Flow Control Functions; Switching Flow, Loops.

Code Blocks and Browser Output, Objects, Strings Processing, Form processing, Connecting to database, using cookies, dynamic contents.

UNIT-V

Introduction to Web Publishing or Hosting : Creating the Web Site, Saving the site, Working on the web site. Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites.

TEXT BOOKS:

1. Dietel and Dietel : —Internet and World Wide Web - How to Program‖, 5th Edition, PHI/Pearson Education, 2011
2. Web Technologies: HTML,CSS, XML,Php Black Book.

REFERENCE BOOKS:

1. Chris Bates, —Web Programming, building internet applications‖, 2ndEdition, WILEY,
   Dreamtech, 2008.
2. HTML 5 in simple steps Kogent Learning Solutions Inc, Dreamtech Press
3. Beginning CSS: Cascading Style Sheets for Web Design Ian Pouncey, ichard York Wiley India

Course Outcomes:

The Students will be able to:

1. Develop the application of the HTML for document structure.
2. Develop the skills in analyzing the usable of a website.
3. Create dynamic webpage, using PHP.
4. Using PHP to manipulate Files.
5. Develop the concept of web publishing

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UGC AUTONOMOUS

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

INTERNET OF THINGS
(Open Elective – I)

Course Objectives:
The Students will:

1. Understand the basic building blocks of IoT
2. Analyze the difference between M2M and IoT
3. Introduction of Basics of IoT System Management
4. Extend the knowledge in WSN an IoT enabling technology.
5. Acquire knowledge about challenges of IoT and Identify the specific application of IoT.

UNIT–I:
Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates.

UNIT–II:
Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

IoT and M2M –Difference between IoT and M2M, SDN, NFV, Difference between SDN and NFV.

UNIT–III:
Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

UNIT–IV:
Network & Communication aspects
Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

UNIT-V:
Challenges in IoT
Design challenges, Development challenges, Security challenges, other challenges

Domain specific applications of IoT
Home automation, Industry applications, Surveillance applications, Other IoT applications

Text Books:

1. Internet of Things – A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Course Outcomes:

The Students will be able to:

1. Analyze the physical and logical design of IoT.
2. Understand the characteristic and communication models of IoT and Compare and contrast M2M and IoT, SDN and NFV
3. Understand the Basics IoT management System
4. Understand the wireless medium issues, MAC protocols, routing protocols
5. Comprehend important challenges of IoT related to design, development and security and Learn about specific application of IoT.

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B. Tech.	**L**	**T-P-D**	**C**
III Year II sem	**3**	**0-0-0**	**3**

INTRODUCTION TO MINING TECHNOLOGY
(OPEN ELECTIVE - I)

COURSE OBJECTIVES:

The Student will:

1. introduce about distribution of mineral deposits in India
2. acquaint with different stages of mining process
3. get idea about Drilling and its machinery
4. get idea about Explosives and blasting in mines
5. know about shaft sinking methods, precaution & lining during shaft sinking

UNIT-I:

Introduction: Distribution of mineral deposits in India and other countries, mining contributions to civilization, mining terminology

UNIT –II:

Stages in the life of the mine - prospecting, exploration, development, exploitation, and reclamation. Access to mineral deposit- selection, location, size and shape (incline, shaft and Adit), brief overview of underground and surface mining methods.

UNIT-III:

Drilling: Types of drills, drilling methods, electric, pneumatic and hydraulic drills, drill steels and bits, drilling rigs, and jumbos.

UNIT-IV:

Explosives: Classification, composition, properties and tests, fuses, detonators, blasting devices and accessories, substitutes for explosives, handling and storage, transportation of explosives.; Rock blasting: Mechanism of rock blasting, blasting procedure, and pattern of shot holes.

UNIT –V:

Shaft sinking: Ordinary and special methods, problems, and precautions, shaft supports and lining.

TEXTBOOKS:

1. R. P. Pal, Rock blasting effect and operation, A. A. Balkema, 1st Ed, 2005.
2. D. J. Deshmukh, Elements of mining technology, Vol. 1, Central techno, 7th Ed, 2001.

REFERENCE BOOKS:

1. 1. C. P. Chugh, Drilling technology handbook, Oxford and IBH, 1st Ed, 1977.
2. 2. R. D. Singh, Principles and practices of modern coal mining, New age international, 1st Ed, 1997.

COURSE OUTCOMES:

The student will be able to:

1. Learn about distribution of mineral deposits in India
2. Learn about stages on mining process
3. Learn about drilling and its machinery
4. Understand about explosives, blasting and blasting mechanism
5. Understand about shaft sinking methods, precautions and lining of shafts

Open Elective - II

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

WASTE MANAGEMENT
(Open Elective-II)

Course Objectives:

The Students will:

1. provide in depth knowledge about handling of solid waste from cradle to grave.
2. It also provides the knowledge of designing and constructing the solid waste treatment system.
3. Provides the residue disposed of in an environmentally sound way.
4. Provides students depth knowledge in waste minimization.
5. provides knowledge in design and maintenance of different units

UNIT - I:

Introduction

Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes Municipal waste, industrial waste, plastic waste, electronic waste, bio-medical waste and hazardous waste - Characteristics of Solid Wastes: Physical, chemical and biological characteristics-Problems due to improper disposal of solid waste.

UNIT II:

Functional Elements of Solid Waste Management

Waste generation and handling at source-onsite storage-Collection of solid wastes Collection methods and services-storage of solid waste- guidelines for collection route layout.

UNIT - III: Transfer and Transport of Wastes

Transfer station-types of vehicles used for transportation of solid waste-Processing and segregation of the solid waste- various methods of material segregation.

Processing and Transformation of Solid Wastes

Recycling and recovery principles of waste management- Composting: definition methods of composting-advantages of composting- Incineration: definition methods of incineration advantages and disadvantages of incineration.

UNIT - IV: Treatment and Disposal of Solid Waste

Volume reduction, Open dumping, land filling techniques, Landfills: classification Design and Operation of landfills, Land Farming, Deep well injection.

UNIT - V: Waste Minimization

Introduction to waste minimization, waste minimization techniques-5R (refuse, reduce, reuse, recover, recycle), municipal waste minimization, industrial waste minimization.

Text Books:

1. Solid and hazardous waste management by M.N.Rao and Razia sultana, BS publications
2. Environmental Engineering by Howard S.Peavy, Donald R.Rowe and George Tchobanognous

Reference Books:

1. Integrated Solid Waste Management by Tchobanognous.
2. Environmental engineering by Y.Anjaneyulu, B.S publication.
3. Environmental Pollution Control Engineering by C.S. Rao; Wiley Eastern Ltd., New Delhi.
4. Environmental engineering by Gerad Kiley, Tata Mc Graw Hill

Course Outcomes:

Students will be able to

1. Understand the components of solid waste management and the laws governing it
2. Acquires the knowledge of design, operation and maintenance of landfills, incinerators and composting units.
3. Reducing the amount and toxicity of material entering the waste flow (minimization)
4. Reusing as much material as practicable;
5. Recycling the waste that cannot be used and recovery of resources

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

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

ESTIMATION, QUANTITY SURVEY & VALUATION
(Open Elective-II)

Course Objective

The Students will:

1. Understand how to estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
2. Estimate the detailed quantities of various items of work and their rates in building projects.
3. Estimate the quantities of works and evaluate cost of project.
4. Understand and apply the concept of Valuation for Properties
5. Understand, Apply and Create the Tender and Contract document.

UNIT - I:

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating

UNIT II:

Detailed Estimates of Buildings - Reinforcement bar bending and bar requirement schedules

UNIT - III:

Earthwork for roads and canals.

UNIT - IV:

Rate Analysis – Working out data for various items of work over head and contigent charges.

UNIT - V:

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation - Standard specifications for different items of building construction.

Text Books:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

Reference Books:

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.

Course Outcomes:

The Students will be able to

1. Prepare detailed and abstract estimates for buildings, roads and canals
2. Prepare valuation of buildings.
3. Interpret Contract document of for civil engineering works
4. To study on Valuation of buildings, Standard specifications for different items building construction
5. Formulate construction scheduling and project Management methods.

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

ELECTRIC AND HYBRID VEHICLES
(OPEN ELECTIVE - II)

Course Objectives:
The Student will

1. understand working of different configurations of electric vehicles, and its components
2. understand hybrid vehicle configuration and performance analysis.
3. Introduce the transmission configuration and its analyze the characteristics
4. analyze the different speed control techniques
5. design and evaluate the sizing of components in hybrid vehicles.

UNIT-I : ELECTRIC VEHICLES
Introduction to Electric Vehicles – History of Electric and Hybrid Vehicles - Components - vehicle mechanics - Roadway fundamentals - vehicle kinetics - Dynamics of vehicle motion - Propulsion System Design.

UNIT-II : BATTERIES
Basics - Types - Parameters - Capacity - Discharge rate - State of charge - state of Discharge - Depth of Discharge - Technical characteristics - Battery pack Design - Properties of Batteries.
Fuel Cells - Types - Fuel Cell Electric Vehicle.

UNIT-III: DC & AC ELECTRICAL MACHINES
(Speed control Techniques)
Motor and Engine rating – Requirements – Speed control techniques of DC machines in Electric Vehicles – Speed control techniques of Three phase A/c machines -Induction machines- Permanent Magnet Machines, Switched Reluctance Machines.

UNIT-IV: ELECTRIC VEHICLE DRIVE TRAIN
Transmission configuration - Components - gears, differential, clutch, brakes regenerative braking- motor sizing- Gear Ratio – Torque speed characteristics - EV Motor Sizing Initial Acceleration - Rated Vehicle Velocity - Maximum Velocity - Maximum Gradability.

UNIT-V: HYBRID ELECTRIC VEHICLES
Types of Hybrid Vehicles - series and parallel Hybrid Electric Vehicles, series- parallel configuration - Internal Combustion Engines - Reciprocating Engines - Practical and Air-Standard Cycles - Air-Standard Otto Cycle - Air-Standard Diesel Cycle - Example IC Engines in HEVs - Design - Drive train - sizing of components.

TEXT BOOKS:

1. Iqbal Hussain, “Electric & Hybrid Vehicles - Design Fundamentals”, Second Edition, CRC Press, 2011
2. James Larminie, “Electric Vehicle Technology Explained”, John Wiley & Sons, 2003.

REFERENCES:

1. Mehrdad Ehsani, Yimin Gao, Ali Emadi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals”, CRC Press, 2010.

2. Sandeep Dhameja, “Electric Vehicle Battery Systems”, Newnes, 2001

Course outcomes:

The student will be able to:

1. Understand the working of different configurations of electric vehicles, hybrid vehicles and its components.
2. Apply the basic concepts of batteries and Motors in the design of Electric and Hybrid Vehicles.
3. Differentiate the modes of operation of Hybrid Vehicles.
4. Analyze the performance of hybrid vehicles.
5. Design the basic parameters of Electric and Hybrid Electric Vehicles.

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

MATERIALS IN ELECTRICAL SYSTEMS
(OPEN ELECTIVE - II)

Course Objectives:
The Student will

1. understand the importance of various materials used in electrical engineering
2. obtain a qualitative analysis of their behavior and applications.
3. analyze the process used in manufacturing of integrated circuits
4. perform the calculations on cables on various aspects
5. evaluate the characteristics of HV and EHV cable.

UNIT-I : Materials
Conductors-free electron theory and electron scattering Di electrics Polarization, solid, liquid and gas dielectrics Insulators-Classification, Application in electric devices.

UNIT-II : Magnetic materials
Classification based on orientation of magnetic dipoles, Optoelectronic materials, Semiconductors-simple and compound, Refractory Materials. Solders and contacts, Super conductivity and super conducting materials.

UNIT-III: Components
Resistors and Capacitors. Display units:-LED, LCD and Monitors. Effect of environment on components.

UNIT-IV: Processes
Basic processes used in the manufacture of integrated circuits such as Epitaxy, masking, photolithography, diffusion, oxidation, Etching, metallization, Scribing, wire bonding and Encapsulation. Induction and Dielectric heating. Electron beam welding and cutting..

UNIT-V: Cables
Calculations of capacity of cables, charging current, stress, grading, heating of cables, Construction and characteristics of HV & EHV cable

TEXT BOOKS:

1. S.O. Kasap, Principles of Electrical Engineering Materials," MGH.
2. Mahajan, Principles of growth and processing of semiconductors," MGH.
3. Decker, Electrical Engineering Materials," PHI.

REFERENCES:

1. Dhir, Electronic components and Materials Principles manufacturing and Maintenance," TMH.
2. Allison, „Electronic Engineering Materials and Devices," TMH.
3. Ruska N Scot, Microelectronic processing – an introduction to the manufacture of integrated circuits," MGH.

Course outcomes:

The student will be able to:

1. Understand various types of materials and their properties in various conditions.
2. Evaluate magnetic materials and their behavior.
3. Evaluate semiconductor materials and technologies.
4. Acquire Knowledge on Materials used in electrical engineering and applications.
5. Design the components and observe the effect of these components on environment.

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

FUNDAMENTALS OF OPERATIONS RESEARCH

Open Elective - II

Course Objectives:
The Student will

1. Get the basic knowledge of formulation, Solve the LPP models using graphical and mathematical applications.
2. Identify the optimal way of developing various transport models, Choose the appropriate assignment of men and machinery to perform various tasks
3. Understand the optimal sequencing for a machine or for a job when there are m machines and n jobs; understand the concept of replacing machine at the appropriate
4. Understand the strategies in the business environment and decide the strategy to get maximum value of the game. Understand the inventory in an industry or business organization and its importance.
5. Define waiting time at any point to get the desired service for a single channel service and multi-channel service.

UNIT – I Introduction - Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

Allocation: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle.

UNIT – II

Transportation problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem

UNIT – III

Sequencing – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely-Group Replacement.

UNIT – IV

Theory of games: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.

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.

Simulation: Definition – types of simulation models- applications, advantages and disadvantage. Brief introduction of simulation languages – inventory and queuing problems using random numbers

TEXT BOOKS:

1. Operation Research/J. K. Sharma /Mac Milan.
2. Introduction to O.R/Hillier & Libermann (TMH).

REFERENCES:

1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspanand Lawrence Friedman
2. Operations Research /A. M. Natarajan, P. Balasubramaniam, A. Tamilarasi / Pearson Education
3. Operations Research / Wagner/ PHI Publications.
4. Operations Research / ACS Kumar/Yesdee

Course outcomes:

The student will be able to:

1. Allocate and distribute material, machine, man hour, money and number of men in any service and manufacturing industry.
2. Allot optimum quantities to various destinations from different sources with minimum cost. Assign the required men and machines to perform the given tasks.
3. Determine the number of items to be produced and the product mix. Schedule and sequence production runs by proper allocation of machines and men to get maximum gain or profit.
4. Compute the economic order quantity in different scenario to minimize inventory cost. Determine the quantity to be ordered when there are quantity discounts on the price.
5. Determine the number of service channels required to keep minimum waiting time at optimum service cost. Determine the shortest path for a given route and to solve the inventory and capital management problems.

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

(F41OF) Digital Systems Using VHDL

(Open Elective -II)

COURSE OBJECTIVES

The Students will:

1. Learn how a Hardware Description Language (HDL) is used to describe and implement hardware.
2. Learn how to simulate and test that hardware and optimise their designs.
3. Learn in-depth study of combinatorial and sequential hardware systems and the use of finite state machines in the design of sequential systems.
4. To understand concept of Programmable Devices, PLA, PAL, CPLD and FPGA and implement digital system using VHDL.
5. To implement combinational and sequential circuits using VHDL.

UNIT I

Review of Logic Design Fundamentals: Combinational Logic, Boolean Algebra and Algebraic Simplification, Karnaugh maps, Designing with NAND and NOR Gates, Hazards in Combinational Networks, Flip-flops and latches, Mealy Sequential Network, Equivalent States and reduction of State Tables, Sequential Network Timing, Setup and Hold Times, Synchronous Design, Tristate Logic and Buses.

UNIT II

Introduction to VHDL: VHDL Description of Combinational Networks, Modeling Flip-flops using VHDL Process, VHDL Models for a Multiplexer, Compilation and Simulation of VHDL Code, Modeling a Sequential Machine, Variables, Signals and Constants, Arrays, operators, Functions, Procedures, Packages and Libraries, VHDL Model for a 74163 Counter.

UNIT III

Designing with Programmable Logic Devices: Read-Only Memories, Programmable Logic Arrays (PLAs), Programmable Array Logic (PALs) , Other Sequential Programmable Logic devices(PLDs),Design of a Keypad Scanner.

Design of Networks for Arithmetic Operations: Design of a Serial Adder with Accumulator, State Graphs for Control Networks, Design of a Binary Multiplier, Multiplication of Signed Binary Numbers, Design of a Binary Divider.

UNIT IV

Digital Design with SM Charts: State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative Realizations for SM Charts using Microprogramming, Linked State Machine.

Designing with Programmable gate Arrays and Complex Programmable Logic Devices: Xilinx 3000 Series FPGAs, Designing with FPGAs, Xilinx 4000 Series FPGAs, Using a One-Hot

State Assignment, Altera Complex Programmable Logic Devices(CPLDs),Altera FLEX 10K Series CPLDs.

UNIT V

Floating-Point Arithmetic: Representation of Floating-Point Numbers, Floating-point Multiplication, Other Floating-Point Operations.

Hardware Testing and Design for Testability: Testing Combinational Logic, Testing Sequential Logic, Scan Testing, Boundary Scan, Build-In Self-Test**.**

TEXTBOOKS:

1. Charles H,Roth ,“Digital system design using VHDL” , 2nd Edition, PWS publishing co.
2. Zainalabedin Navabi, “VHDL analysis and modeling of digital systems”,2nd Edition, MGH, 2004.

REFERENCE BOOKS:

1. Stphen Brown, "Fundamental of Digital logic with VHDL Design", Tata McGraw Hill, 2008.
2. J.Bhaskar ,“A VHDL primer”,3rd edition 2004, Prentice Hall of India Limited.
3. Michael D.Ciletti, “Advanced Digital design with Verilog HDL”, 2nd Edition, PHI Ltd, 2005.

COURSE OUTCOMES

The Students will be able to:

1. develop a digital logic and apply it to solve real life problems.
2. practice combinational and sequential digital circuits using different styles of modeling of VHDL.
3. analyze, design and implement sequential logic circuits.
4. employ digital system design using PLD.
5. simulate and implement combinational and sequential circuits using VHDL systems.

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IV Year - I Semester	**3**	**0-0-0**	**3**

(F41OG) IC TECHNOLOGY

(Open Elective -II)

COURSE OBJECTIVES:

The Student will

1. understand the basic building blocks of linear and digital integrated circuits.
2. Familiarize with op-amp applications of active filters and oscillators.
3. gain the theory about applications of analog multipliers and PLL.
4. demonstrate the working of ADC and DAC.
5. understand few special functionalities of combinational and sequential integrated circuits.

UNIT I: INTEGRATED CIRCUITS

Classification, Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics, 741 Op-Amp and its Features, Concept of Virtual Ground ,Modes of operation-inverting, non-inverting, differential.

UNIT II: OP-AMP APPLICATIONS

Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits, Differentiators and Integrators, Comparators, Schmitt Trigger, Multivibrators.

UNIT III: ACTIVE FILTERS & OSCILLATORS

Introduction, First Order and Second Order Low Pass, High Pass and Band Pass Filters, Active Band Reject and All Pass Filters.

Principle of Operation and Types of Oscillators – RC, Wien Bridge and quadrature type. Waveform Generators – Triangular, Saw Tooth, Square Wave.

UNIT IV: TIMERS & PHASE LOCKED LOOPS

Introduction to 555 Timer, Functional Diagram, Monostable and Astable Operations and Applications, Schmitt Trigger, PLL - Introduction, Block Schematic, Principles and Description of Individual Blocks of 565, VCO. Introduction to Voltage Regulators, Features of 723 Regulator.

UNIT V: D-A AND A- D CONVERTERS

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Modern Digital Electronics – RP Jain – 4/e – TMH, 2010.
2. Op-Amps and Linear Integrated Circuits – Concepts and Applications by James M.Fiore, Cengage/ Jaico, 2/e, 2009.
3. Operational Amplifiers and Liner Integrated Circuits by K.Lal Kishore – Pearson, 2008.

COURSE OUTCOMES:

The Student will be able to:

1. model operational amplifiers with linear and digital integrated circuits.
2. design op amp as active filters and oscillators.
3. reconstruct and relate circuits using operational amplifiers for various applications.
4. examine OP Amp to work as a converter.
5. design special function integrated circuits.

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

COMPUTER NETWORKS

(Open Elective-II)

Course objectives:
The Students will :

1. Recognize various layering approaches for networking and understand the functionalities of physical layer.
2. Identify the data link layer protocols, multi access protocols, Ethernet technologies and various internetworking devices.
3. Examine design issues of network layer, services provided to above layer and routing, and congestion control protocols.
4. Examine IP protocol, addressing, various protocols like CIDR, ICMP,ARP and RARP of internet Layer and examination of transport layer services.
5. Examine Transport layer protocols like TCP, UDP, RPC and various congestion controlling mechanisms, including application layer services, protocols like HTTP, FTP, E-Mail etc.

UNIT - I:
Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.
Physical Layer: Guided transmission media, wireless transmission media.

UNIT - II:
Data Link Layer: design issues, Framing, Error Detection and Error Correction, Block Coding, Hamming Distance, CRC, Flow control and error Control.
Protocols: Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols..
Connecting Devices: Repeaters, Hubs, Switches, Gateways and **Bridges -** Learning and Spanning tree bridges.
Multi Access protocols- Random access - . ALOHA, CSMA, CSMA/CD and CSMA/CA, Controlled access, Channelization. Ethernet IEEE 802.3, IEEE 802.5, IEEE 802.11

UNIT - III:
Network Layer: Network layer design issues, Store and forward packet switching, connection less and connection oriented network services.
Internetworking: Protocols-IPV4 and IPV6**,** Logical Addressing-IPV4, IPV6, Tunnelling and Packet Fragmentation.
Address Mapping: ARP, RARP, DHCP, ICMP and IGMP.

Routing Algorithms: Shortest Path Finding and Distance Vector Routing Algorithms.

UNIT - IV:
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), The TCP Connection Establishment, The TCP Connection Release, Crash recovery, The TCP sliding window, The TCP congestion control, Improving Quality of Service Techniques: Leaky Bucket Algorithm.

UNIT - V:

Application Layer: Introduction, services, Application layer paradigms.

Applications: DNS, WWW, HTTP, FTP, E-MAIL, TELNET, SNMP, SSH.

TEXT BOOKS:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCES BOOKS:

1. "Computer Networks", 5E, Peterson, Davie, Elsevier
2. "Introduction to Computer Networks and Cyber Security", Chawan - HwaWu, Irwin, CRC Publications.
3. "Computer Networks and Internets with Internet Applications", Comer .

Course outcomes:

The Students will be able to:

1. Demonstrate the networking concepts, various Layering approaches and their functionalities.
2. Understand the protocols of Data Link layer, how a medium can be shared among multiple devices, Ethernet technologies and internetworking devices used.
3. Work on fragmentation, assigning of logical address and judge on routing, congestion.
4. Demonstrate the working of IP Protocol, other protocols of internet layer and services of transport layer.
5. Explain the transport layer and application layer protocols, their working.

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

PYTHON PROGRAMMING

(Open Elective-II)

Course objectives:

The Students will :

1. Learn how to design and program Python applications.
2. Learn how to use lists, tuples, and dictionaries in Python programs.
3. Learn how to identify Python object types, Components, decision statements, pass arguments in Python.
4. Learn how to build and package Python modules for reusability, design object oriented programs with Python classes, use class inheritance in Python for reusability.
5. Learn how to use exception handling in Python applications for error handling

UNIT - I:

Programming paradigms; Structured programming vs object oriented programming, OOPs fundamentals- class, object, abstraction, encapsulation, polymorphism, and inheritance; Introduction to Python Getting started to Python- an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements Values and types, Variables and keywords, statements, evaluating expressions, operators and operands, order of operations, composition. Functions function calls, type conversion, type coercion, pre-defined functions, composition, user define functions, flow of execution, passing parameters, function parameters and scope. Conditionals and recursion modulus operator, Boolean expression, logical operators, conditional execution, alternative execution, chained and nested conditionals, return statement; Recursion, infinite recursion.

UNIT - II:

Python data structures Strings Creating, initializing and accessing the elements; String operators, comparing strings using relational operators; String functions and methods. **Lists:** Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending, updating and deleting elements; List operations; List functions and Methods, list parameters, nested lists, Matrices.

Dictionaries

Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, dictionary operations traversing, appending, updating and deleting elements, Dictionary functions and methods.

Tuples

Mutability and tuples, Immutable concept, creating, initializing and accessing the elements in a tuple, Tuple functions.

UNIT - III:

Object oriented programming using Python: creating python classes, classes and objects: user defined compound types, attributes, instances as arguments, instances as return values, objects are mutable, copying; classes and functions: pure function, modifiers; Exceptions: raising exceptions, handling exceptions, exception hierarchy.

UNIT - IV:

Classes and methods: object oriented features, optional arguments, initialization method, operator overloading and polymorphism. Inheritance: Basic Inheritance: extending built-ins, overriding and super; Multiple inheritance: the diamond problem, different sets of arguments.

UNIT - V:

Files handling and Exceptions: Text files, writing variables, Directories, Pickling;
Database Programming in Python: Connection module, connect MySQL Data base, perform DDL, DML and DQL operations.

Text Books:

1. **Python 3 Object Oriented Programming,** Dusty Phillips, Packet Publishing, 2010.
2. **Programming in Python 3** - A complete Introduction to the Python Language-Second Edition, Mark Summerfiels, Addison-Wesley 2010.

Reference Books:

1. **Programming Python- 4th Edition**, Mark Lutz, O'Reilly, 2011.
2. **Object-Oriented Programming in Python**, Michael H, Goldwasser, David Letscher, Pearson Prentice Hall, 2008.

Course outcomes:

The Students will be able to:

1. Describe to design and program Python applications.
2. Analyse and conversion of to use lists, tuples, and dictionaries in Python programs.
3. Explain the concept to identify Python object types, Components ,decision statements, pass arguments in Python.
4. Apply decision for building and package Python modules for reusability, design object-oriented programs with Python classes, use class inheritance in Python for reusability.
5. Apply file handling and Exception handling Concepts in real world using python

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

COMPUTER ORGANIZATION
(Open Elective-II)

COURSE OBJECTIVES:

The Students will :

1. understand the basic operations of the computer system.
2. know the functioning of CPU and the control unit
3. analyze various algorithms for arithmetic operations in the computer.
4. understand different hierarchical memory systems including cache memory and virtual memory.
5. Recognize different ways of communicating with input/output devices and standard I/O interfaces.

UNIT-I :

Basic structures of Computers: Computer Types, Functional unit, Basic operational concepts, Bus structures, software, Performance, multiprocessors and multi computers.
Data Representation: Fixed point representation, Floating point representation, Error detection codes.

UNIT-II:

Register Transfer and Micro operations: Register transfer language, Register transfer, Bus and memory transfers, Arithmetic micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
Basic computer organization and Design: Instruction codes, computer registers, computer instructions, Timing and control, instruction cycle.

UNIT-III:

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

UNIT-IV:

The Memory System: Basic concepts, Semiconductor RAM memories, Read-Only memories, speed, Size and Cost, Cache memories, performance considerations, Virtual memories, Secondary storage.

UNIT-V:

Input/output Organization: Accessing I/O Devices Interrupts, Interrupt hardware, Enabling and disabling interrupts, Direct memory access, Buses, interface circuits, Standard I/O interfaces.

TEXT BOOKS:

1. ComputerOrganization-CarlHamacher,ZvonkoVranesic,SafwatZaky,VthEdition,McGraw Hill.
2. Computer System Architecture-M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCE BOOKS:

1. Computer organization and architecture-William stallings, Sixth Edition, Pearson/PHI
2. Structures Computer Organization-Andrew S.Tanebaum,4th Edition PHI/Pearson.

COURSE OUTCOMES:

The Students will be able to:

1. Illustrate basic operations of the computer system.
2. Apply knowledge of CPU and the control unit.
3. Apply various algorithms for arithmetic operations in the computer.
4. To classify different memory systems.
5. Produce knowledge on input/output organization.

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HUMAN COMPUTER INTERACTION
(Open Elective-II)

Course Objectives:
The Students will :

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to include human diversity.
3. Select an effective style for a specific application.
4. Design mock ups and carry out user and expert evaluation of interfaces.

UNIT I
Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II
Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT III
Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT IV
Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT V
Software tools – Specification methods, interface – Building Tools. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia

REFERENCE BOOKS:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

Course Outcomes:

The Students will be able to:

1. Explain the human, Computer components functions regarding interaction with computer
2. Demonstrate Understanding of Interaction between the human and computer components.
3. Use Paradigms, HCI in the software process.
4. Implement Interaction design basics.

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IV Year - I Semester	3	0-0-0	3

INTRODUCTION TO EMBEDDED SYSTEMS

(OPEN ELECTIVE-II)

Course Objectives:

The Students will:

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

UNIT–I:

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

UNIT–II:

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

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

UNIT–III:

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

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

UNIT–IV:

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

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

UNIT-V:

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

Text Books:

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

References:

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

Course Outcomes:

The Students will be able to:

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

J.B INSTITUTE OF ENGINEERING & TECHNOLOGY

UGC AUTONOMOUS

B. Tech.	**L**	**T-P-D**	**C**
IV Year I sem	**3**	**0-0-0**	**3**

INTRODUCTION TO SURFACE MINING

(OPEN ELCTIVE II)

COURSE OBJECTIVES:

1. To introduce surface mining terms and applicable conditions
2. To acquaint with different machinery used in surface mining
3. To get idea about Drilling and blasting of surface ore bodies.
4. To get idea about lighting, dust and slopes in surface mines.
5. To know about ore and waste transportation.

UNIT-I: Definition, Terminology, Applicability and limitations of surface mining, Classification, Advantages and dis-advantages of surface mining.

UNIT-II : Introduction to surface mining machinery: Equipment selection; Working with rippers, shovels, draglines, shovel-dragline combination; bucket wheel excavator. Disposal of OB/waste material

UNIT-III:

Drilling & blasting**:** Drilling mechanism, drilling patters, Drill bits Explosives, Blasting accessories, Bulk explosives, problems in blasting.

UNIT-IV: Basics of Mine lighting, Sources of dust in surface mining, dust control, and slope stabilization

UNIT-V: Methods of excavation & transportation – shovel-dumper combination, draglines, surface miner, bucket wheel excavator. Impacts on environment due to surface mining

TEXTBOOKS:

1. D.J. Deshmukh, Elements of Mining Technology, Vol 1, Central Techno, 7th Edition, 2001.
2. Principles & Practices of Coal Mining, R.D. Singh

REFERENCE BOOKS

1. Surface Mining Technology, by Prof S.K.Das, Lovely Prakashan, Dhanbad

COURSE OUTCOMES:

The student will be able to:

1. Understand about surface mining terms and conditions of applicability
2. Learn about different machinery used in surface mining
3. Learn drilling and blasting in surface mining
4. Understand mine lighting, dust and slopes in surface mining
5. Understand the transportation of ore and waste in surface mining.

Open Elective - III

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UGC AUTONOMOUS

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

ELEMENTS OF CIVIL ENGINEERING
(Open Elective-III)

Course Objectives:

The Students will

1. understand different methods of surveying for various applications.
2. familiarize with various types of building materials.
3. understand transportation and traffic management.
4. Gain knowledge of water sources, supply& its treatment.
5. Study about Highway development in India, Necessity for Highway planning, different road development plans.

UNIT - I:

Introduction, history of the civil engineering, sub – disciplines of civil engineering.

UNIT II:

Surveying

Introduction, divisions of surveying, classification of surveying, principles of surveying. Linear measurements and errors–introduction, methods of linear measurements, chaining instruments, types of error and correction. Compass surveying – introduction, angular measurement using compass, whole circle bearing and reduced bearing, fore bearing and back bearing. Traverse surveying –introduction, chain and compass traversing, closing error and adjustments. Levelling– introduction, types of levelling instruments, dumpy level, adjustment of level, levelling staff.

UNIT - III:

Building Materials and Construction

Materials: Introduction to construction materials like ferrous and nonferrous metals, alloys, Stones, Bricks, Lime, Cement, Timber, Sand, Aggregates, Mortar, Concrete and bitumen. Construction: Types of building, different loads considered in building design, types of foundation in building, other developments and constructions of buildings.

UNIT - IV:

Fire and Earthquake Protection in Building Introduction, fire protection in building, structural and architectural safety requirements of resistive structures, fire resistive properties of building materials, fire exit requirements, force and acceleration on building due to earthquake, building response characteristics, building drift.

UNIT - V:

Water Supply, Sanitary and Electrical Works in Building

Introduction, water supply system, water supply layout of a building, house drainage, traps, electrical works in building.

Highway Engineering:

Introduction, historical background of road or highway, classification of roads, pavements and roads, traffic control mechanism.

TEXT BOOKS:

1. Elements of Civil Engineering Author: Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das Publisher: PHI Learning Private Limited New Delhi.
2. Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
3. Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain16th Edition Publisher: Laxmi Publication Delhi.
4. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.

Reference Books:

1. Surveying Theory and Practice (7th Edition) Author: James M Anderson and Edward M Mikhail Publisher: McGraw Hill Education, India Pvt. Ltd.
2. Surveying and Leveling Author: R. Subramanian Publisher: Oxford University.
3. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.
4. Civil Engg. Drawing Author: S. C. Rangwala Publisher: Charotar Pub. House Anand.

Course Outcomes:

Students will be able to

1. Carry out simple land survey and prepare maps showing the existing details.
2. Find out area of irregular shaped plane areas.
3. Understand building plan, elevation and section.
4. Get acquainted with construction materials and transportation systems.
5. Understand transportation and traffic problems.

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

DISASTER MANAGEMENT
(Open Elective-III)

Course Objectives:

The Student will:

1. provide basic conceptual understanding the difference between the hazard and a disaster.
2. gain knowledge about the various disasters and their impacts.
3. provide basic understanding about the hazard and vulnerability profile of India.
4. have conceptual understanding about the disaster management phases.
5. gain approaches of Disaster Risk Reduction (DRR) and the relationship between vulnerability, Disasters, disaster prevention and risk reduction.

UNIT - I:

Concept of Disaster, Different approaches ,Concept of Risk, Levels of Disasters ,Disaster Phenomena and Events (Global, national and regional) ,Hazards and Vulnerability, Natural and man-made hazards, response time, frequency and forewarning levels of different hazards, Characteristics and damage potential or natural hazards, hazard assessment ,Dimensions of vulnerability factors, vulnerability assessment Vulnerability and disaster risk ,Vulnerabilities to flood and earthquake hazards.

UNIT II:

Disaster Management Mechanism, Concepts of risk management and crisis managements. Disaster Management Cycle, Response and Recovery Development, Prevention, Mitigation and Preparedness ,Planning for Relief.

UNIT - III:

Capacity Building: Concept, Structural and Non-structural Measures ,Capacity Assessment; Strengthening Capacity for Risk reduction ,Counter-Disaster Resources and their utility in Disaster Management ,Legislative Support at the state and national levels.

UNIT - IV:

Coping with Disaster ,Coping Strategies; alternative adjustment processes, Changing Concepts of disaster management ,Industrial Safety Plan; Safety norms and survival kits, Mass media and disaster management.

UNIT - V:

Planning for disaster management, Strategies for disaster management planning, Steps for formulating a disaster risk reduction plan, Disaster management Act and Policy in India. Organizational structure for disaster management in India, Preparation of state and district disaster management plans .

TEXT BOOKS:

1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

REFERENCES:

1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.

Course Outcomes:

The Students will be able to

1. Acquired knowledge on various types of disasters and hazards.
2. Distinguish between the hazard and a disaster can be analysed.
3. Acquired knowledge on the various approaches of Disaster Risk Reduction (DRR)
4. Ability to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
5. Develop ability to respond to different disasters.

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

ELECTRIC COSTING AND ESTIMATION
(OPEN ELECTIVE - III)

Course Objectives:
The Student will

1. emphasize the estimation and costing aspects of all electrical equipment,
2. design and estimation of wiring
3. design overhead and underground distribution lines,
4. classify types of substations and illumination
5. understand the Installation and costing of Electrical Equipment.

UNIT-I : Design Considerations of Electrical Installations
Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT-II : Electrical Installation for Different Types of Buildings and Small Industries
Electrical installations for residential buildings – estimating and costing of material, Electrical
installations for commercial buildings, Electrical installations for small industries.

UNIT-III: Overhead and Underground Transmission and Distribution Lines
Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV: Substations
Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations – Floor mounted type.

UNIT-V: Design of Illumination Schemes
Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes LED, CFL and OCFL differences.

TEXT BOOKS:

1. "K. B. Raina, S. K. Bhattacharya", "Electrical Design Estimating and Costing", NewAge International Publisher, 2010.
2. "Er. V. K. Jain, Er. Amitabh Bajaj", "Design of Electrical Installations", UniversityScience Press.

REFERENCES:

1. Code of practice for Electrical wiring installations,(System voltage not exceeding 650volts), Indian Standard Institution, IS: 732-1983.
2. Guide for Electrical layout in residential buildings, Indian Standard Institution, IS:4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS: 2032.
4. Code of Practice for selection, Installation of Maintenance of fuse (voltage notexceeding 650 V), Indian Standard Institution, IS: 3106-1966.
5. Code of Practice for earthling, Indian Standard Institution, IS: 3043-1966.
6. Code of Practice for Installation and Maintenance of induction motors, IndianStandard Institution, IS: 900-1965.
7. Code of Practice for electrical wiring, Installations (system voltage not exceeding 650Volts), Indian Standard Institution, IS: 2274-1963.
8. "Gupta J. B., Katson, Ludhiana", "Electrical Installation, estimating and costing", S.K. Kataria and sons, 2013

Course outcomes:

The student will be able to:

1. Understand the design considerations of electrical installations.
2. Design electrical installation for buildings and small industries.
3. Analyze the feasibility of type of substation
4. Understand the performance of various materials used for transmission and distribution
5. Identify and design the various types of light sources for different applications.

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

POWER PLANT ENGINEERING
(OPEN ELECTIVE - III)

Course Objectives:
The Student will

1. provide the knowledge on principles of solar radiation & solar energy collection & storage and applications.
2. prepare graduates to express the Knowledge on wind energy, geo-thermal energy, and ocean energy plants.
3. understand the behaviour of different power plants.
4. analyse different types of steam cycles and it's efficiencies in a steam power plant.
5. Expose on principle of safety and environmental issues.

UNIT-I : Thermal Power Plants
Basic thermodynamic cycles, various components of steam power plant- Layout- Pulverized coal burners- Fluidized bed combustion - Coal Handling systems - Ash handling systems - Forced draft and induced draft fans- Boilers- Feed pumps- Super heater- Regenerator - Condenser- Dearearators - Cooling tower

UNIT-II Hydro-electric Power Plants(Elementary Aspects)
Layout- Dams -Selection of water turbines – types - Pumped storage hydel plants

UNIT-III: Nuclear Power Plants(Elementary Aspects)
Principles of nuclear energy- Fission reactions - Nuclear reactor-Nuclear power plants

UNIT-IV: Gas and Diesel Power Plants(Elementary Aspects)
Types, Open and closed cycle gas turbine, Work output & thermal efficiency, Methods to improve performance-reheating, Inter-coolings, Regeneration-Advantage and disadvantages - Diesel engine power plant, Component and layout.

UNIT-V: Non-Conventional Power Generation:(Elementary Aspects)
Solar energy collectors, OTEC, Wind power plants, Tidal power plants and geothermal resources, Fuel cell, Thermoelectric power generation.

TEXT BOOKS:

1. Arora and Domkundwar, -"A Course in Power Plant Engineering", Dhanpat Rai and Co.Pvt. Ltd., New Delhi.
2. P.K. Nag,-"Power Plant Engineering", Tata McGraw Hill, Second Edition, Fourth reprint 2003.

REFERENCES:

1. Bernhardt G.A. Skrotzki and William A. Vopat, -"Power Station Engineering and Economy", Tata McGraw Hill Publishing Company Ltd., New Delhi, 20th reprint 2002.
2. G.D. Rai, -"An Introduction to Power Plant Technology", Khanna Publishers, Delhi-110 005.
3. M.M. El-Wakil, -"Power Plant Technology", Tata McGraw Hill, New Delhi, 1984.

Course outcomes:

The student will be able to:

1. Describe basic working principles of gas turbine and diesel engine power plants.
2. Define the performance characteristics and components of such power plants.
3. List the principal components and types of nuclear reactors.
4. List types, principles of operations, components and applications of steam turbines, steam generators, condensers, feed water and circulating water systems.
5. Estimate different efficiencies associated with power plant systems

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

FUNDAMENTALS OF ROBOTICS

Open Elective - III

Course Objectives: The Student will

1. understand the theoretical aspects of Robotics
2. acquire practical experience in the field of Robotics through design projects and case studies.
3. understand the importance of robots in various fields of engineering.
4. understand trajectory planning and types of motion
5. expose to various robots and their operational details.

UNIT-I: Robotics-Introduction-classification with respect to geometrical configuration (Anatomy), Controlled system & chain type: Serial manipulator & Parallel Manipulator.

Components of Industrial robotics-precession of movement-resolution, accuracy & repeatability-Dynamic characteristics- speed of motion, load carrying capacity & speed of response-Sensors-Internal sensors: Position sensors & Velocity sensors, External sensors: Proximity sensors, Tactile Sensors, & Force or Torque sensors.

UNIT-II: Grippers - Mechanical Gripper-Grasping force-Engelberger-g-factors-mechanisms for actuation, Magnetic gripper, vaccume cup gripper-considerations in gripper selection & design. Industrial robots specifications. Selection based on the Application.

UNIT-III: Kinematics-Manipulators Kinematics, Rotation Matrix, Homogenous Transformation Matrix, D-H transformation matrix, D-H method of assignment of frames. Direct and Inverse Kinematics for industrial robots. Differential Kinematics for planar serial robots

UNIT-IV: Trajectory planning: Joint space scheme- Cubic polynomial fit-Obstacle avoidance in

operation space-cubic polynomial fit with via point, bleding scheme. Introduction Cartesian space scheme. Control- Interaction control, Rigid Body mechanics, Control architecture-position, path velocity, and force control systems, computed torque control, adaptive control, and Servo system for robot control.

UNIT-V: Programming of Robots and Vision System-Lead through programming methods-Teach pendent- overview of various textual programming languages like VAL etc.

Introduction to Mobile Robots: A brief history of mobile robotics, applications and market. Recent advances in the mobile robotics for RISE (Risky Intervention and Surveillance

Environment) applications.

TEXT BOOKS:

1. Industrial Robotics / Groover M P /Mc Graw Hill
2. Introduction to Robotics / John J. Craig/ Pearson

REFERENCES:

1. Theory of Applied Robotics /Jazar/Springer.H. Asada and J. J. E. Slotine, "*Robot Analysis and Intelligence*", Wiley Inter-Science. 1986
2. Robotics / Ghosal / Oxford

Course outcomes: The student will be able to

1. apply the basic components of robots.
2. differentiate types of robots and robot grippers.
3. model forward and inverse kinematics of robot manipulators.
4. analyze forces in links and joints of a robot.
5. programme a robot to perform tasks in differential applications.

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IV Year - I Semester	**3**	**0-0-0**	**3**

DIGITAL SYSTEMS USING VERILOG

(Open Elective -III)

COURSE OBJECTIVES

The Students will

1. understand the constructs and conventions of the Verilog HDL programming.
2. Industrial-standard design software for coding, synthesis and simulation.
3. Learn in-depth study of combinational and sequential hardware systems and the use of finite state machines in the design of sequential systems.
4. understand concept of Programmable Devices, PLA, PAL, CPLD and FPGA and implement digital system using VHDL.
5. implement combinational and sequential circuits using VHDL.

UNIT I: Review of Logic Design Fundamentals

Combinational Logic, Boolean Algebra and Algebraic Simplification, Karnaugh maps, Designing with Nand and Nor Gates, Hazards in Combinational Networks, Flip-flops and latches,Mealy Sequential Network, Equivalent States and reduction of State Tables, Sequential Network Timing, Setup and Hold Times, Synchronous Design, Tristate Logic and Buses.

UNIT II: Introduction to Verilog

Computer-Aided Design, Hardware Description Languages, Verilog Description of Combinational Circuits, Verilog Modules, Assignments, Procedural Assignments, Modeling Flip-Flops Using Always Block, Always Blocks Using Event Control Statements, Delays in Verilog, Compilation, Simulation and Synthesis of Verilog Code, Data Types and Operators, Simple Synthesis Examples for Multiplexers, Modeling Registers and Counters Using Verilog Always Statements, Behavioral and Structural Verilog, Constants, Arrays, Loop in Verilog, Testing in Verilog Model.

UNIT III: Introduction to Programmable Logic Devices

Brief Overview of Programmable Logic Devices, Simple Programmable Logic Devices(SPLDs),Complex Programmable Logic Devices(CPLDs),Field-Programmable Gate Arrays(FPGAs), Problems.

Design Examples

BCD to 7-Segment Display Decoder, A BCD Adder, 32-Bit Adders, Traffic Light Controller, State Graphs for Control Circuits, Scoreboard and Controller, Array Multiplier.

UNIT IV: SM Charts and Microprogramming

State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Microprogramming, Linked State Machine.

Designing with Field Programmable Gate Arrays

Implementing Functions in FPGAs, Implementing Functions Using Shannon's Decomposition, Carry Chains in FPGAs, Examples of Logic Block in Commercial FPGAs, Dedicated memory in FPGA, Dedicated Multipliers in FPGAs, Cost of Programmability.

UNIT V:Floating-Point Arithmetic

Representation of Floating-Point Numbers, Floating-point Multiplication, Floating-point Additions, Other Floating-Point Operations.

Hardware Testing and Design for Testability

Testing Combinational Logic, Testing Sequential Logic, Scan Testing, Boundary Scan, Build-In Self-Test.

TEXTBOOKS:

1. By Charles Roth, Lizy K. John, Byeong Kil Lee,"Digital System Design using Verilog".
2. Zainalabdien Navabi, Verilog Digital System Design, TMH, 2nd edition.

REFERENCE BOOKS:

1.T.R.Padmanabhan & Bala Tripura sundari, "Design through Verilog HDL", WSE2004 IEEE press.

2.Fundamentls of Digital Logic with Veilog design by Stephen Brown, Zvonkoc Vranesic, TMH, 2nd edition, 2010.

3. Digital Logic Design using Verilog , State machine & synthesis for FPGA, Sunggu Lee, Cengage Learning ,2009.

4. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.

COURSE OUTCOMES

The Students will be able to:

1. describe, design, simulates and synthesize the computer hardware.
2. practice verilog hardware description language.
3. develop program codes for synthesis-friendly combinational and sequential logic incorporating the concept of sustainability of design and development.
4. analyze, design and implement sequential logic circuits.
5. construct digital system design using PLD.

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

ADVANCED COMPUTER ARCHITECTURE

(Open Elective -III)

COURSE OBJECTIVES:

The Student will

1. understand the fundamentals of computer design and technology trends.
2. familiarize with the Instruction level parallelism.
3. gain knowledge about memory design and virtual memory.
4. know about architectures of multiprocessors and storage systems.
5. analyze the Inter connection networks and design of clusters.

UNIT-I

Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design. Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler.

UNIT-II

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP. ILP software approach- compiler techniques- static branch protection - VLIW approach - Hardware support for more ILP at compile time- Hardware verses Software Solutions.

UNIT-III

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT-IV

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading. Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system.

UNIT-V

Inter connection networks and clusters- interconnection network media – practical issues in interconnecting networks- examples – clusters- designing a cluster.

TEXT BOOKS:

1. Computer Architecture and Parallel Processing, Kai Hwang and A Briggs International edition Mcgraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.
3. Parallel Computer Architecture, A Hardware/Software Approach, david E Culler, Jaswinder Pal Singh, Anoop Gupta, Elseveir.

REFERENCE BOOKS:

1. Computer Architecture, A quantitative approach, 3rd edition, John L Hennessy and David A Patterson Morgan Kufmann (an imprint elsevier).

COURSE OUTCOMES:

The Students will be able to

1. understand the fundamentals of computer design and technology trends.
2. expertise with the Instruction level parallelism.
3. illustrate the concepts of memory design and virtual memory.
4. obtain knowledge on architectures of multiprocessors and storage systems.
5. design the Inter connection networks and design of clusters.

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

SOFTWARE ENGINEERING

(Open Elective-III)

Course objectives:

The Students will :

1. Analyze basic Software engineering methods.
2. Describe software engineering layered technology and Process frame work.
3. Design software architecture and UML modeling
4. Recognize testing approaches such as unit testing and integration testing.
5. Demonstrate software evolution and related issues such as version and risk management

UNIT - I:

Introduction to Software Engineering: The evolving role of Software, changing nature of Software, Software Myths.
A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.
Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document**.**
Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.
System Analysis Models: Context models, behavioral models, data models, object models, structured methods

UNIT - III:

Design Engineering: Design process and Design quality, Design concepts, the design model.
Creating an architectural design: Software architecture, Data design, Introduction to UML, Importance of modeling, Principle of modeling, Concepts of modeling and architecture.
Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.
Metrics for Process and Products: Software Measurement, Metrics for software quality.
UNIT - V:

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.
Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering A Practitioner's Approach, Roger S Pressman, 6th edition. McGraw-Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS:

1. The Unified Modeling Language, User Guide by Grady Booch, James Rambaugh, Ivar Jaccobson.
2. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
3. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008

Course outcomes:

The Students will be able to:

1. Apply software engineering principles and techniques
2. Evaluate requirements for a software system
3. Apply the process of analysis and design using the object-oriented approach
4. Write test cases for different requirement and implement testing.
5. Evaluate different version and risk management

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

JAVA PROGRAMMING
(Open Elective-III)

Course Objectives:
The students will :

1. Describe with constructors and string handling functions.
2. Explain Inheritance and Polymorphism.
3. Discuss Exception handling and Multithreading.
4. Review Applet Programming, Event Handling and scripting.
5. Discuss Collection frame work in java and Files.

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, data types, 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 stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection,

String handling: String, StringBuffer, StringTokenizer.

UNIT – II

Inheritance - Inheritance hierarchies, super and sub classes, 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-Defining, 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, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading - 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

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 to applets, applet security issues.

UNIT – V

Collection Framework in Java – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

Files – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

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

TEXT BOOKS:

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Java The complete reference, 8th editon, Herbert Schildt, TMH.

REFERENCE BOOKS :

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

Course Outcomes:

The Students will be able to:

1. Apply constructors and string Handling.
2. Demonstrate Inheritance and Polymorphism.
3. Choose Exception handling and Multithreading.
4. Practice applet Programming Solve Event Handling.
5. Choose Collection frame work and files.

J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
UGC AUTONOMOUS

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

SOFTWARE PROJECT MANAGEMENT
(Open Elective-III)

COURSE OBJECTIVES:

The Students will:

1. Discuss the conventional and contemporary software project management principles.
2. Understand the ability to assess and plan project schedule and assign resources
3. Select an appropriate project development methodology among various alternating processes.
4. Identify project risks, understand the responsibilities, monitor and track project deadlines and the capability to work in a team environment.

UNIT-I

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of Software Economics: Software Economics.

Improving Software Economics: Reducing software product size, Improving software processes, Improving team effectiveness, Improving automation, Achieving required quality.

UNIT-II

The old way and the New way: The principles of conventional software engineering, Principles of modern software management.

Life Cycle Phases: Engineering and Production stages, Inception, Elaboration, Construction, Transition phases.

Artifacts of the Process: The artifact sets, Management artifacts, Engineering artifacts, Programmatic artifacts.

UNIT-III

Model Based Software Architectures: A Management perspective and Technical perspective.

Work Flows of the Process: Software process workflows, Iteration workflows.

Checkpoints of the Process: Major milestones, Minor milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process.

UNIT-IV

Project Organizations and Responsibilities: Line-of-business organizations, Project organizations.

Process Automation: Automation building blocks.

Project Control and Process Instrumentation: The seven core metrics, Management indicators, quality indicators, life cycle expectations, and pragmatic software metrics.

UNIT-V

Future Software Project Management: Modern project profiles, next generation software economics, modern process transitions.

Tailoring the Process: Process discriminants.
Case Study: The command centre processing and display system-replacement (CCPDS-R)

TEXT BOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005
2. Software Project Management, Joel Henry: Pearson Education

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005

COURSE OUTCOMES:

The Student is able to:

1. Describe the conventional s/w management and explain how to improve s/w economics
2. Understand and discuss the key phases of project management and the key skills associated with each.
3. Explain the concept of workflows and checkpoints of the processes.
4. Discuss the responsibilities in the project organization.
5. Distinguish between conventional project and modern project profiles.

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

INTRODUCTION TO INTELLIGENT SYSTEMS
Open Elective - III

Course Objectives:

At the end of the course, students will learn:

1. Understand In-depth of specialist bodies of knowledge within the engineering discipline.
2. Establish engineering methods to complex engineering problem solving.
3. Be Fluent application of engineering techniques, tools and resources

UNIT–I:

Introduction To Artificial Intelligence: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem, characteristics, Production system characteristics -Specialized production system

UNIT–II:

Representation Of Knowledge: Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic Structured representation of knowledge.

UNIT–III:

Knowledge Inference: Knowledge representation -Production based system, Frame based system.

UNIT–IV:

Inference - Backward chaining, forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT-V:

Expert Systems: Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics.

Text Books:

1. Kevin Night, Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, Tata McGraw-Hill Education Private Limited, 3rd edition, 2009, ISBN: 978-0070678163.
2. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2nd edition, 2007.ISBN, 0132097680.

References:

1. Peter Jackson, “Introduction to Expert Systems”, Pearson Education, 3rd edition, 2007. ISBN-13: 978-0201876864
2. Stuart Russel, Peter Norvig , “AI – A Modern Approach”, Pearson Education, 2nd edition, ISBN-13: 978-0137903955

Course Outcomes:

The Students will be able to:

1. Gain basic understanding of the underlying principles and philosophy of computational intelligence systems Technologies.
2. Be capable of constructing intelligent systems (in software) that perform useful engineering tasks

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B.Tech.	**L**	**T-P-D**	**C**
IV Year - I Sem	**3**	**0-0-0**	**3**

INTRODUCTION TO GEOLOGY

(OPEN ELECTIVE III)

COURSE OBJECTIVES:

The Student will:

1. introduce rock types and their physical properties
2. acquaint with different structures occurring in rocks
3. get idea about Ground water, and aquifers
4. get idea about coal formation and its stages.
5. know about minerals occurring in India.

UNIT-I:

Introduction, Definitions, Importance of geology in mining, Types of rocks, Physical properties of rocks.

UNIT-II:

Structural Geology: Definition, terminology, and Primary and secondary structures: Bedding, lineation, foliation, cleavage, Strike and dip. Definition of faults, folds and joints and their types, Unconformities and its kinds.

UNIT-III:

Ground Water: Introduction, Hydrological Cycle, origin and occurrence of groundwater, water table. Aquifers: Types of aquifers, confined and unconfined aquifers, perched aquifers.

UNIT-IV:

Coal: Stages of formation, composition, theories of formation of coal.

UNIT-V:

Occurrence and distribution of important metallic mineral deposits in India: Iron – Copper, - Lead and Zinc – Manganese – Aluminum – Chromium.

Occurrence and distribution of important non-metallic mineral deposits in India: Asbestos – kyanite – Sillimanite.

TEXTBOOKS:

1. Structural Geology – Billings, M.P. Prentice Hall.
2. Engineering geology –by Dr. Chennkeshavulu.

REFERENCE BOOKS:

1. A Textbook of Geology: Mukherjee P.K., The World Press Pvt. Limited Calcutta.

COURSE OUTCOMES:

The student will be able to:

1. Understand about rocks and their properties
2. Learn about different structures occurring in rocks
3. Understand about ground water, water table and aquifers
4. Learn about coal and its formation theories
5. Distinguish metallic and non-metallic minerals.

Open Elective - IV

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

INDUSTRIAL WASTE WATER TREATMENT
(Open Elective-IV)

COURSE OBJECTIVES:

The Students will:

1. Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation
2. Understand the industrial process, water utilization and waste water generation
3. Impart knowledge on selection of treatment methods for industrial wastewater
4. Acquire the knowledge on operational problems of common effluent treatment plants.
5. Gain knowledge on different techniques and approaches for minimizing the generation and application of Physio chemical and biological treatment methods for recovery, reuse and disposal of industrial wastewater.

UNIT – I:

Sources of Pollution - Physical, Chemical, Organic & Biological properties of Industrial Wastes- Difference between industrial & municipal waste waters - Effects of industrial effluents on sewers and Natural water Bodies.

UNIT – II:

Pre & Primary Treatment - Equalization, Proportioning, Neutralization, Oil separation by Floating-Waste Reduction-Volume Reduction-Strength Reduction

UNIT-III:

Waste Treatment Methods - Nitrification and De-nitrification-Phosphorous removal -Heavy metal removal - Membrane Separation Process - Air Stripping and Absorption Processes - Special Treatment Methods - Disposal of Treated Waste Water.

UNIT-IV:

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food processing Industries, Steel, and Petroleum Refineries

UNIT-V:

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries – Joint Treatment of Raw Industries waste water and Domestic Sewage – Common Effluent Treatment Plants(CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects

TEXT BOOKS:

1. Metcalf & Eddy, “Wastewater engineering Treatment disposal reuse”, Tata McGraw Hill.
2. Eckenfelder, W.W., “Industrial Water Pollution Control”, McGraw-Hill

REFERENCE BOOKS:

1. M.N. Rao and Dutta – Industrial Waste.
2. Mark J. Hammer, Mark J. Hammer, Jr., “Water & Wastewater Technology”, Prentice Hall of India.
3. N.L. Nemerrow –Theories and practices of Industrial Waste Engineering. C.G. Gurnham – Principles of Industrial Waste Engineering

COURSE OUTCOMES:

The Students will be able to

1. Learn a firm foundation and knowledge of mathematics, science and engineering principles and the ability to apply the knowledge.
2. Define and reason about fundamental concepts of waste water treatment
3. Design and conduct experiments and the ability
4. To analyze the data, interpret results and draw conclusions.
5. Design a component, system or process to meet desired needs and imposed constraints.

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

AIR POLLUTION AND CONTROL
(Open Elective-IV)

Course Objectives:

The Students will

1. introduce students to basic concepts of pollution.
2. gain the knowledge of causes of air pollution.
3. gain the knowledge of health related to air pollution.
4. develop skills relevant to control of air pollution.
5. Understand the quality of air.

UNIT–I: Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources

UNIT–II: Effects of Air pollutants on man, material and vegetation; Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT–III: Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x; NO_x; CO; HC etc., air-fuel ratio. Computation and Control of products of combustion. Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT–IV: Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.
Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.
Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT-V: General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.
Air Quality Management – Monitoring of SPM, SO_x; NO_x and CO Emission Standards.

Text Books:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York

References:

1. Air pollution and control By K.V.S.G. Murali Krishna, Kaushal Publishers. Kakinada.

Course Outcomes:

The Students will be able to

1. Acquired knowledge on the basic elements of causes and occurrence of the air pollution.
2. Have awareness on the different causes of the air pollution.
3. Have awareness about different health related problems caused due to air pollution.
4. develop concepts in controlling and prevention of air pollution.
5. Analyse the quality of air.

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

DISTRIBUTED GENERATION AND MICROGRID
(OPEN ELECTIVE - IV)

Course Objectives:
The Student will

1. illustrate the concept of distributed generation
2. analyze the impact of grid integration.
3. study concept of Micro grid and its configuration
4. understand the Economic and control aspect of DGs
5. find optimal size, placement and control aspects of DGs

UNIT-I : Need for Distributed Generation
Renewable sources in distributed generation - Current scenario in distributed generation - Planning of DGs – Siting and sizing of DGs – Optimal placement of DG sources in distribution systems.

UNIT-II : Grid Integration of DGs
Different types of interfaces - Inverter based DGs and rotating machine based interfaces - Aggregation of multiple DG units - Energy storage elements - Batteries, ultra capacitors, flywheels.

UNIT-III: Technical Impacts of DGs
Transmission systems, Distribution systems, De-regulation – Impact of DGs upon protective relaying – Impact of DGs upon transient and dynamic stability of existing distribution systems

UNIT-IV: Economic and Control Aspects of DGs
Market facts, issues and challenges - Limitations of DGs - Voltage control techniques, Reactive power control, Harmonics, Power quality issues - Reliability of DG based systems – Steady state and Dynamic analysis.

UNIT-V: Introduction to Micro-grids
Types of micro-grids – Autonomous and non-autonomous grids – Sizing of micro-grids - Modeling & analysis - Micro-grids with multiple DGs – Micro-grids with power electronic interfacing units - Transients in micro-grids - Protection of micro-grids – Case studies

TEXT BOOKS:

1. H. Lee Willis, Walter G. Scott , 'Distributed Power Generation – Planning and Evaluation', Marcel Decker Press, 2000.
2. M.Godoy Simoes, Felix A.Farret, 'Renewable Energy Systems – Design and Analysis with Induction Generators', CRC press.

REFERENCES:

1. Robert Lasseter, Paolo Piagi, ' Micro-grid: A Conceptual Solution', PESC 2004, June 2004.
2. F. Katiraei, M.R. Iravani, 'Transients of a Micro-Grid System with Multiple Distributed Energy Resources', International Conference on Power Systems Transients (IPST'05) in Montreal, Canada on June 19-23, 2005.
3. Z. Ye, R. Walling, N. Miller, P. Du, K. Nelson, 'Facility Microgrids', General Electric Global Research Center, Niskayuna, New York, Subcontract report, May 2005.

Course outcomes:

The student will be able to:

1. Find the size and optimal placement DG
2. Analyze the impact of grid integration and control aspects of DGs
3. Model and analyze a micro grid taking into consideration the planning and Operational issues of the DGs to be connected in the system
4. Describe the technical impacts of DGs in power systems.
5. Implement the micro grids and their control schemes

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

RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE -IV)

Course Objectives:
The Student will

1. understand the various types of renewable energy sources.
2. analyze the principle and operation of direct energy conversion.
3. understand and analyze the hybrid energy systems.
4. apply the renewable energy sources to real world electrical and electronics problems.
5. apply the renewable energy sources to real world electrical and electronics applications.

UNIT-I : Principles of Solar Radiation
Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II : Solar Energy Collection
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.
Solar Energy Storage and Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III: Wind Energy
Sources and potentials, Power from wind, Properties of air and wind, Types of wind turbines, Operating characteristics, Betz criteria.
Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.
UNIT-IV: Geothermal Energy
Resources, types of wells, methods of harnessing the energy, potential in India
Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-V: Direct Energy Conversion
Need for DEC, Carnot cycle, limitations, and principles of DEC
Environmental effects of energy conversion systems:
Pollution from coal and preventive measures, Steam stations and pollution, Pollution free energy systems

TEXT BOOKS:

1. Non-Conventional Energy Sources /G.D. Rai, khanna publications.
2. Renewable Energy Sources /Twidell&Weir CRC Press .

REFERENCES:

1. Renewable Energy resources /Tiwari and Ghosal/Narosa
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Renewable Energy sources and emerging technologies by D.P. Kothari, K.C. Singhal, P.H.I
5. Systems" -Academic Press, 1st Edition 2009.

Course outcomes:

The student will be able to:

1. Understand the need of utilization of alternate energy resources.
2. Discuss the collection of solar energy, storage of solar energy and its applications.
3. Illustrate the potential of Wind and bio mass as a renewable source.
4. Understand the potential of geothermal energy and ocean energy as a renewable source.
5. Discuss the direct energy conversion systems.

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

Open Elective - IV

DIGITAL MANUFACTURING

Course Objectives:
The Student will

1. Understand the need of digital fabrication
2. Understand about Two dimensional layer by layer techniques
3. Know about extrusion based systems, post processing and the software issues involved in digital fabrication
4. Know the applications of digital fabrication

UNIT-I :

INTRODUCTION TO ADDITIVE MANUFACTURING: Introduction to AM, AM evolution, Classification of Additive Manufacturing, Distinction between AM & CNC Machining, Advantages of AM

UNIT-II :

TWO- DIMENSIONAL LAYER- BY LAYER TECHNIQUES: Stereo-lithography (SL), Solid Foil Polymerization (SFP), Selective Laser Sintering (SLS), Selective Powder Building (SPB), Ballistic Particle Manufacturing (PM)

UNIT-III:

EXTRUSION BASED SYSTEMS: Introduction, basic principles, Fused Deposition Modeling, Materials, and Limitations of FDM

POST PROCESSING: Introduction, Support Material Removal, Surface Texture Improvements, Accuracy Improvements, Aesthetic Improvements

UNIT-IV:

SOFTWARE ISSUES FOR ADDITIVE MANUFACTURING: Introduction, Preparation of CAD Models: The STL file, Problems with STL files, STL file manipulation, Beyond the STL file, Additional software to assist AM

UNIT-V:

AM APPLICATIONS:

Applications in design, Applications in Engineering Analysis and Planning

Medical Applications: Customized Implants and Prosthesis, Aerospace applications and Automotive Applications

Other Applications: Jewelry Industry, Coin Industry, Tableware Industry.

TEXT BOOKS:

1. Ian Gibson, David W Rosen, Brent Stucker, “Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing”, Springer 2010.
2. Chuaa Chee Kai, Leong Kah Fai, “Rapid Prototyping: Principles & Applications”, World Scientific, 2010.

REFERENCES:

1. Ali K.Karmani, EmandAbouel Nasr, “Rapid Prototyping: Theory and Practice”, Springer 2006.
2. Andreas Gebhardt, Understanding Additive Manufacture: Rapid Prototyping, Rapid Tooling and Rapid Manufacture, Hanser Publishers, 2013.
3. Hopkinson, N.Haque, and Dickens Rapid Manufacturing: Advanced Research in Virtual and Rapid Prototyping, Taylor and Francis, 2007.

Course outcomes:

The student will be able to:

1. Understand the importance of digital fabrication
2. Identify different techniques involved in two dimensional layering
3. Analyze the software issues involved in digital fabrication and know about extrusion based systems and post processing
4. Apply the knowledge gained in the digital fabrication

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EMBEDDED SYSTEM DESIGN

(Open Elective-IV)

COURSE OBJECTIVES:

The Student will

1. understand the characteristics of embedded systems and application areas.
2. explain the core of embedded system and gain the knowledge of Embedded Software.
3. analyze ARM Cortex processor and its architecture.
4. gain knowledge on software aspects of embedded systems.
5. understand various communication protocols in Embedded Systems.

UNIT-I

The concept of embedded systems design, Embedded microcontroller cores, embedded memories. Examples of embedded systems, quality attributes- Design metrics - challenges. Embedded Hardware: Processor embedded into a system- Processor selection- embedded hardware units and devices.

UNIT-II

Embedded Software: An overview of programming languages- challenges and issues related to embedded software development.

Co-design-development process: Design cycle - Embedded software development tools- Target Machines - Linker/Locators - Embedded Software on Target system -Issues in co-design.

UNIT-III

ARM® Cortex™- M0+ processor: Overview - Architecture - Features- interfaces- configurable options-Modes of operation and Execution and Instruction Set- FRDM KL25Z Architecture - Interfacing of I/O devices with FRDM KL25Z.

UNIT-IV

Software aspects of embedded systems: real time programming languages and operating systems for embedded systems.

Technological aspects of embedded systems: Interfacing between analog and digital blocks, signal conditioning, digital signal processing.

UNIT-V

Communication protocols: Network Embedded Systems- Serial Bus Protocols- Parallel Bus Device Protocols, Parallel Communication Network Using ISA,PCI, PIC-X and Advanced Buses- Internet Enabled Systems, Network protocols- Wireless and Mobile System Protocols.

TEXT BOOKS:

1. Shibu K.V, “Introduction to Embedded Systems”, McGraw Hill.
2.J.W.Valvano, "Embedded Microcomputer System: Real Time Interfacing", Brooks/Cole, 2000.

REFERENCE BOOKS:

1. Raj Kamal, “Embedded Systems”, TMH.
2. Frank Vahid, Tony Givargis, “Embedded System Design”, John Wiley.
3. Lyla, “Embedded Systems”, Pearson, 2013.
4. David E. Simon, “An Embedded Software Primer”, Pearson Education.

COURSE OUTCOMES:

The student will be able to

1. define the characteristics of embedded systems, classification and application areas.
2. obtain knowledge on Embedded software and Co-design development.
3. familiarize the working of ARM Cortex processor.
4. develop knowledge on software aspects of embedded systems.
5. employ various communication protocols in Embedded Systems.

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SOFTWARE DEFINED RADIO

(Open Elective-IV)

COURSE OBJECTIVES:

The Students will:

1. study fundamentals and state of the art concepts in software defined radio.
2. Understand the concepts of Radio Resource Management.
3. Understand the reconfiguration of the network elements.
4. Remember the object oriented representation of radio and network resources.
5. Study of radio resource management in heterogeneous networks.

UNIT -I

Introduction: The Need for Software Radios, What is Software Radio, Characteristics and benefits of software radio- Design Principles of Software Radio, RF Implementation issues the Purpose of RF Front – End, Dynamic Range- The Principal Challenge of Receiver Design. RF Receiver Front- End Topologies- Enhanced Flexibility of the RF Chain with Software Radios- Importance of the Components to Overall Performance- Transmitter Architectures and Their Issues- Noise and Distortion in the RF Chain, ADC and DAC Distortion.

UNIT -II

Profile and Radio Resource Management : Communication Profiles- Introduction, Communication Profiles, Terminal Profile, Service Profile , Network Profile, User Profile, Communication Profile Architecture, Profile Data Structure, XML Structure, Distribution of Profile Data, Access to Profile Data, Management of Communication Profiles, Communication Classmarks, Dynamic Classmarks for Reconfigurable Terminals, Compression and Coding, Meta Profile Data.

UNIT -III

Radio Resource Management in Heterogeneous Networks : Introduction, Definition of Radio Resource Management, Radio Resource Units over RRM Phases, RRM Challenges and Approaches, RRM Modelling and Investigation Approaches, Investigations of JRRM in Heterogeneous Networks, Measuring Gain in the Upper Bound Due to JRRM, Circuit Switched System, Packet-Switched System, Functions and Principles of JRRM, General Architecture of JRRM, Detailed RRM Functions in Sub-Networks and Overall Systems.

UNIT -IV

Reconfiguration of the Network Elements : Introduction, Reconfiguration of Base Stations and Mobile Terminals, Abstract Modelling of Reconfigurable Devices, the Role of Local Intelligence in Reconfiguration, Performance Issues, Classification and Rating of Reconfigurable Hardware, Processing Elements, Connection Elements, Global Interconnect Networks, Hierarchical Interconnect Networks.

Installing a New Configuration, Applying Reconfiguration Strategies, Reconfiguration Based on Comparison, Resource Recycling, Flexible Workload Management at the Physical Layer,

Optimized Reconfiguration, Optimization Parameters and Algorithms, Optimization Algorithms, Specific Reconfiguration Requirements, Reconfiguring Base Stations, Reconfiguring Mobile Terminals.

UNIT -V

Object – Oriented Representation of Radios and Network Resources: Networks- Object Oriented Programming- Object Brokers- Mobile Application Environments- Joint Tactical Radio System.

Case Studies in Software Radio Design: Introduction and Historical Perspective, SPEAK easy-JTRS, Wireless Information Transfer System, SDR-3000 Digital Transceiver Subsystem, Spectrum Ware, CHARIOT.

TEXT BOOKS:

1. Software Defined Radio Architecture System and Functions- Markus Dillinger, Kambiz Madani, WILEY 2003.
2. Software Defined Radio: Enabling Technologies- Walter Tuttle Bee, 2002, Wiley Publications.

REFERENCE BOOKS:

1. Software Radio: A Modern Approach to Radio Engineering - Jeffrey H. Reed, 2002, PEA Publication.
2. Software Defined Radio for 3G - Paul Burns, 2002, Artech House.
3. Software Defined Radio: Architectures, Systems and Functions - Markus Dillinger,Kambiz. Madani, Nancy Alonistioti, 2003, Wiley.
4. Software Radio Architecture: Object Oriented Approaches to wireless System Engineering–Joseph Mitola, III, 2000, John Wiley & Sons.

COURSE OUTCOMES:

The students will be able to:

1. illustrate the design principles of software defined radio.
2. analyze the analog RF components as front end block in implementation of SDR.
3. visualize digital hardware architectures and development methods.
4. familiarize the radio recourse management in heterogeneous networks.
5. remember the object oriented representation of radio and network resources.

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IV Year - II Semester	**3**	**0-0-0**	**3**

E-COMMERCE

(Open Electives-IV**)**

Course objectives:

The Students will :

1. Gain knowledge about the main objective and at the same time need is transaction on your web store. Of, course if you are selling products online what you require are customers. If you are getting good reach ability then your business will definitely grow. Therefore one of the objectives is high reachability.
2. Solve conversions i.e., if people are coming on your web store and purchasing something then it will calculate as conversions and from the number of people who are buying stuff from your web store we can calculate the conversion rate.
3. Provide customer satisfaction i.e., customer is the main part of any e-commerce business so it's very important to make your customer happy and satisfied by providing quality and desirable products, on time delivery, 24*7 customer support, and timely sale & best deal offers you can make your customer happy. It is one of the main objectives of e-commerce.
4. Receive social popularity i.e., unless and until you are not famous and popular among people you cannot establish your brand. Social presence with omni channel and digital marketing is essential for any e-commerce business.
5. Understand the infrastructure for E-Commerce.

UNIT-I:

Introduction, Electronic Commerce Framework, The Anatomy of E-Commerce applications, E-Commerce Business Models.

E-Commerce Consumer applications, E-Commerce organization applications.

UNIT-II:

Consumer Oriented Applications, mercantile process models, mercantile models from the consumer's perspective, Mercantile from the merchant's perspective.

Types of Electronic Payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards & Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk & Electronic Payment Systems, Designing Electronic Payment Systems.

UNIT-III:

Electronic Data Interchange, EDI Applications in Business, EDI implementation, MIME, and value added networks.

Intra organizational E-Commerce, Macro forces and Internal Commerce, Work flow automation and Coordination, Customization and Internal Commerce, Supply Chain Management(SCM).

UNIT-IV:

Making a business case for a Document Library: Digital document types, Corporate Data warehouses.

Advertising and Marketing: The new age of Information Based Marketing, advertising on Internet, charting the Online marketing process, Market Research.

UNIT-V:

Consumer Search and Resource Discovery, information search and Retrieval, Electronic commerce catalogs or directories, Information Filtering.

Multimedia and Digital video, Key Multimedia concepts, Digital Video & Electronic Commerce, Desktop Video Processing, Desktop Video Conferencing.

Text Books

1. "Frontiers of electronic commerce" – Kalakota, Whinston, Pearson
2. "E-Commerce", S.Jaiswal – Galgotia

References

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison-Wesley.
2. Goel, Ritendra "E-commerce", New Age International
3. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education

Course outcomes:

The Students will be able to:

1. Demonstrate an understanding of the foundations and importance of e-commerce.
2. Demonstrate an understanding of retailing in e-commerce by:
    a. Analyzing branding and pricing strategies,
    b. Using and determining the effectiveness of market research.
    c. Assessing the effects of disintermediation.
3. Analyze the impact of e-commerce on business models and strategy.
4. Describe internet trading relationships including business-to-business, intra-organizational.
5. Describe the infrastructure for E-Commerce.

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

BIG DATA ANALYTICS

(Open Elective-IV)

Course objectives:

The Students will :

1. Understand the basics of Big Data and Big data Platform
2. Attain the knowledge of Big Data analytics, Approaches and Tools
3. Describe MapReduce fundamentals and HDFC File system
4. Differentiate between Hadoop and RDBMS concepts
5. Apply analytics on Structured and Unstructured Data.

UNIT-I

Big Data Analytics : What is big data, History of Data Management ; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics:What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools

UNIT-II:

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT-III:

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop

Introduction of HDFS: Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS

UNIT-IV:

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors;

HDFC (Hadoop Distributed File System): HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN

UNIT-V:

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;
Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools

TEXT BOOKS:

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book™ , DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012

Course Outcomes:
The Students will be able to:

1. Know the basics of Big Data and its environment
2. Achieve the knowledge of Big Data analytics Tools and its Approaches
3. Define MapReduce fundamentals and HDFC Architecture
4. Distinguish between Hadoop and RDBMS concepts
5. Illustrate analytics on Structured and Unstructured Data.

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COMPUTER FORENSICS
(Open Elective-IV)

Course objectives:

The Students will :

1. Understand Computer forensics fundamentals.
2. Analyze various computer forensics technologies.
3. Know the principles of effective digital forensics investigation techniques.
4. Identify methods for data recovery.
5. Understand the methods for preservation of digital evidence.

UNIT I

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

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

UNIT II

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

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

UNIT III

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

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

UNIT IV

Processing crime and incident scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a

search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case.
Current computer forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software.

UNIT V

E-Mail investigations: Exploring the role of E-mail in investigation, exploring the role of the client and server in E-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.
Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.
Working with windows and DOS Systems: Understanding file systems, exploring Microsoft File Structures, Examining NTFS Disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS Startup tasks, virtual machines.

TEXT BOOKS

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

REFERENCE BOOKS

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

Course Outcomes:

The Students will be able to:

1. Utilize a systematic approach to computer investigations, various forensic tools, and collect digital evidence.
2. Perform digital forensics analysis upon Windows, MAC and LINUX operating systems, email investigations.
3. Analyze and carve image files both logical and physical
4. Explain guidelines for investigation reporting.
5. Apply the implications of anti-forensics to the digital forensics investigator

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IV Year - II Semester	**3**	**0-0-0**	**3**

E-DISASTER MANAGEMENT
(Open Elective-IV)

Course Objectives

The Students will :

1. Explain various disasters and their impacts.
2. Describe storage networking technologies such as FC-SAN, NAS, IP-SAN and data archival solution – CAS.
3. Identify different storage virtualization technologies and their benefits.
4. Understand and articulate business continuity solutions including, backup technologies, and local and remote replication.
5. Identify parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions.

UNIT - I:

Introduction to Disasters: Information Availability, Causes of Information Unavailability, Measuring Information Availability.

Consequences of Downtime; Failure Analysis, Single Point of Failure, Fault Tolerance, Multipathing Software.

UNIT II:

Backup and Recovery: Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations.

Backup Methods, Backup Process, Backup and Restore Operations, Backup Topologies, Backup in NAS Environments, Backup Technologies.

UNIT - III:

Local Replication: Source and Target, Uses of Local Replica, Data Consistency, Local Replication Technologies, Restore and Restart Considerations Creating Multiple Replicas, Management Interface.

Remote Replication: Modes of Remote Replication, Remote Replication Technologies Network Infrastructure.

UNIT - IV:

Securing the Storage Infrastructure: Storage Security Framework, Risk Triad, Assets, Threats, Vulnerability. Storage Security Domains, Securing the Application Access Domain. Securing the Management Access Domain, Securing Backup, Recovery, and Archive (BURA) , Security Implementations in Storage Networking SAN , NAS, IP SAN.

UNIT - V:

Monitoring the Storage Infrastructure: Parameters Monitored, Components Monitored , Monitoring Examples , Alerts, Storage Management Activities , Availability management , Capacity management , Performance management ,Security Management.

Reporting, Storage Management Examples, Storage Infrastructure Management Challenges, Developing an Ideal Solution, Storage Management Initiative, Enterprise Management Platforms.

Text Books:

1. Information Storage and Management: Storing, Managing, and Protecting Digital Information, Ganesh Rajaratnam,EMC Education Services. Wiley Publications.
2. Executive Guide to Preventing Information Technology Disasters By Richard Ennals. Springer.

Reference Books:

1. Information Management & Computer Security, Port Elizabeth Technikon, Port Elizabeth, MCB UP Ltd.
2. Information Security Management Systems, Godesberger Allee, BSI.

Course Outcomes

The Students will be able to:

1. Apply important storage technologies and their features such as availability, replication, scalability and performance.
2. Show employs project teams to install, administer and upgrade popular storage solutions.
3. Illustrate virtual servers and storage between remote locations.
4. Use the knowledge of Disaster Management Phases.
5. Implement the parameters of managing and monitoring storage infrastructure and describe common storage management activities and solutions.

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INTRODUCTION TO NEURAL NETWORKS
Open Elective - IV

Course Objectives:
The Students will learn:

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

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

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

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

UNIT–IV:
Multilayer Perceptron's: Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment, feature detection.

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

Hopfield models: Hopfield models, computer experiment.

Text Books:

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

References:

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

Course Outcomes:

The Students will be able to:

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

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INTRODUCTION TO MINE ENVIRONMENT

(OPEN ELECTIVE IV)

COURSE OBJECTIVES:

The Students will:

1. introduce about atmospheric, mine air & their limitations
2. acquaint with spontaneous heating and explosions in coal mines
3. get idea about sources of dust, and its control in mines
4. get idea about miners' diseases & lighting in mines
5. know about reclamation of mines, impact of mining on environment & sustainable mining

UNIT-I:

Atmosphere and mine air composition. Origin of gases, properties, limitations of gases in underground mines

UNIT-II:

Spontaneous Combustion: Factors, control measures.

Explosions: Causes of firedamp explosion, preventive measures against firedamp explosion.

UNIT-III:

Dust: Sources in underground and opencast mines, standards and control measures.

UNIT-IV:

Miners diseases, Lighting standards in underground and opencast mines**.**

UNIT-V:

Reclamation, plantation of surface mines, Impact of mining on environment & sustainable mining.

TEXTBOOKS:

1. Elements of Mining Technology (VOL-2) – by D.J. Deshmukh.
2. Surface Mining – by S.K. Das.

REFERENCE BOOKS:

1. Mine Ventilation – by G.B. Mishra.

COURSE OUTCOMES:

The student will be able to:

1. Learn about atmospheric and mine air
2. Learn about spontaneous combustion and explosion in coal mines
3. Understand about dust sources and its control in mines
4. Learn about miners' diseases, mine lighting and its standards
5. Learn about reclamation of mines, impacts of mining on environment and sustainable mining