ACADEMIC REGULATIONS (NR-21)

COURSE STRUCTURE

AND

DETAILED SYLLABI

FOR

B.Tech Regular Four Year Degree Courses

(For the Batches Admitted From 2021-2022)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2022-2023)

COMPUTER SCIENCE AND ENGINEERING

NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana state, India

NARSIMHAREDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana state, India

ACADEMIC REGULATIONS FOR B.TECH. REGULAR STUDENTS WITH EFFECT FROM ACADEMIC YEAR 2021-22 (NR- 21)

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

NARSIMHAREDDY ENGINEERING COLLEGE (NRCM) offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year2020-21.

2.0 Eligibility for admission

2.1 Admission to the under graduate (UG) programme shall be 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 the University 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, failing which student shall forfeit seat in B.Tech course. Each student shall secure 160 credits (with CGPA $\geq$ 5) required for the completion of the under graduate programme and award of the B.Tech. Degree.

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

3.2.1 Semester scheme

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

3.2.2. Credit courses

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

- 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, Gender Sensitization lab, Artificial Intelligence and Cyber Security are mandatory non credit 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 Institute has followed almost all the guidelines issued by AICTE/UGC.

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

9		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
10	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' shall be 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 The academic section of the college invites 'registration forms' from students before the beginning of the semester. The registration requests for any 'current semester' shall be **completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'**.

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

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

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

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

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

class-work for that semester.

4.8 Dropping of subjects/ courses may be permitted, only after obtaining prior approval from the faculty advisor/ counselor 'within a period of 15 days' from the beginning of the current semester.

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

4.10 **Professional electives**: The students have to choose six professional electives (PE-I to VI) 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 shall be 60.

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

5.3 More than **one faculty member** may offer the **same subject** (lab/ practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection of choice for students will be based on - '**first come first serve** basis and CGPA criterion.

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

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

6.0 Attendance requirements

6.1 A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (excluding attendance in mandatory courses like Environmental Science, Constitution of India, Intellectual Property Rights, Gender Sensitization lab, Artificial Intelligence and Cyber Security) for that semester. Two periods of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject.

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

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

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

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

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.

7.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if student secures not less than 35% (25 marks out of 70 marks) in the semester end examination, and a minimum of 40% (40 marks out of 100 marks) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing **'C'** grade or above in that subject/course.

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

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

7.3 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 18 credits out of 37 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 47 credits out of 79 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 73 credits out of 123 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

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

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

7.7 A student **detained in a semester due to shortage of attendance may be re- admitted in the same semester in the next academic year for fulfillment of academic requirements**. The academic regulations under which a student has been 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.

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

8.0 Evaluation - Distribution and Weightage of marks

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

8.2 Continuous Internal Evaluation (CIE)

For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of one objective paper, one descriptive paper and one assignment. The objective paper shall be for 10 marks and the descriptive paper shall be for 15 marks together with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for descriptive paper). The objective paper is set with 20 multiple choice, fill-in the blanks and matching type of questions for a total of 10 marks. The descriptive paper shall contain 5 full

questions out of which, the student has to answer 3 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus. Five marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination. The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each student in Continuous Internal Evaluation. If any student is absent from any subject of a mid-term examination, an on-line test will be conducted for him by the College.

The details of the end semester question paper pattern are as follows:

8.2.1 Semester End Examination (SEE)

- The semester end examinations (SEE) will be conducted for 70 marks consisting of twoparts viz. i) **Part- A** for 20 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question consisting of ten sub-questions. There will be 2 questions from each unit and carry 2 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 any one of the two questions.

8.2.2 ` 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.

8.2.3 For subjects like **Machine Drawing Practice/Machine Drawing**, the SEE shall be 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.

8.2.4 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 15Marks,
(iii) Part – C – 3 out of 5 questions from Units – III, IV, V for 30 Marks.

8.2.5 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 20 marks and, (i) Part – B for 50 marks. Part – A is a compulsory question consisting of ten sub- questions. carry 2 marks each.

8.3 For practical subjects there shall be 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 shall be evaluatedfor15 marks and internal practical examination shall be evaluated for 10 marks and 5 marks for viva conducted by the laboratory teacher concerned. The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being Internal Examiner and the other being External Examiner, both nominated by the Principal from the panel of experts recommended by the Chairman, BOS (Board Of Study).

8.4 For the subject having design and/or drawing, (such as engineering graphics, engineering drawing, machine drawing, machine drawing practice and estimation), the distribution shall be 30 marks for continuous internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 marks for semester end examination. There shall be two internal tests in a semester and the average of the two shall be considered for the award of marks for internal tests.

8.5 There shall be an Industrial Oriented Mini Project/Summer Internship, in collaboration with an industry of their specialization. Students will register for this before III-year II semester examinations and pursue it during summer vacation. Industrial Oriented Mini Project/Summer Internship shall be submitted in a report form and presented before the committee in IV year I semester. It shall be evaluated for 100 external marks. The committee consists of an external examiner, Head of the Department, supervisor of the Industrial Oriented mini project/Summer Internship and a senior faculty member of the department. There shall be no internal marks for Industrial Oriented Mini Project/Summer Internship.

8.6 There shall be a seminar presentation in IV year I 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 shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 100 internal marks. There shall be no semester end examination for the seminar.

8.7 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.

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

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

8.9 For Project Stage – II, the external examiner shall evaluate the project work for 70 marks and the project supervisor shall evaluate it for 30 marks. The topics for industrial oriented mini project, seminar and Project Stage – I shall be different from one another. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together. For conducting viva-voce of project stage – II, Principal selects an external examiner from the list of experts in the relevant branch submitted by the Chairman, BOS of the Department.

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.

8.10 For mandatory courses of Environmental Science, Constitution of India, Intellectual Property Rights, Gender Sensitization lab, Artificial Intelligence and Cyber Security etc.., a student has to secure 40 marks out of 100 marks (i.e., 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course.

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

8.12 **MOOCs / SWAYAM Courses**: Meeting with the global requirements to inculcate the habit of Self-learning and in compliance with UGC guidelines, MOOC (Massive Open Online Course) Courses have been introduced as electives. The proposed MOOCs courses would be additional choices in all the elective groups subject to the availability during the respective semesters and respective departments will declare the list of the courses at the beginning of the semester. Course content for the selected MOOCs courses shall be drawn from respective MOOCs links or shall be supplied by the department. Evaluation of the Course shall be done by the provider. Student has to submit the certificate of MOOCs given from the provider.

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

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

9.0 Grading procedure

9.1 Grades will be awarded to indicate the performance of students in each theory subject, laboratory / practical's, 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 a corresponding letter grade shall be 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 shall be followed:

% of Marks Secured in a Subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
Greater than or equal to 90%	O (Outstanding)	10
80 and less than90%	A^+ (Excellent)	9
70 and less than80%	A (Very Good)	8
60 and less than70%	B^+ (Good)	7
50 and less than60%	B (Average)	6
40 and less than50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	Ab	0

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

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

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

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

$$\mathbf{CGPA} = \{ \sum_{j=1}^{M} C_j \, G_j \} / \{ \sum_{j=1}^{M} C_j \} \text{ ... for all S semesters registered}$$

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

where '**M**' is the **total** no. of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered**' 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 shall be 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 shall be 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 shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

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

11.0 Declaration of results

11.1 Computation of SGPA and CGPA are done using the procedure listed in (9.6 to9.9).

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, shall be declared to have '**qualified'** for the award of B.Tech. Degree in the chosen branch of Engineering selected at the time of admission.

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

12.3 A student with final CGPA (at the end of the under graduate programme) ≥ 7.50, and fulfilling the following conditions - shall be 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 ≥ 7.50, 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 ≥ 7.50 shall be placed in **'first class'.**

12.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but< 7.50 shall be placed in **'first class'.**

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

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

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

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 TRANSITORY REGULATIONS

14.1 A candidate, who is detained or has discontinued a semester, on readmission shall be required to do all the courses in the curriculum prescribed for the batch of students in which the student joins subsequently. However, exemption will be given to those candidates who have already passed such courses in the earlier semester(s) he was originally admitted into and substitute subjects are offered in place of them as decided by the Board of Studies. However, the decision of the Board of Studies will be final.

a) Four Year B.Tech Regular course:

A student who is following Jawaharlal Nehru Technological University (JNTUH) curriculum and detained due to the shortage of attendance at the end of the first semester shall join the autonomous batch of first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with regular candidates of Autonomous stream and will be governed by the autonomous regulations.

A student who is following JNTUH curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses will be offered in place of them as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUH for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUH regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

b) Three Year B.Tech program under Lateral Entry Scheme:

A student who is following JNTUH curriculum and detained due to the shortage of attendance at the end of the first semester of second year shall join the autonomous batch of third semester. Such students shall study all the courses prescribed for the

batch in which the student joins and considered on par with Lateral Entry regular candidates of Autonomous stream and will be governed by the autonomous regulations.

A student who is following JNTUH curriculum, if detained due to lack of credits or shortage of attendance at the end of the second semester of second year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses are offered in place of them as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUH for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUH regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

c) Transfer candidates (from non-autonomous college affiliated to JNTUH):

A student who is following JNTUH curriculum, transferred from other college to this institute in third semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute courses are offered in their place as decided by the Board of Studies. The student has to clear all his backlog courses up to previous semester by appearing for the supplementary examinations conducted by JNTUH for the award of degree. The total number of credits to be secured for the award of the degree will be the sum of the credits up to the previous semester under JNTUH regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

d) Transfer candidates (from an autonomous college affiliated to JNTUH):

A student who has secured the required credits up to previous semesters as per the regulations of other autonomous institutions shall also be permitted to be transferred to this institute. A student who is transferred from the other autonomous colleges to this institute in third semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The total number of credits to be secured for the award of the degree will be the sum of the credits up to previous semester as per the regulations of the college from which he is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous status. The class will be awarded based on the academic performance of a student in the autonomous pattern.

15.0 REVISION OF REGULATIONS ANDCURRICULUM

15.1 The Institute from time to time may revise, amend or change the regulations, scheme of examinations and syllabi if found necessary and on approval by the Academic Council and the Governing Body and shall be binding on the students, faculty, staff, all authorities of the Institute and others concerned.

NARSIMHAREDDY ENGINEERING COLLEGE
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Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana state, India

ACADEMIC REGULATIONS FOR B.TECH. (LATERAL ENTRY SCHEME) FROMTHE AY 2022-23

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 123 credits and secure 123 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, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. Promotion rule

S. No	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 25 credits out of 42 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to f	(i) Regular course of study of third year second semester.
		(ii) Must have secured at least 51 credits out of 86 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

5	**Fourth year first semester to fourth year second semester**	**Regular course of study of fourth year first semester.**

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

	Nature of Malpractices/Improper conduct	Punishment
	If the student:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which student is appearing but has not made use of (material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students involved. In case of an outsider, he will be handed over to the police and a case 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 project work and shall not be permitted to Appear for the remaining examinations of the subjects of that semester/year.

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

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

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

INSTITUTION VISION

To produce competent professionals who can contribute to the industry, research and societal benefits with environment consciousness and ethical Values.

INSTITUTION MISSION

- Adapt continuous improvements in innovative teaching-learning practices and state-of-the- art infrastructure to transform students as competent professionals and entrepreneurs in multi-disciplinary fields.
- Develop an innovative ecosystem with strong involvement and participation of students and faculty members.
- Impart National development spirit among the students to utilize their knowledge and skills for societal benefits with ethical values.

DEPARTMENT VISION

To produce technically competent professionals with quality education in cutting edge technologies with professional ethics.

DEPARTMENT MISSION

- To impart quality technical education in design and implementation of IT applications through innovative teaching - learning practices
- To inculcate Professional behavior, with strong ethical values, and research capabilities
- To educate students to be an effective problem solvers with social sensitivity for the betterment of the society and humanity as a whole.

PROGRAM OUTCOMES (POs)

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Demonstrate proficiency in fundamental concepts and advanced technologies of computer science to succeed in their careers and/or obtain a higher degree.

PEO2: Analyze complex computing problems in multidisciplinary area and creatively solve them.

PEO3: Recognize ethical dilemmas in work environment and apply professional code of ethics.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

PSO1: Apply acquired knowledge of programming languages, data structures, algorithms, and standard software engineering principles to devise effective solutions for intricate computational issues.

PSO2: Design and develop efficient web and mobile based applications under realistic constraints.

PSO3: Apply core and advanced concepts of database management systems, data mining and machine learning to devise engineer solutions for practical problems.

NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana state, India
Accredited by NBA & NAAC with 'A' Grade
Approved by AICTE
Permanently affiliated to JNTUH

B.Tech in COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE & SYLLABUS (NR21 Regulation)

Applicable from AY 2021-22 Batch

I YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	MA1101BS	Linear Algebra & Calculus	3	1	0	4
2	AP1102BS	Applied Physics	3	1	0	4
3	CS1103ES	Programming for Problem Solving	3	1	0	4
4	EN1104HS	English	2	0	0	2
5	AP1105BS	Applied Physics Lab	0	0	3	1.5
6	CS1106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	EN1107HS	English Language and Communication Skills Lab	0	0	2	1
8	*MC1001	Environmental Science	3	0	0	0
		Induction Program	-	-	-	-
		Total	**14**	**3**	**8**	**18**

I YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	p	Credits
1	MA1201BS	Advanced Calculus	3	1	0	4
2	CH1202BS	Chemistry	3	1	0	4
3	ME1203ES	Engineering Graphics	1	0	4	3
4	EE1204ES	Basic Electrical Engineering	3	0	0	3
5	CH1205BS	Chemistry Lab	0	0	3	1.5
6	ME1206ES	Engineering Workshop	1	0	3	2.5
7	EE1207ES	Basic Electrical Engineering Lab	0	0	2	1
		Total	**11**	**2**	**12**	**19**

II YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	EC2101ES	Analog and Digital Electronics	3	0	0	3
2	CS2102PC	Data Structures	3	1	0	4
3	MA2103BS	Computer Oriented Statistical Methods	3	1	0	4
4	CS2104PC	Computer Organization and Architecture	3	0	0	3
5	CS2105PC	Object Oriented Programming using C++	2	0	0	2
6	EC2106ES	Analog and Digital Electronics Lab	0	0	2	1
7	CS2107PC	Data Structures Lab	0	0	3	1.5
8	CS2108PC	IT Workshop Lab	0	0	3	1.5
9	CS2109PC	C++ Programming Lab	0	0	2	1
	*MC2002	Gender Sensitization Lab	0	0	2	0
		Total	**14**	**2**	**12**	**21**

II YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	CS2201PC	Discrete Mathematics	3	0	0	3
2	SM2202MS	Business Economics & Financial Analysis	3	0	0	3
3	CS2203PC	Operating Systems	3	0	0	3
4	CS2204PC	Database Management Systems	3	1	0	4
5	CS2205PC	Java Programming	3	1	0	4
6	CS2206PC	Operating Systems Lab	0	0	3	1.5
7	CS2207PC	Database Management Systems Lab	0	0	3	1.5
8	CS2208PC	Java Programming Lab	0	0	2	1
10	*MC2001	Constitution of India	3	0	0	0
		Total	**18**	**2**	**8**	**21**

III YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	CS3101PC	Formal Languages and Automata theory	3	0	0	3
2	CS3102PC	Software Engineering	3	0	0	3
3	CS3103PC	Computer Networks	3	0	0	3
4	CS3104PC	Artificial Intelligence	3	0	0	3
5		Professional Elective - I	3	0	0	3
6		Professional Elective - II	3	0	0	3
7	CS3105PC	Software Engineering Lab	0	0	3	1.5
8	CS3106PC	Computer Networks Lab	0	0	3	1.5
9	EN3107HS	Advanced Communication Skills Lab	0	0	2	1
		Total	**18**	**0**	**8**	**22**

III YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	CS3201PC	Machine Learning	3	1	0	4
2	CS3202PC	Compiler Design	3	1	0	4
3	CS3203PC	Design and Analysis of Algorithms	3	1	0	4
4		Professional Elective–III	3	0	0	3
5		Open Elective-I	3	0	0	3
6	CS3204PC	Machine Learning Lab	0	0	3	1.5
7	CS3205PC	Compiler Design Lab	0	0	3	1.5
8	CS3206PC	Professional Elective–III Lab	0	0	2	1
9	*MC3002	Cyber Security	3	0	0	0
		Total	**18**	**0**	**8**	**22**

IV YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	CS4101PC	Information Security	3	0	0	3
2	CS4102PC	Data Mining	2	0	0	2
3		Professional Elective–IV	3	0	0	3
4		Professional Elective–V	3	0	0	3
5		Open Elective–II	3	0	0	3
6	CS4103PC	Information Security & Data Mining Lab	0	0	2	1
7	CS4104PC	Industrial Oriented Mini Project / Summer Internship	0	0	3	2
8	CS4105PC	Seminar	0	0	2	1
	CS4106PC	Project Stage – I	0	0	6	3
	*MC4001	Intellectual Property Rights	3	0	0	0
		Total	**17**	**0**	**13**	**21**

IV YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	SM4201MS	Organizational Behavior	3	0	0	3
2		Professional Elective– VI	3	0	0	3
3		Open Elective– III	3	0	0	3
4	CS4202PC	Project Stage-II	0	0	14	7
		Total	**9**	**0**	**14**	**16**

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

PROFESSIONAL ELECTIVES LIST

Professional Electives	Subject Code	Subject Name	Total Credit
Professional Elective I	CS3108PE	Information Theory & Coding	3
	CS3109PE	Advanced Computer Architecture	3
	CS3110PE	Data Analytics	3
	CS3111PE	Image Processing	3
	CS3112PE	Principles of Programming Languages	3
Professional Elective II	CS3113PE	Computer Graphics	3
	CS3114PE	Advanced Operating Systems	3
	CS3115PE	Information Retrieval Systems	3
	CS3116PE	Distributed Databases	3
	CS3117PE	Natural Language Processing	3

Professional Elective III Theory and Lab	Subject & Lab Name	Subject Code	Subject Credits	Lab Code	Lab Credits
	Concurrent Programming	CS3206PE	3	CS3211PE	1
	Network Programming	CS3207PE	3	CS3212PE	1
	Scripting Languages	CS3208PE	3	CS3213PE	1
	Mobile Application Development	CS3209PE	3	CS3214PE	1
	Python Programming	CS3210PE	3	CS3215PE	1

Professional Elective IV	CS4107PE	Graph Theory	3
	CS4108PE	Introduction to Embedded Systems	3
	CS4109PE	E-Commerce	3
	CS4110PE	Cloud Computing	3
	CS4111PE	Ad-hoc & Sensor Networks	3
Professional Elective V	CS4112PE	Advanced Algorithms	3
	CS4113PE	Real Time Systems	3
	CS4114PE	Soft Computing	3
	CS4115PE	Internet of Things	3
	CS4116PE	Software Project Management	3
Professional Elective VI	CS4203PE	Computational Complexity	3
	CS4204PE	Distributed Systems	3
	CS4205PE	Neural Networks & Deep Learning	3
	CS4206PE	Human Computer Interaction	3
	CS4207PE	Cyber Forensics	3

List of Open Electives offered by various departments

Sr. No.	Branch	Open Elective Offered (OE – I)	Open Elective Offered (OE – II)	Open Elective Offered (OE –III)
1	**Civil Engineering**	CE3211OE: Basics of Civil Engineering	CE4121OE: Environmental Impact Assessment	CE4231OE: Remote Sensing and GIS
2		CE3212OE: Building Materials and Construction	CE4122OE: Industrial Waste Water Treatment	CE4232OE: Disaster Management
3	**Electrical And Electronics Engineering**	EE3211OE: Electrical Installation and costing	EE4121OE: Renewable Energy sources	EE4231OE: Instrumentation and Control
4		EE3212OE: Electrical Engineering Material	EE4122OE: Reliability Engineering	EE4232OE: Energy Storage Systems
5	**Mechanical Engineering**	ME3211OE: Operation Research	ME4121OE: Fabrication Processes	ME4231OE: Reliability Engineering
6		ME3212OE: Fundamentals of Mechanical Engineering	ME4122OE: Total Quality Management	ME4232OE: Industrial Management
7		ME3213OE: Metallurgy of Non-Metallurgists	ME4123OE: Energy Management and Conservation	ME4233OE: Renewable Energy Sources
7	**Electronics And Communication Engineering**	EC3211OE: Fundamentals of Internet of Things	EC4121OE: Principles of Computer Communications and Networks	EC4231OE: Electronic Measuring Instruments
9	**Computer Science Engineering**	CS3211OE: Introduction to Data Science	CS4121OE: Python Programming	CS4231OE: Machine Learning
10		CS3212OE: Data mining	CS4122OE: R Programming	CS4232OE: Cloud Computing
11		CS3213OE: Computer Forensics	CS4123OE: JAVA Programming	CS4233OE: Natural Language Processing

LINEAR ALGEBRA & CALCULUS

B.Tech. I Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
MA1101BS	Basic Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn

1. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Method of finding Eigen values, eigenvectors and to reduce the quadratic form to canonical form.
3. Concept of expansion of Fourier series.
4. Geometrical approach to mean value theorems and evaluation of improper integrals using Beta and Gamma functions.
5. Partial differentiation and finding maxima and minima of function of two or more variables.

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

1. Solve the system of Linear equations in various engineering problems
2. Evaluate the Eigen values and Eigen vectors
3. Expand Fourier series of given functions in arbitrary intervals
4. Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
5. Find the extreme values of functions of two variables with/ without constraints.

UNIT-1: Matrices

Matrices: Introduction. 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, LU Decomposition Method.

UNIT-2: Eigen values and Eigen vectors

Vectors Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties.Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding the inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of Quadratic forms; Reduction of Quadratic form to Canonical form by Orthogonal Transformation.

UNIT-3: Fourier series

Definition of periodic function, Fourier expansion of periodic function in $(0,2\pi) and (-\pi,\pi)$. Determination of Fourier coefficients – Fourier series of even and odd functions; Half – Range Fourier Sine and Cosine expansions.

UNIT-IV: Calculus

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value theorem. Definition of Improper Integral : Beta and Gamma functions and their applications.

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

Definition 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.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010

APPLIED PHYSICS

B.Tech. I Year I Semester.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
AP1102BS	Basic Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives:

1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
3. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. To study applications in engineering like memory devices, transformer core and superconductors.

Course Outcomes: Upon graduation:

1. Demonstrate the importance of behavior of a particle quantum mechanically
2. Analyze the role of semiconductors in science and engineering Applications.
3. Analyze & compare the device structures in Semiconductor electronics .
4. Analyse and explain principle, working of various laser systems and examine light propagation through optical fibers.
5. Examine various magnetic dielectric properties and Apply them in engineering applications

UNIT-I

Principles of 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, G-P Thomson experiment, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II

Semiconductor Physics: Origin of Energy Band Formation in Solids, Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, Hall effect, Formation of PN junction, Open circuit PN junction, Energy diagram of PN diode, I-V Characteristics of PN junction diode, Zener diode –breakdown mechanism and characteristics

UNIT-III

Physics of Semiconductor Devices:, Generation & recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Photo diode(PIN diode) & Solar cell - their structure, Materials, working principle and Characteristics.

UNIT-IV

Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser-Scientific & Medical applications.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Absorption & Bending Losses associated with optical fibres, Applications of optical fibres-Sensor & Medical Field.

UNIT-V

Dielectric Properties: Polarisation, Permittivity and Dielectric constant, Types of Polarisation, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

Magnetic Properties: Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Hard & Soft Magnetic materials, Applications of magnetic materials.

TEXT BOOKS:

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

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Guptha on NPTEL

PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I Semester.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CS1103ES	Engineering Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives:

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

Course Outcomes: The student will learn

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

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), Syntaxand Logical Errors in compilation, object and executable code , Operators, expressions andprecedence, 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 branchingwith 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.Command line arguments

UNIT - II: Arrays, Strings, Structures and Pointers:

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 availablein C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

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

UNIT - III: Preprocessor and File handling in C:
Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data toexisting files, Writing and reading structures using binary files, Random access using fseek, ftell andrewind 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 Recursivefunctions
Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of differentdata types

UNIT - V: Introduction to Algorithms:
Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a givenset, finding if a number is prime number, etc.
Basic searching in an array of elements (linear and binary search techniques),
Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms),Basic concept of order of complexity through the example programs

TEXT BOOKS:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)

REFERENCE BOOKS:

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

ENGLISH

B.Tech. I Year I Semester.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN1104HS	Humanities & Sciences	2	0	0	2	30	70	100
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:32		

INTRODUCTION In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS

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.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement. **Reading:** Improving Comprehension Skills – Techniques for Good Comprehension **Writing:** Format of a Formal Letter- **Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III 'Blue Jeans' 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

UNIT –IV ' KING LEAR ' a tragedy story by William Shakespeare, play synopsis of Act 1 & 2 published by Bloom, Harold. "King Lear." Shakespeare : The Invention of the Human. New York: Riverhead, 1998.

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 - Essay Writing-Précis Writing.

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

Vocabulary: Technical Vocabulary and their usage **Grammar:** Common Errors in English **Reading:** Reading Comprehension-Exercises for Practice **Writing: Technical Reports**-Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

Textbook:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. Nahum Tate's 1681 Adaption of King Lear

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.

APPLIED PHYSICS LAB

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
AP1105BS	Basic Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

Course Outcomes:

1. Design; create skills to impart practical knowledge in real time solution.
2. Explain, demonstrate principle, concept, working and application of new technology and compare results with theoretical calculations
3. Construct and develop, organize new instruments with practical knowledge.
4. Interpret, and summarize of new concept in the solution of practical oriented problems and to extend the knowledge about the solution to theoretical problems.
5. Understand measurement technology, usage of new instruments

List of Experiments:

1. Energy gap of P-N junction diode: 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. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.
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 characteristics of LASER sources.
8. Optical fibre: To determine the bending losses of Optical fibres.
9. LCR Circuit: To determine the Quality factor of LCR Circuit.
10. R-C Circuit: To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CS1106ES	Engineering Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

[Note:The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:

CodeLite: https://codelite.org/
Code::Blocks:
http://www.codeblocks.org/

DevCpp :
http://www.bloodshed.net/devcpp.html
Eclipse: http://www.eclipse.org

This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:

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

Course Outcomes: The candidate is expected to be able to:

1. Formulate the algorithms for simple problems
2. Translate given algorithms to a working and correct program
3. Correct syntax errors as reported by the compilers
4. Identify and correct logical errors encountered during execution
5. Represent and manipulate data with arrays, strings and structures
6. Use pointers of different types
7. Create, read and write to and from simple text and binary files
8. Modularize the code with functions so that they can be reused

Practice sessions:

1. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
2. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:

1. Write a program for fiend the max and min from the three numbers.
2. Write the program for the simple, compound interest.
3. 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.
4. 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:

   5 x 1 = 5
   5 x 2 = 10
   5 x 3 = 15
5. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

1. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
2. 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)
3. Write a program that finds if a given number is a prime number
4. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
5. 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.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C program to find the roots of a Quadratic equation.
8. Write a C program to calculate the following, where x is a fractional value.

   1-x/2 +x^2/4-x^3/6
9. 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.

Arrays and Pointers and Functions:

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

2. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
3. Write a C program that uses functions to perform the following:
4. Addition of Two Matrices
5. ii. Multiplication of Two Matrices
6. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
7. Write C programs that use both recursive and non-recursive functions
8. To find the factorial of a given integer.
9. ii. To find the GCD (greatest common divisor) of two given integers.
10. iii. To find x^n
11. Write a program for reading elements using pointer into array and display the valuesusing array.
12. Write a program for display values reverse order from array using pointer.
13. Write a program through pointer variable to sum of n elements from array.

Files:

1. Write a C program to display the contents of a file to standard output device.
2. Write a C program which copies one file to another, replacing all lowercase characterswith their uppercase equivalents.
3. Write a C program to count the number of times a character occurs in a text file. Thefile name and the character are supplied as command line arguments.
4. Write a C program that does the following:
5. 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 atoi 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.
6. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).

Strings:

1. Write a C program to convert a Roman numeral ranging from I to L to its decimalequivalent.
2. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
3. Write a C program that uses functions to perform the following operations:
4. To insert a sub-string in to a given main string from a given position.
5. ii. To delete n Characters from a given position in a given string.
6. 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.)
7. Write a C program that displays the position of a character ch in the string S or – 1 ifS doesn‘t contain ch.
8. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

1. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Displayan error message if an invalid choice is entered.

2. 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    * *
                                            *
```

Sorting and Searching:

1. Write a C program that uses non recursive function to search for a Key value in agiven
2. List of integers using linear search method.
3. Write a C program that uses non recursive function to search for a Key value in agiven
4. Sorted list of integers using binary search method.
5. Write a C program that implements the Bubble sort method to sort a given list of
    a. Integers in ascending order.
6. Write a C program that sorts the given array of integers using selection sort in descending order
7. Write a C program that sorts the given array of integers using insertion sort in ascending order
8. Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

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

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN1107HS	Humanities & Sciences	0	0	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

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

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain

1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

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

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

Listening Skills

Objectives

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

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

a. Listening for general content
b. Listening to fill up information
c. Intensive listening
d. Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

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

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

Exercise – I

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

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

Exercise – II

CALL Lab: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong 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.

****

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component): *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

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

ENVIRONMENTAL SCIENCE
(MANDATORY NON CREDIT COURSE)

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
*MC1001	Humanities & Sciences	3	0	0	0	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

Course Objectives:

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

Course Outcomes:

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

UNIT-I

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

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

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

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of

pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

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

UNIT-V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

ADVANCED CALCULUS

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
MA1201BS	Basic Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn

1. Various analytical Methods to solve first order first degree ordinary differential equations.
2. Methods to solve higher order ordinary differential equations.
3. Concept of multiple integrals and their applications.
4. The physical quantities involved in engineering field related to vector valued functions.
5. Line, Surface and Volume integrals and their applications.

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

1. Find the solutions of first order first degree differential equations and their applications.
2. Solve higher order ordinary differential equations with constant coefficients and apply the concept of differential equation to real world problems.
3. Compute areas and volumes using double and triple integrals.
4. Calculate gradient of scalar point function and divergence, curl of vector point function.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I: First Order Ordinary Differential Equations

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;Applications: LR circuit problems.

UNIT-II: Ordinary Differential Equations of Higher Order

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 xV(x); method of variation of parameters; Applications: LCR circuit problems.

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian 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 (double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: Vector Differentiation

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

Line, Surface and Volume Integrals; Theorems of Greens, Gauss and Stoke's (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. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes

2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984

CHEMISTRY

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CH1202BS	Basic Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course objectives:

1. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
2. To develop specialized knowledge in the analysis of water and waste water which are essential for the engineers and in industry.
3. Learn about the fundamentals of electrode reactions and electrochemical cells
4. To provide an understanding of the corrosion principles and engineering methods used to minimize and prevent corrosion.
5. To familiarize students about the characteristics and applications of different polymers and engineering materials in every day life.
6. To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course outcomes:

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. Apply knowledge and understanding of water treatment process to real world problems.
3. Interpret the knowledge of electrochemical phenomenon involved in developing batteries and understanding fuel cells fundamentals.
4. Ability to determine appropriate method of protection against corrosion for a metal based on its applications in different fields.
5. Classify and characterize different polymers engineering materials and apply its knowledge to select suitable materials for specific applications.
6. The required skills to get clear concepts on basic spectroscopy and applications to medical and other fields.

UNIT - I:

Molecular structure and Theories of Bonding:

Atomic and molecular orbitals. Linear combination of atomic orbitals (LCAO), molecular orbitals of diatomic orbitals, molecular orbital energy level diagrams for N_2, O_2 and F_2 molecules.

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. Numerical problems. Disadvantages of hard water.

Boiler troubles: Scales and Sludges, caustic embrittlement, boiler corrosion, Softening of water by internal treatment of Boiler feed water and ion- exchange processes. Desalination of water – Reverse osmosis. Sewage water treatment. Potable water treatment - Disinfection of potable water by chlorination and Ozonization.

UNIT-III

Electrochemistry, Batteries and Corrosion:

Electrochemistry: Electrochemical cells- Electrode, electrode potential, standard electrode potential, types of electrodes- Calomel and glass electrodes. Nernst equation, electrochemical series and its applications.

Batteries: Cell and battery - Primary (Lithium cell) and secondary batteries (Lead – acid storage battery, Lithium ion battery, advantages and applications of solid state battery)

Fuel cells: Hydrogen-oxygen, solid polymer electrolytic fuel cell, Bio chemical fuel cells------- Advantages and Applications.

Corrosion and its control –Concept of corrosion, Types of corrosion,

mechanism of Chemical & Electro chemical corrosion. Types of electro chemical corrosion (Galvanic corrosion, Pitting, Water line corrosion, stress corrosion). Factors affecting corrosion.

Corrosion control methods -Principle of cathodic protection- Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP) .

Protective coatings: Metallic coatings- Hot dipping, metal cladding, cementation, electroplating of copper, electro less plating of nickel**, paints.**

UNIT-IV

Engineering materials:

Ceramics: Properties & types of ceramics. Engineering applications of ceramics

Polymers: Defnition, classification, properties of polymers. Plastics-Compounding of plastics, Engineering applications of plastics (PVC, Teflon, Bakelite), Fibres - Applications of Nylon 6. FRP- Types, advantages and applications. Natural rubber and its vulcanization. Elastomers-Applications. Conducting polymers and its applications-Mechanism of conduction and doping in poly acetylene. Applications of bio degradable polymers.

Composites: Classification, Constituents, advantages, applications.

Lubricants: Classification, properties and mechanism of lubrication.

UNIT-V

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.

Suggested Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
6. R. V. E. Gadag & A. Nityananda Shetty, Engineering Chemistry, I K International Publishing House Private Limited, New Delhi, 2015 Edition

ENGINEERING GRAPHICS

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME1203ES	Engineering Sciences	1	0	4	3	30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 64				Total Classes:80		

Course objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

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

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids –Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion ofIsometric Views to Orthographic Views and Vice-versa –Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):

Introduction to CAD Software Package Commands. - Free Hand Sketches of 2D- Creation of 2DSketches by CAD Package

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

BASIC ELECTRICAL ENGINEERING

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EE1204ES	Engineering Sciences	3	0	0	3	30	70	100
Contact Classes: 64	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:64		

Course Objectives:

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

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations•

UNIT-I:

D.C. Circuits Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems and maximum power transfer thorem. Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

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

UNIT-III:

Transformers Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Construction and working principle of Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

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. Power factor measurement using 2 wattmeter method, Elementary calculations for energy consumption,

TEXT BOOKS/ REFERENCE BOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering”, Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 198

CHEMISTRY LAB

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CH1205BS	Basic Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as an function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

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

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of Rf values of some organic molecules by TLC technique.

List of 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 Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe2+ by Potentiometry using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
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. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

ENGINEERING WORKSHOP

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME1206ES	Engineering Sciences	1	0	3	2.5	30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:64		

Pre-requisites: Practical skill

Course Objectives:

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

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

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including pluming, fitting,carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes includingdrilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

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

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and WoodWorking

TEXT BOOKS:

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

REFERENCE BOOKS:

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

BASIC ELECTRICAL ENGINEERING LAB

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN1207ES	Humanities & Sciences	0	0	2	1	30	40	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

Course Objectives:

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

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL , RC and RLC circuits using DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a SinglePhase Transformer
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star Delta, Delta-Delta, Delta-star, Star-Star)
9. Measurement of Active and Reactive Power in a balanced Three-phase circuit
10. Open circuit Characteristics of a Separately/Self Excited DC Shunt/Compound Generator
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

ANALOG AND DIGITAL ELECTRONICS

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
EC2101ES	Foundation	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: No Prerequisites								

CourseObjectives:

- To introduce components such as diodes, BJT sand FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes:

- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.
- Learn Postulates of Boolean algebra and to minimize combinational functions
- Design and analyze combinational and sequential circuits
- Know about the logic families and realization of logic gates.

COURSE SYLLABUS

UNIT- I

Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, p-n junction asa rectifier, V-I characteristics, effect of temperature, diode resistance, diffusion capacitance, diode switching times, break down diodes,Tunnel diodes, photo diode,LED. Diode Applications - clipping circuits, comparators, half wave rectifier, Full wave rectifier, rectifier withcapacitorfilter.

UNIT- II

BJTs:Transistorcharacteristics:The junction transistor,transistoras an amplifier,CB,CE,CC configurations, comparison of transistor configurations, the operating point, self-bias or Emitter bias,biascompensation,thermalrunawayandstability,transistoratlowfr

equencies,CEamplifierresponse,gain bandwidth product, Emitter follower, RC coupled amplifier, two cascaded CE and multi stage CEamplifiers.

UNIT- III

FETs and Digital Circuits: FETs: JFET, V-I characteristics, MOSFET, low frequency CS and CDamplifiers, CS and CD amplifiers.

Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE OR gate, De Morgan Laws, NAND and NOR DTL gates, modified DTL gates, HTL and TTL gates, output stages, RTL and DCTL, CMOS,Comparison of logic families.

UNIT- IV

Combinational Logic Circuits: Basic Theorems and Properties of Boolean Algebra, Canonical and Standard Forms, Digital Logic Gates, The Map Method, Product - of-Sums Simplification, Don't - Care Conditions, NAND and NOR Implementation, Exclusive - OR Function, BinaryAdder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT- V

Sequential Logic Circuits: Sequential Circuits, Storage Elements: Latches and flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read only Memory.

TEXT BOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e,Jaccob Millman,Christos Halkias and Chethan D.Parikh, *Tata McGraw-Hill Education*,India,2010.
2. Digital Design, 5/e, Morris Mano and MichaelD. Cilette, *Pearson, 2011*.

REFERENCE BOOKS:

1. Electronic Devices and Circuits, Jimmy J Cathey, *Schaum soutline series*, 1988.
2. Digital Principles, 3/e, Roger L.Tokheim, *Schaum's outline series*, 1994.

DATA STRUCTURES

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS2102PC	Core	L	T	P	C	CIA	SEE	Total
		3	1	0	4	30	70	100
Contact classes: 45	Tutorial Classes : 15	Practical classes : NIL				Total Classes :60		
Prerequisites: A course on "Programming for Problem Solving".								

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

Course Outcomes:

- Ability to select the data structures that efficiently model the information in aproblem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs and AVL-trees.

COURSE SYLLABUS

UNIT- I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

UNIT- II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

HashTable Representation: Hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT- III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVLTrees, Definition, Height of an AVL Tree, Operations–Insertion, Deletion and Searching, Red–Black, Splay Trees.

UNIT- IV

Graphs: Graph Implementation Methods.Graph Traversal Methods.

Sorting: Heap Sort, External Sorting - Model for external sorting, Merge Sort.

UNIT- V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer–Moore algorithm, the Knuth- Morris - Pratt algorithm, Standard Tries, Compressed Tries, and Suffix tries.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C–A.S.Tanenbaum, Y.Langsam and M.J.Augenstein,PHI/PearsonEducation.

REFERENCE BOOK:

1. Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.

COMPUTER ORIENTED STATISTICAL METHODS

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
MA2103BS	**Foundation**	**3**	**1**	**0**	**4**	**30**	**70**	**100**
Contact classes: 45	**Tutorial Classes : 15**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: Mathematics courses of first year of study.								

Course Objectives:

- To learn the theory of Probability and probability distributions of single and multiple random variables
- To learn the sampling theory and testing of hypothesis and making inferences
- To learn stochastic process and Markov chains.

Course Outcomes:

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

- Apply the concepts of probability and distributions to some case studies
- Correlate the material of one unit to the material in other units
- Resolve the potential misconceptions and hazards in each topic of study.

COURSE SYLLABUS

UNIT- I

Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules,Conditional Probability, Independence, and the Product Rule,B ayes' Rule.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

UNIT- II

Mathematical Expectation: Mean ofa Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

UNIT- III

Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t–Distribution, F-Distribution.

UNIT- IV

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, And Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning aSingle Mean, Tests on Two Means, Teston a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT- V

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady statecondition, Markov analysis.

TEXT BOOKS:

1. Ronald E.Walpole, Raymond H.Myers, Sharon L.Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. SC Gupta and VK Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S. D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS:

1. T.T.Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

COMPUTER ORGANIZATION AND ARCHITECTURE

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS2104PC	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: No Prerequisites								

Course Objectives:

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, micro programmed control unit,pipelining and vector processing, memory organization and I/O systems and multiprocessors

Course Outcomes:

- Understand the basics of instructions sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

COURSE SYLLABUS

UNIT- I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language 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, Memory Reference Instructions, Input – Output and Interrupt.

UNIT- II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT- III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating–point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT- IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT- V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

MultiProcessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, cache Coherence.

TEXT BOOK:

1. Computer System Architecture–M.MorisMano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization–Carl Hamacher, Zvonks Vranesic, Safea Zaky, VthEdition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S.Tanenbaum, 4thEdition, PHI/Pearson.

OBJECT ORIENTED PROGRAMMING USING C++

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS2105PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		2	**0**	**0**	**2**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on "Programming for Problem Solving using C".								

Course Objectives:

- Introduces Object Oriented Programming concepts using the C++ language.
- Introduces the principles of data abstraction, inheritance and polymorphism;
- Introduces the principles of virtual functions and polymorphism
- Introduces handling formatted I/O and unformatted I/O
- Introduces exception handling

Course Outcomes:

- Able to develop programs with reusability
- Develop programs for file handling
- Handle exceptions in programming
- Develop applications for a range of problems using object-oriented programming techniques

COURSE SYLLABUS

UNIT- I

Object-Oriented Thinking : Different paradigms for problem solving, need for OOP paradigm, differences between OOP and Procedure oriented programming, Overview of OOP concepts - Abstraction, Encapsulation, Inheritance and Polymorphism.

C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statement- if, switch, while, for, do, break, continue, goto statements. Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions. Dynamic memory allocation and de-allocation operators - new and delete, Preprocessor directives.

UNIT- II

C++ Classes and Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction,ADT and information hiding.

UNIT- III

Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.

Virtual Functions and Polymorphism: Static and Dynamic binding, virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes,Virtual destructors.

UNIT- IV

C++ I/O: I/O using C functions, Stream classes hierarchy, Stream I/O, File streams and String streams, Overloading operators, Error handling during file operations, Formatted I/O.

UNIT- V

Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions.

TEXT BOOKS:

1. The Complete Reference C++, 4th Edition, Herbert Schildt, Tata McGraw Hill.
2. Problem solving with C++: The Object of Programming, 4thEdition, Walter Savitch, Pearson Education.

REFERENCE BOOKS:

1. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
2. OOP in C++, 3rd Edition, T.Gaddis, J.Waltersand G.Muganda, Wiley Dream Tech Press.
3. Object Oriented Programmingin C++, 3rd Edition, R.Lafore, Galigotia Publications Pvt Ltd.

ANALOG AND DIGITAL ELECTRONICS LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EC2106ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites: No Prerequisites								

Course Objectives:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concept of combinational logic circuits and sequential circuits

Course Outcomes:

Upon completion of the Course, the students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.
- Postulates of Boolean algebra and to minimize combinational functions
- Design and analyze combinational and sequentiall circuits
- Known about the logic families and realization of logic gates.

List of Experiments

1. Full Wave Rectifier with & without filters
2. Common Emitter Amplifier Characteristics
3. Common Base Amplifier Characteristics
4. Common Source amplifier Characteristics
5. Measurement of h-parameters of transistor in CB,CE,CC configurations
6. Input and Output characteristics of FET in CS configuration
7. Realization of Boolean Expressions using Gates
8. Design and realization logic gates using universal gates

9. Generation of clock using NAND/NOR gates
10. Design a 4–bit Adder/Subtractor
11. Design and realization a Synchronous and Asynchronous counter using flip-flops
12. Realization of logic gates using DTL, TTL, ECL, etc.

DATA STRUCTURES LAB

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS2107PC	Core	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		
Prerequisites: A Course on "Programming for problem solving".								

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks,queues and linked lists.
- Ability toImplement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list
   i) Creation ii)Insertion iii)Deletion iv)Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list
   i) Creation ii)Insertion iii)Deletion iv)Traversal
3. Write a program that uses functions to perform the following operations on circular linked list
   i) Creation ii)Insertion iii)Deletion iv)Traversal
4. Write a program that implement stack (its operations) using
   i) Arrays ii)Pointers
5. Write a program that implement Queue (its operations) using
   i) Arrays ii)Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sortii)Selection sort iii)Insertion sort

7. Write a program that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linearsearch ii)Binarysearch
8. Write a program to implement the tree traversal methods.
9. Write a program to implement the graph traversal methods.

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz,S. Sahni and Susan Anderson Freed,*UniversitiesPress*.
2. Data Structures using C–A.S.Tanenbaum, Y.Langsam and M.J.Augenstein, *PHI/PearsonEducation*.

REFERENC EBOOK:

1. Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F.Gilbergand B.A.Forouzan, Cengage *Learning*.

IT WORKSHOP LAB

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2108PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		
Prerequisites: No Prerequisites								

Course Objectives:

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers.In addition hardware and software level trouble shooting process, tips and tricks would be covered. The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered.In addition, awareness of cyber hygiene, protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentation and personal websites using the Microsoft suite of office tools and LaTeX.

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be

given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and followitup with a Viva

Task 5: Hardware Trouble shooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Trouble shooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.The work done should be verified by the instructor and followed up with aViva.

Internet & World WideWeb

Task 1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: **Search Engines & Netiquette:** Students should know what search engines are and how touse the search engines. A few topics would be given to the students for which they need to search on Google.This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an antivirussoftware, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block popups, block active downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1–Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, UsingLaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format in word.

Task 2: Using LaTeX and Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors,Inserting Header and Footer,Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing tool bar and Word Art,FormattingImages,Textboxes,Paragraphs and Mail Mergein word.

Excel

Excel Orientation: The mentor needs to tell the importance of MSoffice2007/equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered ineach. Using Excel– Accessing, overview of toolbars, saving excels files, Using help and resources.

Task 1: Creating Scheduler- Features to be covered: Gridlines, Format Cells, Summation, autofill, Formatting Text

Task 2: Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std, deviation, Charts, Renaming and Inserting work sheets,Hyper linking,Count function,LOOKUP/VLOOKUP

Task 3: Performance Analysis-Features to be covered:-Split cells,freeze panes, group and outline, Sorting,Boolean and logical operators,Conditional formatting

LaTeX and MS/equivalent (FOSS) tool PowerPoint

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts,Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power Point.Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyper links, Inserting–Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slides lotter, notes etc) and Inserting–Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Comdex Information Technology course toolkit Vikas Gupta, *WILEY Dreamtech*
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, *WILEY Dreamtech*
3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education.*
4. PC Hardware- A Hand book–KateJ.Chase*PHI*(Microsoft)
5. LaTeX Companion–Leslie Lamport, *PHI/Pearson.*
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.– *CISCOPress,Pearson Education.*
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan – CISCO Press, *PearsonEducation.*

C++ PROGRAMMING LAB

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS2109PC	Core	L	T	P	C	CIA	SEE	Total
		0	0	2	1	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 36				Total Classes :36		
Prerequisites: A course on "Programming for Problem Solving".								

Course Objectives:

- Introduces object-oriented programming concepts using the C++language.
- Introduces the principles of data abstraction, inheritance and polymorphism;
- Introduces the principles of virtual functions and polymorphism
- Introduces handling formatted I/O and unformatted I/O
- Introduces exception handling

Course Outcome:

- Ability to develop applications for a range of problems using object-oriented programming techniques

List of Experiments

1. Write a C++ Program to display Names, RollNo and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects.Read and display the contents of the array.

2. Write a C++ program to declare Struct. Initialize and display contents of member variables.

3. Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

4. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.

5. Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT)=30% of the gross salary).

6. Write a C++ program to illustrate the concepts of console I/O operations.

7. Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.

8. Writea C++ program to allocate memory using new operator.

9. Writea C++ program to create multi level inheritance. (Hint: Classes A1, A2, A3)

10. Write a C++program to create an array of pointers. Invoke functions using array objects.

11. Write a C++ program to use pointer for both base and derived classes and call the member function.Use Virtual keyword.

GENDER SENSITIZATION LAB
(An Activity-based Course)

B.Tech. II Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
*MC2002	Mandatory	0	0	2	0	0	100*	100*
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 36				Total Classes :36		
Prerequisites: No Prerequisites								

Objectives of the Course:

- To develop students sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflectcritically on gender violence.
- To expose students to more interactions between men and women.

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be 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, every day life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
  •Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the text book will empower students to understand and respond to gender violence.

UNIT- I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men-Preparing for Womanhood.Growing up Male. First lessons in Caste.

UNIT–II: GENDER ROLES AND RELATIONS

Two or Many?-Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum:Beyond the Binary.

UNIT–III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor-"My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics-Fact and Fiction.Unrecognized and Unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT–IV: GENDER-BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a HumanRights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Every day Harassment-Further Reading:"*Chupulu".*
Domestic Violence: Speaking Out Is Home a Safe Place?-When Women Unite [Film].Rebuilding Lives.Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT–V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature –Just Relationships: Being Together as Equals
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note:

1. Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

2. Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".

ESSENTIAL READING:

The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha,Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote,Vasudha Nagaraj,Asma Rasheed,Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi,Telangana Governmentin 2015.**

ASSESSMENT AND GRADING:

- Discussion & Class room Participation:20%
- Project/Assignment: 30%
- End Term Exam:50%

DISCRETE MATHEMATICS

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2201PC	Core	3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: An understanding of Mathematics in general is sufficient.								

Course Objectives

- Introduces the elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:

- Ability to understand and construct precise mathematical proofs
- Ability to use logic and set theory to formulate precise statements
- Ability to analyze and solve counting problems on finite and discrete structures
- Ability to describe and manipulate sequences
- Ability to apply graph theory in solving computing problems

COURSE SYLLABUS

UNIT- I

The Foundations: Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT- II

Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations,Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT- III

Algorithms, Induction and Recursion: Algorithms, The Growth of Functions, Complexity of Algorithms

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness

UNIT- IV

Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion

UNIT- V

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs,Graph Coloring.

Trees: Introduction to Trees, Applications of Trees,Tree Traversal,Spanning Trees,Minimum Spanning Trees

TEXT BOOK:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- KennethHRosen, 7thEdition, TMH.

REFERENCES BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science-J.P.Tremblay and R.Manohar,TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: JoeL.Mott, Abraham Kandel, Teodore P.Baker, 2nded, Pearson Education.
3. Discrete Mathematics-Richard Johnsonbaugh, 7ThEdn., Pearson Education.
4. Discrete Mathematics with Graph Theory-Edgar G.Goodaire, Michael M.Parmenter.
5. Discrete and Combinatorial Mathematics-an applied introduction: Ralph.P.Grimald, 5thedition, Pearson Education.

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
SM2202MS	Foundation	3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites:None								

Course Objectives:

- To learn the basic Business types, impact of the Economy on Business and Firms specifically.
- To analyze the Business from the Financial Perspective.

Course Outcome:

- The students will understand the various Forms of Business and the impact of economic variables on the Business.
- The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
- The Students can study the firm's financial position by analysing the Financial Statements of a Company.

COURSE SYLLABUS

UNIT–I

Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics,Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multi disciplinary nature of Business Economics.

UNIT- II

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good

Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. **Supply Analysis:** Determinants of Supply, Supply Function & Law of Supply.

UNIT- III

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Mono polistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT- IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, preparation of Final Accounts.

UNIT- V

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turn over Ratios, Profitability Ratios,Proprietary Ratios, Solvency, Leverage Ratios (simple problems).Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

1. D.D.Chaturvedi, S.L.Gupta, Business Economics-Theory and Applications, International Book House Pvt.Ltd.2013.
2. Dhanesh KKhatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt.Ltd.2012.

REFERENCE BOOKS:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S.N.Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

OPERATING SYSTEMS

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2203PC	Core	3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		

Prerequisites:

- **A course on "Computer Programming and Data Structures".**
- **A course on "Computer Organization and Architecture".**

Course Objectives:

- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, dead locks, memory management,file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands,system call interface for process management,inter process communication and I/O in Unix

Course Outcomes:

- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems and architectures interact and how to use each effectively.

COURSE SYLLABUS

UNIT- I

Operating System- Introduction, Structures- Simple Batch, Multi programmed,Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services,System Calls

UNIT- II

Process and CPU Scheduling-Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms,Multiple –Processor Scheduling.

System call interface for process management- fork, exit, wait, waitpid, exec

UNIT- III

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

Process Management and Synchronization-The Critical Section Problem, Synchronization Hardware, Semaphores and Classical Problems of Synchronization, Critical Regions, Monitors

Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT- IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, PageReplacement, Page Replacement Algorithms.

UNIT- V

File System Interface and Operations-Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management.Usage of open, create, read, write, close, lseek, stat, ioctl systemcalls.

TEXT BOOKS:

1. Operating System Principles-Abraham Silberchatz, Peter B.Galvin, Greg Gagne, 7thEdition, JohnWiley
2. Advanced programming in the UNIX environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems–Internals and Design Principles Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems,Andrew S.Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighanand Pike, PHI/Pearson Education
5. UNIX Internals-The New Frontiers, U.Vahalia, Pearson Education.

DATA BASE MANAGEMENT SYSTEMS

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS2204PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**0**	**4**	**30**	**70**	**100**
Contact classes: 45	**Tutorial Classes : 15**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on "Data Structures".								

Course Objectives:

- To understand the basic concepts and the applications of data base systems.
- To master the basics of SQL and construct queries using SQL.
- To learn models, data base design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

- Gain knowledge of fundamentals of DBMS,data base design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with data bases access techniques

COURSE SYLLABUS

UNIT- I

Database System Applications: A Historical Perspective, File Systems versus a DBMS**,** the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Data base Design and ER Diagrams, Entities, Attributes and EntitySets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual DesignWith the ERModel

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**,** Tuple relational Calculus, Domain relational calculus.

UNIT- III

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT and EXCEPT,Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normalform.

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.

UNIT- V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Indexd at a 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.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata McGraw Hill ,* 3rd Edition
2. Database System Concepts, Silberschatz, Korth, *McGra whill*, Vedition.

REFERENCE BOOKS:

1. Data base Systems design, Implementation and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, *PearsonEducation*
3. Introduction to Data base Systems,C.J. Date,*PearsonEducation*
4. Oracle for Professionals, The XTeam, S.Shah and V.Shah, *SPD.*
5. Data base Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI.*
6. Fundamentals of Data base Management Systems, M.L. Gillenson,*WileyStudent*Edition.

JAVA PROGRAMMING

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS2205PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**0**	**4**	**30**	**70**	**100**
Contact classes: 45	**Tutorial Classes : 15**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: Programming for Problem Solving								

Course Objectives:

- To introduce the object-oriented programming concepts.
- To understand object-oriented programming concepts and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection frame work and I/O classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

COURSE SYLLABUS

UNIT- I

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding,Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types,

Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance – Inheritance concept,Inheritance basics,Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance,Polymorphism-adhoc polymorphism,pure polymorphism, method overriding, abstract classes, Object class, forms of in heritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT- II

Packages - Defining a Package, CLASSPATH, Access protection, importing packages.Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT- III

Exception handling-Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-inexceptions, creating own exception subclasses.

Multithreading-Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, interthread communication.

UNIT- IV

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing aCollection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable, Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

UNIT- V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, GridBag Layout.

Event Handling-The Delegation event model-Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, Applets– Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons**- JButton, JToggle Button, JCheckBox, JRadioButton, JTabbedPane, JScrollPane, JList, JComboBox, Swing Menus, Dialogs.

TEXT BOOKS:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt.Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, PearsonEducation.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch,JohnWiley&sons
2. Introduction to Java programming, Y.Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. RadhaKrishna, University Press.
4. Programming in Java, S.Malhotra, S.Chudhary, 2nd edition, Oxford Univ.Press.
5. Java Programming and Object-oriented Application Development, R.A.Johnson, CengageLearning.

OPERATING SYSTEMS LAB (UsingUNIX/LINUX)

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2206PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		

Prerequisites:

- **A course on "Programming for Problem Solving".**
- **A course on "Computer Organization and Architecture".**

Co-requisite:

- **A course on "Operating Systems".**

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through simulation Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix.

Course Outcomes:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls.

List of Experiments:

1. Write C program to simulate the following CPU Scheduling algorithms
   a) FCFS b)SJF c)Round Robin d)priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Writea C program to implement the Producer–Consumer problem using semaphores using UNIX/LINUX systemcalls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs
   c) MessageQueues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
   a) Paging b)Segmentation

TEXT BOOKS:

1. Operating System Principles-Abraham Silberchatz, Peter B.Galvin, Greg Gagne, 7th Edition, John Wiley
2. Advanced programming in the Unix environment,W.R.Stevens, *Pearson* education.

REFERENCE BOOKS:

1. Operating Systems–Internals and Design Principles, William Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System-A Design Approach-Crowley, TMH.
3. Modern Operating Systems,Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers,U.Vahalia,Pearson Education

DATA BASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2207PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		
Co-requisites: • Co-requisite of course "Data base Management Systems"								

Course Objectives:

- Introduce ER data model,data base design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:

- Design data base schema for a given application and apply normalization.
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for data base applications using procedures, cursors and triggers.

List of Experiments:

1. Concept design with E-RModel
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger,delete trigger,update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Data base Systems design, Implementation and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. Fundamentals of Data base Systems, Elmasri Navrate, *Pearson Education*
3. Introduction to Data base Systems, C.J.Date, *PearsonEducation*
4. Oracle for Professionals, The XTeam, S.Shah andV.Shah, *SPD*.
5. Data base Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI*.
6. Fundamentals of Data base Management Systems, M.L. Gillenson, *Wiley Student Edition.*

JAVA PROGRAMMING LAB

B.Tech. II Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS2208PC	Core	0	0	2	1	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 36				Total Classes :36		
Co-requisites: Co-requisite of course "Java Programming"								

Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes:

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multi threaded programs.
- Able to write GUI programs using swing controls in Java.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains atleast one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. a) Develop an applet in Java that displays a simple message.
   b) Develop an applet in Java 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.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

6. Write a Java program for the following: Create a doubly linked list of elements.Delete a given element from the above list. Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area ( ). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area ( ) that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header and the remaining lines correspond to rows in the table. The elements are separated by commas.Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

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

12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

13. Write a Java program to list all the files in a directory including the files present in all its sub directories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

REFERENCE BOOKS

1. Java for Programmers, P.J.Deitel and H.M.Deitel, 10th Edition, *Pearson* education.
2. Thinking in Java, Bruce Eckel, *Pearson* Education.
3. Java Programming, D. S. MalikandP.S. Nair, *Cengage* Learning.
4. Core Java, Volume1, 9thedition, Cay S.Horstmann and G Cornell, *Pearson*.

CONSTITUTION OF INDIA

B.Tech. II Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
***MC2001**	**Mandatory**	**3**	**0**	**0**	**0**	**0**	**100***	**100***
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: No Prerequisites								

The Constitution of India is the supreme law of India. Parliament of India can not make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution.The Parliament of India has been empowered to amend the Constitution under Article 368, however, itcannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state.The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society.It reflects India's legacy of "diversity".It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values.No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian ofpeople. It has been protecting not only basic ideals of the Constitution but also strengthened the samet hrough progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy–Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India–The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government–Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article19
15. Scope of the Right to Life and Personal Liberty under Article 21

FORMAL LANGUAGES AND AUTOMATA THEORY

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3101PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: A course on "Discrete Mathematics"								

Course Objectives

- To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- To understand deterministic and non-deterministic machines.
- To understand the differences between decidability and undecidability.

Course Outcomes

- Able to understand the concept of abstract machines and their power to recognize the languages.
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Able to gain proficiency with mathematical tools and formal methods.

COURSE SYLLABUS

UNIT- I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of AutomataTheory–Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How a DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions.Conversion of NFA to DFA, Moore and Melay machines.

UNIT- II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages: Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT- III

Context-Free Grammars: Definition of Context- Free Grammars, Derivations Using a Grammar, Left most and Right most Derivations, the Language of a Grammar, Sentential Forms, Parse Tress, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata: Definition of the Push down Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata.From CFG to PDA, From PDA to CFG.

UNIT- IV

Normal Forms for Context-Free Grammars: Eliminating useless symbols, Eliminating €-Productions.Chomsky Normal form, Griebech Normal form.

Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications.

Closure Properties of Context-Free Languages: Closure properties of CFL's, Decision Properties of CFL's

Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description,The language of a Turing machine

UNIT- V

Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem,Other Undecidable Problems, Counter machines.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computation, 3rd Edition, John E.Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, Pearson Education.
2. Theory of Computer Science–Automata languages and computation, Mishra and Chandrashekaran, 2nd edition, PHI.

REFERENCE BOOKS:

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. ATextbook on Automata Theory, P.K.Srimani, NasirS.F.B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rdedition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

SOFTWARE ENGINEERING

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3102PC	**Core**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes :**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: No Prerequisites								

Course Objectives

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes

- Ability to translate end-user requirements into system and software requirements, using e.g.UML and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architecture and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness softesting problems and will be able to develop a simple testing report

COURSE SYLLABUS

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 frame work, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The water fall 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 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, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

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.

UNIT- V

Metrics for Process and Products: Software measurement, metrics for software quality.

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 ISO9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach-Roger S.Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach-James F.Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice-Waman S Jawadekar, The McGraw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

COMPUTER NETWORKS

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3103PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **A course on"Programming for problem solving"**
2. **A course on "Data Structures"**

Course Objectives

1. The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

Course Outcomes

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks and how they can be applied in network design and implementation.

COURSE SYLLABUS

UNIT- I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT- II

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.

SlidingWindow protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols.Wireless LANs, Data link layer switching.

UNIT- III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internet working, The Network layer in the internet.

UNIT- IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT- V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks—Andrew S Tanenbaum, David.j.Wetherall, 5th Edition, Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks- S.Keshav, 2nd Edition,Pearson Education
2. Data Communications and Networking–Behrouz A.Forouzan, Third Edition TMH.

ARTIFICIAL INTELLIGENCE

B.Tech. III Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS3104PC	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisite: No Prerequisites								

Course Objectives: To train the students to understand different types of AI agents, various AI search algorithms, fundamentals of knowledge representation, building of simple knowledge - based systems and to apply knowledge representation, reasoning.Study of Markov Models enable the student ready to step into applied AI.

COURSE SYLLABUS

UNIT- I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents **Basic Search Strategies** : Problem Spaces, Uninformed Search (Breadth-First, Depth-FirstSearch, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, GenericBest-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT- II

Advanced Search: Constructing Search Trees, Stochastic Search,A* Search Implementation, Minimax Search, Alpha-Beta Pruning
Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT- III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non-monotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes'Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT- IV

Learning : What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples,Winston's Learning Program, Decision Trees.

UNIT- V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1. Russell S.and Norvig P, Artificial Intelligence: AModern Approach, Third Edition, Prentice- Hall,2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B.Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F.Luger, Artificial Intelligence:Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed. ,2009.

INFORMATION THEORY & CODING

(Professional Elective-I)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3108PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Digital Communications								

Course Objectives:

- To acquire the knowledge in measurement of information and errors.
- Understand the importance of various codes for communication systems
- To design encoder and decoder of various codes.
- To known the applicability of source and channel codes

Course Outcomes:

Upon completing this course, the student will be able to

- Learn measurement of information and errors.
- Obtain knowledge in designing various source codes and channel codes
- Design encoders and decoders for block and cyclic codes
- Understand the significance of codes in various applications

COURSE SYLLABUS

UNIT- I

Coding for Reliable Digital Transmission and storage: Mathematical modelofInformation,A Logarithmic Measure of Information ,Average and Mutual Information and Entropy,Types of Errors,Error Control strategies.

Source Codes: Shannon-fano coding, Huffman coding

UNIT- II

Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an

undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT- III

Cyclic Codes: Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT- IV

Convolutional Codes: Encoding of Convolutional Codes- Structural and Distance Properties, state,tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT- V

BCH Codes: Minimum distance and BCH bounds, Decoding procedure for BCH codes, Syndrome computation and iterative algorithms, Error locations polynomials for single and double error correction.

TEXT BOOKS

1. Error Control Coding- Fundamentals and Applications– ShuLin, Daniel J. Costello, Jr, PrenticeHall, Inc 2014.
2. Error Correcting Coding Theory-ManYoungRhee,McGraw–Hill Publishing 1989

REFERENCE BOOKS

1. Digital Communications- John G.Proakis, 5thed, TMH 2008.
2. Introduction to Error Control Codes- Salvato re Gravano- oxford
3. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, WileyIndia.
4. InformationTheory, Coding and Cryptography–Ranjan Bose, 2nd Edition, 2009, TMH.

ADVANCED COMPUTER ARCHITECTURE

(Professional Elective-I)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3109PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites:Computer Organization								

Course Objectives

- To impart the concepts and principles of parallel and advanced computer architectures.
- To develop the design techniques of Scalable and multithreaded Architectures.
- To Apply the concepts and techniques of parallel and advanced computer architectures to design modern computer systems

CourseOutcomes: Gain knowledge of

- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures, Pipelining, Super scalar processors, multiprocessors

COURSE SYLLABUS

UNIT- I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multi vector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT- II

Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws,ScalabilityAnalysisandApproaches,HardwareTechnologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology , Virtual Memory Technology.

UNIT- III

Bus Cache and Shared memory, Backplane bus systems, Cache Memory organizations, Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and super scalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT- IV

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocess or system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivetor and SIMD computers, Vector Processing Principals, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations,The connection machine CM-5,

UNIT- V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multicomputers, Scalable and multithreaded Architectures, Dataflow and hybrid Architectures.

TEXT BOOK:

1.Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

REFERENCE BOOKS:

i.ComputerArchitecture,Fourthedition,J. L.HennessyandD.A.Patterson. ELSEVIER.

2. AdvancedComputerArchitectures,S.G.Shiva, SpecialIndianedition, CRC,Taylor&Francis.
3. IntroductiontoHighPerformanceComputingforScientistsandEngineer s,G.HagerandG.Wellein,CRCPress,Taylor&FrancisGroup.
4. AdvancedComputerArchitecture,D. Sima,T.Fountain, P.Kacsuk,Pearsoneducation.
5. ComputerArchitecture,B. Parhami,OxfordUniv.Press.

DATA ANALYTICS

(Professional Elective- I)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3110PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites 1. **A course on"Database Management Systems".** 2. **Knowledge of probability and statistics.**								

Course Objectives:

- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes: After completion of this course students will be able to

- Understand the impact of data analytics for business decisions and strategy
- Carry out data analysis / statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources

COURSE SYLLABUS

UNIT- I

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors / Signals/ GPS etc. Data Management, Data Quality (noise, outliers, missing values,duplicate data) and Data Processing & Processing.

UNIT- II

Data Analytics : Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT- III

Regression–Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.
Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT- IV

Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building–Regression, Classification, Over fitting, Pruning and Complexity, Multiple Decision Tree setc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction.

UNIT- V

Data Visualization : Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Student's Handbook for Associate Analytics – II,III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1. Introduction to Data Mining, Tan, Steinbachand Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts,M.ZakiandW.Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

IMAGE PROCESSING

(Professional Elective- I)

B.Tech. III Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3111PE	Elective	3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		

Prerequisites

1. **Students are expected to have knowledge in linear signals and systems, FourierTransform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of Digital Signal Processing is desirable.**
2. **A course on "Computational Mathematics"**
3. **A course on "Computer Oriented Statistical Methods"**

Course Objectives

- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Course Outcomes

- Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
- Demonstrate the knowledge of filtering techniques.
- Demonstrate the knowledge of 2D transformation techniques.
- Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.

COURSE SYLLABUS

UNIT- I

Digital Image Fundamentals : Digital Image through Scanner, Digital Camera.Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations -DFT, DCT, KLT and SVD.

UNIT- II

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT- III

Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT- IV

Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT- V

Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOK:

1.Digital Image Processing : R.C.Gonzalez & R.E.Woods, AddisonWesley / PearsonEducation, 2nd Ed ,2004.

REFERENCE BOOKS:

1. Fundamentals of Digital Image Processing : A.K.Jain, PHI.
2. Digital Image Processing using MATLAB : RafaelC. Gonzalez, Richard E.Woods, Steven L.Eddins : Pearson Education India,2004.
3. Digital Image Processing: William K.Pratt, John Wilely, 3rd Edition,2004.

PRINCIPLES OF PROGRAMMING LANGUAGES

(Professional Elective-I)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3112PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **A course on"Mathematical Foundations of Computer Science"**
2. **A courseon"Computer Programming and Data Structures"**

Course Objectives

- Introduce important paradigms of programming languages
- To provide conceptual understanding of high-level language design and implementation
- Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Course Outcomes

- Acquire the skills for expressing syntax and semantics informal notation
- Identify and apply a suitable programming paradigm for a given computing application
- Gain knowledge of and able to compare the features of various programming languages

COURSE SYLLABUS

UNIT- I

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade- Offs, Implementation Methods, Programming Environments

Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT- II

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments,Named Constants

Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, TupleTypes, ListTypes, Pointer and Reference Types, TypeChecking, Strong Typing, Type Equivalence

Expressions and Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment

Control Structures–Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT- III

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, LocalReferencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines

Implementing Subprograms : General Semantics of Calls and Returns, Implementing Simple Sub programs, Implementing Subprograms with Stack - Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping

Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT- IV

Concurrency : Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors,Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency. Exception Handling and Event Handling : Introduction, Exception Handlingin Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT- V

Functional Programming Languages : Introduction, Mathematical Functions, Fundamentals of Functional Programming Language,

LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages

Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming.

Scripting Language : Pragmatics, KeyConcepts, CaseStudy : Python–ValuesandTypes, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, DataAbstraction, Separate Compilation, Module Library.(TextBook2)

TEXT BOOKS:

1. Concepts of Programming Languages Robert.W.Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D.A.Watt, Wiley Dreamtech, 2007.

REFERENCE BOOKS:

1. Programming Languages, 2ndEdition, A.B.Tucker, R.E.Noonan, TMH.
2. Programming Languages, K. C.Louden, 2ndEdition, Thomson, 2003

COMPUTER GRAPHICS

(Professional Elective-II)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3113PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.**
2. **A course on " Computer Programming and Data Structures"**

Course Objectives

- The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
- Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; renderingand implementation; visible surface detection;

Course Outcomes

- Acquire familiarity with the relevant mathematics of computer graphics.
- Be able to design basic graphics application programs, including animation
- Be able to design applications that display graphic images to given specifications

COURSE SYLLABUS

UNIT- I

Introduction : Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

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

Polygon Filling : Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT- II

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

2-Dviewing: The viewing pipeline, viewing coordinate reference frame, window to view-portcoordinate transformation, viewing functions, Cohen-Sutherland algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT- III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT- IV

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations.

Viewing:Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT- V

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

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

TEXT BOOKS:

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
3. Computer Graphics, Steven Harrington , TMH

REFERENCE BOOKS:

1. Procedural elements for ComputerGraphics, David FRogers, Tata McGrawhill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics , Shalini Govil, Pai , 2005, Springer.

ADVANCED OPERATING SYSTEMS

(Professional Elective-II)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3114PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Operating Systems"								

Course Objectives

- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems)
- Hardware and software features that support these systems.

Course Outcomes

- Understand the design approaches of advanced operating systems
- Analyze the design issues of distributed operating systems.
- Evaluate design issues of multiprocessor operating systems.
- Identify the requirements Distributed File System and Distributed Shared Memory.
- Formulate the solutions to schedule the real time applications.

COURSE SYLLABUS

UNIT- I

Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. **Theoretical Foundations :** Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT- II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, **Non-Token –Based Algorithms :** Lamport's Algorithm, The Ricart - Agrawala Algorithm, Maekawa's Algorithm,

Token-Based Algorithms : Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm, Raymond's Heuristic Algorithm.

UNIT- III

Distributed Deadlock Detection : Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized-Deadlock–Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT- IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures
Multi Processor Operating Systems : Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.

Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT- V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm,Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration.
Distributed Shared Memory : Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

TEXT BOOK:

1.Advanced Concepts in Operating Systems, Mukesh Singhal, NiranjanG.Shivaratri, TataMcGraw - Hill Edition 2001

REFERENCE BOOK:

1.Distributed Systems : AndrewS. Tanenbaum, MaartenVanSteen, Pearson PrenticeHall, Edition– 2,2007

INFORMATION RETRIEVAL SYSTEMS

(Professional Elective-II)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3115PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: Data Structures								

Course Objectives:

- To learn the important concepts and algorithms in IRS
- To understand the data / file structures that are necessary to design, and implement information retrieval (IR) systems.

Course Outcomes :

- Ability to apply IR principles to locate relevant information large collections of data
- Ability to design different document clustering algorithms
- Implement retrieval systems for web search tasks.
- Design an Information Retrieval System for web search tasks.

COURSE SYLLABUS

UNIT- I

Introduction to Information Retrieval Systems : Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and DataWarehouses.

Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities.

UNIT- II

Cataloging and Indexing : History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction

Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-GramData Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

UNIT- III

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages
Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT- IV

User Search Techniques : Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of BooleanSystems,Searching the INTERNET and Hypertext
Information Visualization : Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

UNIT- V

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems
Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval,Video Retrieval

TEXT BOOK:

1. Information Storage and Retrieval Systems–Theory and Implementation, SecondEdition, Gerald J.Kowalski, Mark T.Maybury, Springer

REFERENCE BOOKS:

1. Frakes,W.B., RicardoBaeza-Yates : Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Information Storage & Retrieval By Robert Korfhage¬JohnWiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

DISTRIBUTED DATABASES

(Professional Elective-II)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3116PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Database Management Systems "								

Course Objectives:

- The purpose of the course is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
- Introduce basic principles and implementation techniques of distributed database systems.
- Equip students with principles and knowledge of parallel and object-oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database managementsystems.

Course Outcomes:

- Understand theoretical and practical aspects of distributed database systems.
- Study and identify various issues related to the development of distributed database system.
- Understand the design aspects of object-oriented database system and related development.

COURSE SYLLABUS

UNIT- I

Introduction : Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problemareas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture.

Distributed Database Design:Alternative Design Strategies,Distribution Designissues, Fragmentation, Allocation.

UNIT- II

Query processing and decomposition : Query processing objectives, characterization of queryprocessors, layers of query processing, query decomposition, localization of distributed data.
Distributed query Optimization : Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT- III

Transaction Management: Definition, properties of transaction, types of transactions, distributedconcurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT- IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.
Parallel Database Systems: Parallel database system architectures, parallel data placement, parallelquery processing, load balancing,databaseclusters.

UNIT- V

Distributed object Database Management Systems: Fundamental object concepts and models,object distributed design, architectural issues, object management, distributed object storage, objectquery Processing.

Object Oriented Data Model : Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS:

1. M.Tamer OZSU and Patuck Valduriez : Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGrawHill.

REFERENCE BOOK:

1.Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems : The CompleteBook", Second Edition,Pearson International Edition

NATURAL LANGUAGE PROCESSING

(Professional Elective-II)

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3117PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites : Datastructures, finite automata and probability theory								

Course Objectives:

- Introduce to some of the problems and solutions of NLP and the irrelation to linguistics and statistics.

Course Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
- Able to manipulate probabilities , construct statistical models over strings and trees, andestimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms
- Able to design different language modeling Techniques.

COURSE SYLLABUS

UNIT- I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT- II

Syntax Analysis : Parsing Natural Language, Treebanks : A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolutionin Parsing, Multilingual Issues

UNIT- III

Semantic Parsing : Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT- IV

Predicate - Argument Structure, Meaning Representation Systems, Software.

UNIT- V

Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure **Language Modeling :** Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Cross lingual Language Modeling

TEXT BOOKS:

1. Multi lingual natural Language Processing Applications : From Theory to Practice–Daniel M.Bikeland Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval : Tanvier Siddiqui , U.S.Tiwary

REFERENCE BOOK:

1.Speech and Natural Language Processing-Daniel Jurafsky & James HMartin, Pearson Publications

SOFTWARE ENGINEERING LAB

B.Tech. III Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3105PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :45		

Prerequisites

1. **A course on "Programming for Problem Solving"**

Co-requisite

1. **A Course on" Software Engineering "**

Course Objectives:

- To have handson experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes:

- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

List of Experiments

Do the following 8 exercises for any two projects given in the list of sample projects or any other projects :

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Designphase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Developtest cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, Apractitioner's Approach-RogerS. Pressman, 6thedition, McGrawHill International Edition.
2. Software Engineering- Sommerville ,7thedition, Pearson Education.
3. The unified modeling language userguide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

COMPUTER NETWORKS LAB

B.Tech. III Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3106PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		
Prerequisites: No Prerequisites								

Course Objectives

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology andobserveitsperformance
- To analyze the traffic flow and the contents of protocol frames

Course Outcomes

- Implement data link layer farming methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- To be able to work with different network tools

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12,CRC-16 and CRCCCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra'salgorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broad cast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption

8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wireshark
    i. Packet Capture UsingWire shark
    ii. StartingWireshark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. Do the following using NS2 Simulator
    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate & Throughput.
    vi. Simulate to Plot Congestion for Different Source / Destination
    vii. Simulate to Determine the Performance with respect toTransmission of Packets

ADVANCED COMMUNICATION SKILLS LAB

B.Tech. III Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EN3107HS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites : No Prerequisites								

1. INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project / research reports /technicalreports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the followingtargets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** -Starting a conversation–responding appropriately and relevantly–using the right body language –Role Play in different situations & Discourse Skills-using visuals-Synonyms and antonyms, wordroots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing / Resume writing / e-correspondence / Technical repor twriting* /–planning for writing–improving one'swriting.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions / seminars / **PPTs** and written presentations through posters / projects/ reports / e-mails / assignments etc.
5. **Activities on Group Discussion and Interview Skills**–Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation - Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

4. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate atleast 35 students in the lab:

- Spacious room with appropriate acoustics.
- RoundTables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P –IV Processor, HardDisk –80GB, RAM–512MB Minimum,Speed–2.8GHZ
- T.V,a digital stereo & Camcorder
- Headphones of High quality

5. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

- OxfordAdvanced Learner's Compass,7th Edition
- DELTA's key to the Next Generation TOEFL Test : Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd.2ndEdition
2. Academic Writing : A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS:

1. Learn Correct English–A Book of Grammar, Usage and Composition by Shiv K.Kumar and Hemalatha Nagarajan.Pearson 2007
2. Professional Communication by Aruna Koneru, McGrawHill Education (India) Pvt.Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press2009.
4. Technical Communication by PaulV. Anderson.2007.Cengage Learningpvt.Ltd. NewDelhi.
5. English Vocabulary in Useseries, Cambridge University Press2008.
6. Hand book for Technical Communication by David A.McMurrey & JoanneBuckley. 2012. C engage Learning.
7. Communication Skills by Leena Sen,PHI Learning PvtLtd., NewDelhi ,2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata McGraw-Hill 2009.

MACHINE LEARNING

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS3201PC	Core	L	T	P	C	CIA	SEE	Total
		3	1	0	4	30	70	100
Contact classes: 45	Tutorial Classes : 15	Practical classes : NIL				Total Classes :60		
Prerequisites 1. Data Structures 2. Knowledge on statistical methods								

Course Objectives

- This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
- To understand computational learning theory.
- To study the pattern comparison techniques.

Course Outcomes

- Understand the concepts of computational intelligence like machine learning
- Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
- Understand the Neural Networks and its usage in machine learning application.

COURSE SYLLABUS

UNIT- I

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues inmachinelearning Concept learning and the general to specific ordering – introduction, a concept learning task, conceptlearning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias**.**

Decision Tree Learning–Introduction, decision tree representation ,appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

UNIT- II

Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems forneuralnetwork learning, perceptions, multi layer networks and the back-propagation algorithm.

Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example : face recognition, advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, ageneral approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT- III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example : learning to classify text, Bayesian belief networks, the EM algorithm.

Computational learning theory–Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, them is take bound model of learning.

Instance - Based Learning- Introduction, *k*-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT- IV

Genetic Algorithms – Motivation, Genetic algorithms,an illustrative example,hypothesis spacesearch, genetic programming, models of evolution and learning, parallelizing genetic algorithms.

Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction,inverting resolution.

Reinforcement Learning–Introduction,the learning task, *Q*–learning,non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT- V

Analytical Learning-1-Introduction, learning with perfect domain theories : PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators.

Combining Inductive and Analytical Learning–Motivation, inductive-analytical approaches to learning using prior knowledge to initialize the hypothesis.

TEXT BOOK:

1.Machine Learning –TomM. Mitchell, -MGH

REFERENCE BOOK:

1.Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

COMPILER DESIGN

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3202PC	Core	3	1	0	4	30	70	100
Contact classes: 45	Tutorial Classes : 15	Practical classes : NIL				Total Classes :60		

Prerequisites

1. **A course on "Formal Languages and Automata Theory"**
2. **A course on "Computer Organization and architecture"**
3. **A course on"Computer Programming and Data Structures"**

Course Objectives:

- Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
- Topics include phases of compiler, parsing, syntax directd translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

Course Outcomes:

- Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yacc tool for devleoping a scanner and parser.
- Design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
- Design algorithms to generate machine code.

COURSE SYLLABUS

UNIT- I

Introduction: The structure of a compiler, the science of building a compiler, programming language basics

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite

Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator,Optimization of DFA-Based Pattern Matchers.

UNIT- II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT- III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation : Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT- IV

Run-Time Environments: Stack Allocation of Space, Access to Non local Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peep hole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

UNIT- V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-FlowAnalysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOK:

1. Compilers : Principles, Techniques and Tools, Second Edition, Alfred V.Aho, Monica S.Lam, RaviSethi, Jeffry D.Ullman.

REFERENCE BOOKS:

1. Lex & Yacc– John R.Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Louden, Thomson.

DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3203PC	Core	3	1	0	4	30	70	100
Contact classes: 45	Tutorial Classes : 15	Practical classes : NIL				Total Classes :60		

Prerequisites:

1. **A course on "Computer Programming and Data Structures"**
2. **A course on"Advanced Data Structures"**

Course Objectives:

- Introduces the notations for analysis of the performance of algorithms.
- Introduces the data structured is joint sets.
- Describes major algorithm ic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate;
- Describes how to evaluate and compare different algorithms using worst-, average-, and best-case analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes:

- Ability to analyze the performance of algorithms
- Ability to choose appropriate data structures and algorithm design methods for a specified application
- Ability to understand how the choice of datastructures and the algorithm design methods impact the performance of programs

COURSE SYLLABUS

UNIT- I

Introduction: Algorithm, Performance Analysis-Spacecomplexity, Timecomplexity, Asymptotic Notations-Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binarysearch, Quicksort, Mergesort, Strassen's matrix multiplication.

UNIT- II

Disjoint Sets: Disjoint set operations, union and find algorithms

Backtracking : General method, applications, n-queen's problem, sum of subsets problem, graph coloring

UNIT- III

Dynamic Programming : General method, applications-Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT- IV

Greedy method : General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

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

TEXT BOOK:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahniand Rajasekharan,University Press.

REFERENCE BOOKS:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T. H. Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd./Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R.Tamassia,JohnWileyand sons.

CONCURRENT PROGRAMMING

(Professional Elective-III)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3206PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **A course on"Operating Systems"**
2. **A course on "Java Programming"**

Course Objectives: To explore the abstractions used in concurrent programming

Course Outcomes:

1. Ability to implement the mechanisms for communication and co-ordination among concurrent processes.
2. Ability to understand and reason about concurrency and concurrent objects
3. Ability to implement the locking and non-blocking mechanisms
4. Ability to understand concurrent objects

COURSE SYLLABUS

UNIT- I

Introduction-Shared Objects and Synchronization, A Fable, Properties of Mutual Exclusion, The Moral, The Producer – Consumer Problem, The Harsh Realities of Parallelization.

Mutual Exclusion - Time, Critical Sections, 2-Thread Solutions, The Peterson Lock, The Filter Lock, Lamport's Bakery Algorithm.

UNIT- II

Concurrent Objects - Concurrency and Correctness, Sequential Objects, Quiescent consistency, Sequential Consistency, Linearizability, Linearization Points, Formal Definitions Linearizability, Compositional Linearizability, The Nonblocking Property, Progress conditions, Dependent Progress Conditions, The Java Memory Model, Locks and synchronized Blocks, Volatile Fields,Final Fields.

UNIT- III

Synchronization Operations, Consensus Numbers, Consensus Protocols, The compare And Set( ) Operation, Introduction Universality, A Lock-Free Universal, Construction Wait-FreeUniversal Construction, Spin Locks, Test-And-SetLocks

UNIT- IV

Linked Lists: The Role of Locking, Introduction, List-Based Sets, Concurrent Reasoning, Coarse-Grained Synchronization, Fine-Grained Synchronization, Optimistic Synchronization, Lazy Synchronization, Non-Blocking Synchronization

UNIT- V

Concurrent Queues and the ABA Problem, Concurrent Stacks and Elimination,Transactional Memories

TEXT BOOKS:

1.The Art of Multiprocessor Programming, by Maurice Herlihy and Nir Shavit, Morgan Kaufmman Publishers ,1stEdition, Indian Reprint 2012.

REFERENCE BOOKS:

1. Java Concurrency in Practice by Brian Goetz , Tim Peierls, Joshua Block, Joseph Bowbeer, David Holmes and Doug Lea, Addison Wesley, 1st Edition, 2006.
2. Concurrent Programming in Java™: Design Principles and Patterns, Second Edition by Doug Lea, Publisher : Addison Wesley, Pub Date: October 01, 1999.

NETWORK PROGRAMMING

(Professional Elective-III)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3207PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Computer Networks"								

Course Objectives:

- To understand interprocess and inter-system communication
- To understand socket programming in it sentirety
- To understand usage of TCP/UDP/Raw sockets
- To understand how to build network applications

Course Outcomes:

- To write socket API based programs
- To design and implement client-server applications using TCP and UDP sockets
- To analyze network programs

COURSE SYLLABUS

UNIT- I

Introduction to Network Programming: OSImodel, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets: Address structures, value – result arguments, Byte ordering and manipulation function andrelated functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT- II

TCP client server: Introduction, TCPE cho server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

Elementary UDP sockets: Introduction UDPE cho server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.
I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server,

UNIT- III

Socket options: getsockopt and setsockopt functions.Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.
Advanced I/O Functions-Introduction, Socket Timeouts, recv and send Functions, readv and writev Functions, recv msg and send msg Functions, Ancillary Data, How Much Data Is Queued?, Sockets and Standard I/O, T/TCP: TCP for Transactions.

UNIT- IV

Elementary name and Address conversions: DNS, gethostbyName function, Resolver option, Function and IPV6 support, uname function, other networking information.

Daemon Processes and inetd Superserver–Introduction, syslogd Daemon, syslog Function, daemon_init Function, inetd Daemon, daemon_inetd Function

Broadcasting- Introduction, Broadcast Addresses, Unicast versus Broadcast, dg_cli Function Using Broadcasting, Race Conditions
Multicasting-Introduction, Multicast Addresses, Multicasting versus Broadcasting on A LAN ,Multicasting on a WAN, Multicast Socket Options, mcast_join and Related Functions, dg_cli Function Using Multicasting, Receiving MBone Session Announcements, Sending and Receiving, SNTP: Simple Network Time Protocol, SNTP(Continued)

UNIT- V

Raw Sockets- Introduction, Raw Socket Creation, Raw Socket Output, Raw Socket Input, Ping Program,Traceroute Program, An ICMP Message Daemon, Datalink Access - Introduction, BPF: BSD Packet Filter, DLPI : Data Link Provider Interface, Linux: **SOCK_PACKET, libpcap**: Packet Capture Library, Examining the UDP Checksum Field.

Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminalmodes, Control Terminals, rlogin Overview, RPC Transparency Issues.

TEXT BOOKS:

1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, PearsonEducation
2. UNIX Network Programming,1st Edition,-W.Richard Stevens.PHI.

REFERENCE BOOKS:

1. UNIX Systems Programmingusing C++ TCHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls,PearsonEducation
3. Advanced UNIX Programming 2nd Edition M.J.ROCHKIND, Pearson Education

SCRIPTING LANGUAGES

(ProfessionalElective-III)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3208PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites:

1. **A course on "Computer Programming and Data Structures"**
2. **A course on "Object Oriented Programming Concepts"**

Course Objectives:

- This course introduces the script programming paradigm
- Introduces scripting languages such as Perl, Ruby and TCL.
- Learning TCL

Course Outcomes:

- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
- Acquire programming skills in scripting language

COURSE SYLLABUS

UNIT- I

Introduction: Ruby, Rails, The structure and Excution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and webservices

Ruby Tk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT- II

Extending Ruby : Ruby Objectsin C,the Juke box extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interperter

UNIT- III

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT- IV

Advanced perl Finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules, objects , interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT- V

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Namespaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk : Tk-Visual ToolKits , Fundamental Concepts of Tk, Tk by example, Eventsand Binding , Perl-Tk.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron,Wiley Publications.
2. Ruby Progamming language by David Flanaganand Yukihiro Matsumoto O'Reilly
3. "Programming Ruby "The Pramatic Progammers guideb y Dabve Thomas Second edition

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B.Ware (AddisonWesley) Pearson Education.
2. Perl by Example, E.Quigley, Pearson Education.
3. Programming Perl, Larry Wall,T.Christiansenand J.Orwant, O'Reilly, SPD.
4. Tcland the Tk Toolkit, Ousterhout, Pearson Education.
5. Perl Power, J.P.Flynt, Cengage Learning.

MOBILE APPLICATION DEVELOPMENT

(Professional Elective-III)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3209PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **Acquaintance with JAVA programming**
2. **A Course on DBMS**

Course Objectives

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Course Outcomes

- Student understands the working of Android OS Practically.
- Student will be able to develop Android user interfaces
- Student will be able to develop, deploy and maintain the Android Applications.

COURSE SYLLABUS

UNIT- I

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, 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 ChangesAndroidApplicationLifecycle–Activities, Activity life cycle, activity states, monitoring state changes

UNIT- II

Android User Interface: Measurements – Device and pixel density independent measuring UNIT - sLayouts– Linear,Relative,Grid and Table Layouts User Interface (UI) Components – Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons,Check boxes, Spinners, Dialog and pickers Event Handling–Handling clicks or changes of various UI components Fragments–Creating fragments, Lifecycleoffragments, 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 anumberorto send SMS

BroadcastReceivers–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

UNIT- V

Database–Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

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

REFERENCE BOOK:

1.Beginning Android 4 Application Development, Wei-MengLee, Wiley India (Wrox), 2013

PYTHON PROGRAMMING

(Professional Elective-III)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3210PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on"Programming for Problem Solving using C".								

Course Objectives:

- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build Web Services and introduction toNetwork and Database Programming in Python.

Course Outcomes:

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core datastructures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

COURSE SYLLABUS

UNIT- I

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types,Unsupported Types

Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences- Strings, Lists, and Tuples, Mapping

and Set Types

UNIT- II

FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files,Command-line Arguments,File System, File Execution, Persistent Storage Modules, Related Modules

Exceptions: Exceptionsin Python, Detectingand Handling Exceptions, Context Management,*Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions,Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related ModulesModules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

UNIT- III

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming:Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock,Thread Module,ThreadingModule,Related Modules

UNIT- IV

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients,CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI,Web (HTTP) Servers

UNIT- V

Database Programming: Introduction, Python Database Application Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules

TEXT BOOK:

1.Core Python Programming, Wesley J.Chun, Second Edition, Pearson.

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A.Lambert, Cengage
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4. Learning Python, Mark Lutz, O'Really

BASICS OF CIVIL ENGINEERING
(Open Elective–I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CE3211OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course objectives: The objectives of the course are:

- To explain the concepts of Civil Engineering.
- To Understand the BuildingMaterials for construction
- To understand the concept of Transportation
- To explain the Soil Characteristics for best foundation
- To know the Drinking water Standards & Water Treatment Units.

Course Outcomes: On successful completion of this course,students should be able to:

- Identify different types of building materials for construction.
- Discuss types of Traffic Flow Characteristics.
- To know the soil classification and its properties.
- Distinguish and understand Drinking water and Waste water properties.

COURSE SYLLABUS

UNIT- I, Building Materials for Construction

Bricks & Cement : qualities of good bricks, types of brick, ingredients of cement, types of cement, Grade of cement.

Concrete & Steel : Properties of cement concrete, types of concrete based on usage & properties and uses of various types of steel, Admixtures.

Building components: lintels, walls, staircases, types of floors,types of roofs, doors, windows-material-types, Finishers-Plastering, Painting, Tiles.

UNIT- II Transportation Engineering

Highway : History and Importance of Highways, Classification of roads, highway crosssection, types of Pavement.

Traffic: Roadsafety-Traffic signals & its types. Road intersections & its types.Railway:Permanent way, Componentsparts itsfunctions. Airway:Typical Airport layout, Factors for airport sites election.

UNIT–III Geotechnical Engineering

Soil formation and its three phase diagram, I.S.Classification of soils. Permeability & its Factors affecting, capillary rise. Compaction–factors affecting compaction.

Geology- Different types & its properties of Rocks & Minerals.

UNIT- IV Water Resources & Irrigation Engineering

Hydro logic cycle, Forms of precipitation, measurement of precipitation by Symons rain gauge.
Abstractions from precipitation : Infiltration, Evaporation & Run off & their Factors affecting.

Irrigation: Water requirement of crops, canal & its losses, Typesoflining-Advantages and disadvantages.

Types of dams, Factors affecting selection of a damsite.Tunneling-Purposes of tunneling.

UNIT–V Environmental Engineering

Drinking Water: types of water demand–factors affecting water quality and testing – drinking water standards.Layout and general outline of water treatment units. Wastewater: Waste water treatment plant Flow diagram. Waste water collection, manholes & house drainage.

Air & Sound pollution– Effects & Controlling methods.

TEXT BOOKS

1. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain–Laxmi Publications (P) ltd., NewDelhi.
2. Transportation Engineering by Khanna & Justo
3. Geotechnical Engineering by Arora
4. Water Resources & Irrigation Engineering by SK Garg
5. Environmental Engineering by Dr.B.C.Punmia

BUILDING MATERIALS AND CONSTRUCTION

(Open Elective–I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE3212OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives: The objectives of the course is to

- List the construction material.
- Explain different construction techniques
- Understand the building bye-laws
- Highlight the smart building materials

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

- Define the Basic terminology that isused in theindustry
- Categorize different building materials, properties and the iruses

COURSE SYLLABUS

UNIT-I

Cement: Introduction, ingredients of cement, types of cement, cement mortar uses.Concrete: Properties of cement concrete, materials, standard concrete mixproportions, curing of concrete, methods-effects of improper curing.

UNIT-II

Bricks & Bricks masonry : qualities of good bricks, types ofbricks, brick masonry and types of brick masonry

Timber : Structure of a tree, defects in timber, seasoning of timber, qualities of good timber, important Indian timber trees.

UNIT-III

Construction Materials : Stone-type of building stones, glass-types based on usage, plastics-advantages and disadvantages, uses, ceramics-types used in building industry.

Structural steel : properties and uses of various types of steel, types.Girders-types & uses

UNIT-IV

Building components : lintels, walls, staircases, types of floors, types of roofs , doors, windows-material-types.

Fire protection : hazards, classification of fire resistant materials and constructions.

UNIT-V

Building planning : principles of building planning, classification of building sand building by laws. Building Services: Plumbing-water distribution, sanitary-lines and fittings, ventilations: functional requirements, system of ventilations.

TEXT BOOKS:

1. Building Materials and Construction–Arora & Bindra, Dhanpat Roy Publications.
2. Building Materials and Construction by GC Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications(P) ltd., New Delhi.

REFERENCE BOOKS:

1.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P.C.Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology– Vol–I & II by R.Chubby, Longman UK.

5.Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

ELECTRICAL INSTALLATION AND COSTING
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EE3211OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Basic Electrical Engineering								

Course Objectives:

- To emphasize the estimation and costing aspects of all electrical equipment, installation and designs on the cost viability.
- To design and estimation of wiring
- To design overhead and underground distribution lines, substations and illumination

Course Outcomes: After Completion of this course, student will be able to

- Understand the design considerations of electrical installations.
- Design electrical installation for buildings and small industries.
- Identify and design the various types of light sources for different applications.

COURSE SYLLABUS

UNIT- I

Design Considerations of Electrical Installations: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuitand Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems ofwiring, Service connections , Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guidelines 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 over headlines, 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", New Age International Publisher, 2010.
2. "Er.V.K. Jain, Er.AmitabhBajaj", "Design of Electrical Installations", University Science Press.

Reference Books:

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 not exceeding 650V), 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, Indian Standard Institution, IS:900-1965.
7. Code of Practice for electrical wiring, Installations (system voltage not exceeding 650Volts), Indian Standard Institution, IS:2274-1963.
8. “GuptaJ.B., Katson,Ludhiana”,“Electrical Installation, estimating and costing”, S.K.Kataria and sons, 2013.

ELECTRICAL ENGINEERING MATERIALS
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EE3212OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite : Engineering chemistry and Engineering Physics - II								

Course Objective:

- To understand the importance of various materials used in electrical engineering and obtain a qualitative analysis of their behavior and applications.

Course Outcomes:

After completion of this course, the student will be able to

- Understand various types of dielectric materials , their properties in various conditions.
- Evaluate magnetic materials and their behavior.
- Evaluate semiconductor materials and technologies.
- Acquire Knowledge on Materials used in electrical engineering and applications.

COURSE SYLLABUS

UNIT- I

Dielectric Materials: Dielectric as Electric Field Medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, breakdown in solid dielectrics, flashover ,liquid dielectrics, electric conductivity in solid, liquid and gaseous dielectrics, Ferro magnetic materials, properties of ferromagnetic materials in static fields, spontaneous, polarization,curiepoint, anti-ferro magnetic materials, piezo electric materials, pyro electric materials.

UNIT- II

Magnetic Materials: Classification of magnetic materials, spontaneous magnetization inferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism, magnetically soft and hard materials, special purpose materials, feebly magnetic materials, Ferrites, cast and cermet permanent magnets,ageing of magnets. Factors effecting permeability and hysteresis

UNIT - III

Semi conductor Materials: Properties of semiconductors, Silicon wafers, integration techniques, Large and very large scale integration techniques(VLSI)

UNIT - IV

Materials for Electrical Applications: Materials used for Resistors, rheostats, heaters,transmission line structures, stranded conductors, bimetals fuses, soft and hard solders, electric contact materials, electric carbon materials, thermo couple materials. Solid, Liquid and Gaseous insulating materials, Effect of moisture on insulation.

UNIT- V

Special Purpose Materials: Refractory Materials, Structural Materials, Radioactive Materials, Galvanization and Impregnation of materials, Processing of electronic materials, Insulatingvarnishes and coolants, Properties and applications of mineral oils, Testing of Transformeroilas per ISI.

Text Books:

1. “R K Rajput”, “A course in Electrical Engineering Materials”, Laxmi Publications, 2009
2. “T K Basak”, “A course in Electrical Engineering Materials”, New Age Science Publications 2009

Reference Books:

1. TTTI Madras, “Electrical Engineering Materials”, McGraw Hill Education, 2004.
2. “Adrianus J.Dekker”, Electrical Engineering Materials, PHI Publication, 2006.
3. S.P.Seth, P.V.Gupta “A course in Electrical Engineering Materials”, Dhanpat Rai & Sons, 2011.

OPERATIONS RESEARCH
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME3211OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: None								

Course Objectives: Understanding the mathematical importance of development of model in a particular optimization model for the issue and solving it.

Course Outcome: Understanding the problem, identifying variables & constants, Formulation of optimization model and applying appropriate optimization technique

COURSE SYLLABUS

UNIT-I

Development - definition - characteristics and phases - Typesof models - Operations Researchmodels-applications.

Allocation : Linear Programming Problem Formulation-Graphicalsolution- Simplex method-Artificial variable techniques : Two-phase method, Big-Mmethod.

UNIT-II

Transportation problem –Formulation - Optimal solution, unbalanced transportation problem-Degeneracy.

Assignment problem-Formulation-Optimal solution,- Variants of Assignment problem-Travelling salesman problem.

UNIT-III

Sequencing.Introduction-Flow-Shop sequencing-njobs through two machines- njobs through three machines-Jobshop sequencing-two jobs through 'm' machines – graphical model Replacement: Introduction - Replacement of

items that deteriorate with time-when money value is not counted and counted-Replacement of items that fail completely - Group Replacement.

UNIT-IV

Theory of Games: Introduction- Terminology- Solution of games with saddle points and with out saddle points. 2x2 games-dominance principle-mx2 & 2xngames - Graphical method.

Inventory: Introduction- Single item, Deterministic models-purchase inventory models with oneprice break and multiple price breaks-Stochastic models -Demand may be discrete variable or continuous variable-single period model and no set up cost.

UNIT-V

Waiting lines: Introduction- Terminology- Singlechannel-Poisson arrivals and Exponential service times with infinite population and finite population models.

Dynamic Programming: Introduction- Terminology, Bellman's principle of optimality Applications of Dynamic programming-shortest path problem-linear programming problem.

TEXT BOOK:

1. Operations Research / J.K.Sharma / MacMilan
2. Introduction to OR / Hillier & Libemann / TMH

REFERENCE BOOKS:

1. Introduction to OR/Taha/PHI
2. Operations Research /NVSRaju/ SMS Education/ 3rd Revised Edition
3. Operations Research/ A.M.Natarajan, P.Balasubramaniam, A.Tamilarasi/ PearsonEducation.

FUNDAMENTALS OF MECHANICAL ENGINEERING
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
ME3212OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Objectives:

To understand the fundamentals of mechanical systems.
To understand and appreciate significance of mechanical engineering in different Fields of engineering.

COURSE SYLLABUS

UNIT- I

Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power,System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth Law and First law.

Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel,Solar,wind,andbio-fuels, Environmental issues like Global warming and Ozone depletion.

UNIT- II

Properties of gases: Gaslaws, Boyle'slaw, Charle'slaw, Combined gas law, Gas constant, Relation between Cp and Cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process,Adiabatic process, Poly-tropicprocess

Propertiesof Steam: Steam formation, Types of Steam, Enthalpy, Specificvolume,Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters.

Steam Boilers:Introduction, Classification, Cochran, Lancashireand Babcock and Wilcox boiler, functioning of different mountings and accessories.

UNIT- III

Heat Engines: Heat Engine cycle and Heat Engine, working substances, Classification of heatengines, Description and thermal efficiency of Carnot; Rankine;OttocycleandDieselcycles.
Internal Combustion Engines: Introduction, Classification, Engine details, four- stroke/two-stroke cycle Petrol / Dieselengines, Indicated power, Brake Power, Efficiencies.

UNIT- IV

Pumps:Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming
Air Compressors:Types and operationof Reciprocating and Rotary air compressors, significance of Multistage.
Refrigeration & Air Conditioning: Refrigerant, Vapor compression refrigeration system, vapor absorption refrigeration system, Domestic Refrigerator,Window and split air conditioners.

UNIT- V

Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pintype flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block;Shoe; Bandand Disc). Transmission of Motion and Power: Shaft and axle, Belt drive, Chain drive, Friction drive, Geardrive.
Engineering Materials: Types and applications of Ferrous & Non ferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer.

TEXT BOOKS:

1. Basic Mechanical Engineering /PravinKumar/Pearson
2. Introduction to Engineering Materials / B.K.Agrawal /McGraw Hill

REFERENCE BOOKS:

1. Fundamental of Mechanical Engineering /G.S.Sawhney/PHI
2. Thermal Science and Engineering /Dr.D.S.Kumar/Kataria

METALLURGY OF NON METALLURGISTS
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
ME3213OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites:None								

Course Objectives:

- To describe the basic principles of metallurgy and the importance of metallurgy in various discipline of engineering.
- Gain a thorough knowledge about heat treatment of steels.
- Gain knowledge about properties and uses of cast irons and non-ferrous metals.
- Gain a working knowledge of basic testing methods for metals.

Course Outcomes:

At the end of the course Student would be able

- To use and apply metallurgy in his own branch of engineering.
- The student will be able to justify the various testing methods adopted for metals.

COURSE SYLLABUS

UNIT- I

Introduction : Crystal structure and defects, Crystal structure of metals, Classification of steels, Carbonsteels. Engineering Materials: Types and applications of Ferrous & Non ferrous metals , Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer.

UNIT- II

Heat Treatment of Steels: The Iron carbon systems, Common phases in steels, Annealing, Normalizing, Hardening and tempering.

UNIT- III

Castirons:Properties and applications of Ductile irons, Malleableirons, Compacted graphiteiron.

UNIT- IV

Non Ferrous Metals: Properties and applications of Light Metals (Al,Be,Mg,Ti), Superalloys.

UNIT- V

Testing of Metals: Hardness testing, Tensile Testing, Impact Testing, Fatigue Testing.

TEXT BOOKS:

1. Materials Science and Engineering, An introduction. WDCallister, Jr.,Adapted by R.Balasubramaniam, John Wiley & Sons, NY, Indianedition, 2007
2. Introduction to Physical Metallurgy–SHAvner, TATA McGRAW HILL,1997
3. Mechanical Metallurgy–G.E.Dieter

REFERENCE BOOKS:

1. Engineering Physical Metallurgy and Heat treatment–Y Lakhtin
2. C.Suryanarayana, Experimental Techniques in Mechanics and Materials, John Wiley, John Wiley, NJ, USA, 2006
3. Foundations of Materials Science and Engineering–WFSmith

FUNDAMENTALS OF INTERNET OF THINGS
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EC3211OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

1. Understand the concepts of Internet of Things and able to build IoT applications
2. Learn the programming and use of Arduino and Raspberry Pi boards.
3. Known about data handling and analytics in SDN.

Course Outcomes: Upon completing this course,the student will be able to

1. Known basic protocols in sensor networks.
2. Program and configure Arduino boards for various designs.
3. Python programming and interfacingforRaspberryPi.
4. Design IoT applications in different domains.

COURSE SYLLABUS

UNIT–I

Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

UNIT- II

Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino,

UNIT–III

Introduction toPython programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi

UNIT- IV

Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics,

UNIT- V

Cloud Computing, Sensor-Cloud, Smart Cities and SmartHomes,Connected Vehicles, SmartGrid, Industrial IoT,Case Study: Agriculture, Healthcare, Activity Monitoring

TEXT BOOKS:

1. "The Internet'ofThings: Enabling Technologies, Platforms, and Use Cases",by Pethuru Raj and Anupama C. Raman (CRC Press)
2. “Make sensors”: Terokarvinen, kemo, karvinen and villey valtokari, 1st edition, maker media, 2014.
3. "Internet of Things: A Hands-on Approach", by Arshdeep Bahgaand Vijay Madisetti

REFERENCE BOOKS:

1. Vijay Madisetti, Arshdeep Bahga,“Internet of Things : A Hands-On Approach”
2. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks : Theory and Practice"
3. Beginning Sensor networks with Arduino and Raspberry Pi– Charles Bell, Apress, 2013

INTRODUCTION TO DATA SCIENCE
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3211OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- Learn data science project concepts
- Learn to collect data and process
- Learn to visualize data

Course Outcomes:

- Able to collect data from various resources and process data
- Able to plot data using various methods
- Able to develop and evaluate models

COURSE SYLLABUS

UNIT – I: Introduction

Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.

UNIT – II: Data Collection and Data Pre-Processing

Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – DataIntegration and Transformation – Data Reduction – Data Discretization.

UNIT – III: Exploratory Data Analytics

Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots –Pivot Table – Heat Map – Correlation Statistics – ANOVA.

UNIT – IV: Model Development

Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sampleEvaluation – Prediction and Decision Making.

UNIT – V: Model Evaluation

Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Over fitting Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing multiple Parameters by using Grid Search.

REFERENCES:

1. Jojo Moolayil, “Smarter Decisions : The Intersection of IoT and Data Science”,PACKT, 2016.

2. Cathy O’Neil and Rachel Schutt , “Doing Data Science”, O'Reilly, 2015.

3. David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big data Analytics”,EMC 2013

4. Raj, Pethuru, “Handbook of Research on Cloud Infrastructures for Big DataAnalytics”, IGI Global.

DATA MINING
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3212OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- Learn data mining concepts understand association rules mining.
- Discuss classification algorithms learn how data is grouped using clustering techniques.
- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining
- To understand the strengths and limitations of various data mining models;

Course Outcomes:

- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules,classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using datamining
- Ability to classify webpages, extracting knowledge from the web

COURSE SYLLABUS

UNIT- I

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

UNIT- II

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

UNIT- III

Classification: Problem Definition, General Approaches to solving a classification problem ,Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction , Methods for Expressing attribute test conditions, Measures for Selecting theBest Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian BeliefNetworks;K-Nearest neighbor classification - Algorithm and Characteristics.

UNIT- IV

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms,Partitioning Clustering-K-Means Algorithm, K-Means Additional issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

UNIT- V

Web and Text Mining : Introduction, webmining, web content mining, web structure mining, we usage mining, Text mining –unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

TEXT BOOKS:

1. Data Mining- Concepts and Techniques-Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition,2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
3. Datamining Techniques and Applications, Hongbo Du Cengage India Publishing

REFERENCE BOOKS:

1. Data MiningTechniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Mining Principles & Applications– T.VSveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.
3. Data Mining, Vikaram Pudi,P Radha Krishna, Oxford University Press

COMPUTER FORENSICS
(Open Elective- I)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3213OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- To understand the cyberspace.
- To understand the **forensics** fundamentals.
- To understand the evidence capturing process.
- To understand the preservation of **digital** evidence.

Course Outcomes:

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

COURSE SYLLABUS

UNIT- I

Computer Forensics Fundamentals:

What is Computer Forensics?,

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 ComputerForensics Technology: Types of Military Computer Forensic Technology, Types of LawEnforcement — Computer Forensic Technology — Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined — Data Back-up and Recovery — The Role of Back-up in Data Recovery — The Data-RecoverySolution.

UNIT- II

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options —Obstacles — Types of Evidence — The Rules of Evidence — Volatile Evidence — General Procedure — Collection and Archiving — Methods of Collection — Artifacts — CollectionSteps — Controlling Contamination: The Chain of Custody Duplication and Preservation of Digital Evidence: Preserving the Digital CrimeScene —Computer Evidence ProcessingSteps — Legal Aspects of Collecting and Preserving Computer Forensic 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.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence inprivate-sector incident scenes, processing law enforcement crime scenes, preparing for asearch, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT- IV

Current Computer Forensic tools : evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mailcrimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cellphone and mobile device forensics : Understanding mobile device forensics, understanding acquisition procedures for cellphones and mobile devices.

UNIT- V

Working with Windows and DOS Systems : understanding filesystems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startuptasks, 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, Richard Bejtiich, Curtis W.Rose, Addison-Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T.Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel,Wiley India Edition.

MACHINE LEARNING LAB

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3204PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**3**	**1.5**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 45**				**Total Classes :45**		
Prerequisite: A course on " Python Programming"								

Course Objective: The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python.

Course Outcomes:

After the completion of the course the student can able to:

- understand complexity of Machine Learning algorithms and their limitations;
- understand modern notions in data analysis-oriented computing;
- be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
- Be capable of performing experiments in Machine Learning using real-world data.

List of Experiments

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 schooldays in a week, the probability that it is Friday is 20 %. What is the probability that a student is absent given that today is Friday?Apply Baye's rule in python to get the result.(Ans:15%)

2. Extract the data from data base using python

3. Implement k-nearest neighbours classification using python

4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k-means clustering with 3 means(i.e.,3 centroids)

VAR 1	VAR2	CLASS
1.713	1.586	0
0.180	1.786	1
0.353	1.240	1
0.940	1.566	0
1.486	0.709	1
1.266	1.106	0
1.540	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map descriptions of individuals onto high, medium and low credit-worthiness.
medium skiing design single twenties no-> high Risk high
golf trading married forties yes -> lowRisk
low speed way transport married
thirties yes -> med Risk medium
foot ball banking single thirties
yes -> low Risk high flying media
married fifties yes-> high
Risk
low football security single
twenties no -> med Risk medium
golf media
singlethirties yes -> med
Riskmedium golf transport
married fortiesyes -> low Riskhigh
skiing banking
singlethirties yes ->
highRisklow golf unemployed

married fortiesyes->highRisk

Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find theunconditional probability of `golf' and the conditional probability of `single' given `medRisk' in thedataset?

6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

COMPILER DESIGN LAB

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS3205PC	Core	0	0	3	1.5	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 45				Total Classes :45		
Prerequisites: A Course on "C Programming " Co-requisites: A course on "Compiler Design"								

Course Objectives:

- To understand the various phases in the design of a compiler.
- To understand the design of top-downand bottom-upparsers.
- To understand syntax directed translation schemes.
- To introduce lex and yacc tools.

Course Outcomes:

- Ability to design, develop, and implement a compiler for any language.
- Able to use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.

List of Experiments

Compiler Design Experiments

1. Write a LEX Program to scan reserved word & Identifiers of C Language
2. Implement Predictive Parsing algorithm
3. Write a C program to generate three address code.
4. Implement SLR(1) Parsing algorithm
5. Design LALR bottom up parser for the given language

<program>::=<block>
<block>::={<variabledefinition><slist>}
|{<slist>}
<variabledefinition>::=int<vardeflist>;
<vardeflist>::=<vardec>|<vardec>,<vardeflist>
<vardec>::=<identifier>|<identifier>[<constant>]
<slist>::=<statement>|<statement>;<slist>

<statement>::=<assignment>|<ifstatement>|<whilestatement>
|<block>|<printstatement>|<empty>
<assignment>::=<identifier>=<expression>
|<identifier>[<expression>]=<expression>
<ifstatement> ::=if<bexpression> then<slist>
else<slist> endif
|if<bexpression>then<slist>endif
<whilestatement>::=while<bexpression>do<slist>enddo
<printstatement>::=print(<expression>)
<expression>::=<expression><addingop><term>|<term>|<addingop><ter
m>
<bexpression>::=<expression><relop><expression>
<relop>::= <|<= |==|>=|>|!=
<addingop>::=+|-
<term>::=<term><multop><factor>|<factor>
<multop>::=* |/
<factor>::=<constant>|<identifier>|<identifier>[<expression>]
| (<expression>)
<constant>::=<digit>|<digit><constant>
<identifier>::=<identifier><letterordigit>|<letter>
<letterordigit>::=<letter>|<digit>
<letter>::=a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit>::=0|1|2|3|4|5|6|7|8|9
<empty>hasthe obviousmeaning
Comments(zeroormorecharactersenclosed betweenthestandard C/Java-stylecommentbrackets
/*...*/) can be inserted.The language has rudimentary support for 1-dimensional arrays. The declaration int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2]. Note also that yous hould worry about the scoping of names.

CONCURRENT PROGRAMMING LAB

(Professional Elective–III Lab)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3211PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites: No Prerequisites **Co-requisites: A course on "Cocurrent Programming"**								

List of Experiments:

1. Design and implement Two-thread mutual exclusion algorithm (Peterson'sAlgorithm) using multithreaded programming.
2. Design and implement Filter Lock algorithm and check for deadlock-free and starvation- free conditions using multithreaded programming.
3. Design and implement Lamport's Bakery Algorithm and check for deadlock- free and starvation- free conditions using multithreaded programming.
4. Design and implement Lock-based concurrent FIFO queue data structure using multithreaded programming.
5. Design a consensus object using read–write registers by implementing a deadlock - free or starvation- free mutual exclusion lock.(Use Compare And Set() Primitive).
6. Design and implement concurrent List queue data structure using multithreaded programming.(Use Atomic Primitives)
7. Design and implement concurrent Stack queue data structure using multithreaded programming.(Use Atomic Primitives)
8. Design and implement concurrent FIFO queue datastructure using multithreaded programming. (Use Atomic Primitives)

NETWORK PROGRAMMING LAB

(Professional Elective–III Lab)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3212PE	**Elective**	**0**	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes :36**				**Total Classes :36**		
Prerequisites: No Prerequisites **Co-requisites: A course on "Network Programming"**								

Course Objectives:

- To understand interprocess and inter-system communication
- To understand socket programming in its entirety
- To understand usage of TCP/UDP/Raw sockets
- To understand how to build network applications

Course Outcomes:

- To write socket API based programs
- To design and implementclient-server applications using TCP and UDP sockets
- To analyze network programs

List of Experiments

1. Implement programs for Inter Process Communication using PIPE, Message Queue and Shared Memory.
2. Write a programme to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions.
3. Design TCP iterative Client and server application to reverse the given input sentence
4. Design TCP iterative Client and server application to reverse the given input sentence
5. Design TCP client and server application to transfer file
6. Design a TCP concurrent server to convert a given text into upper case using multiplexing systemcall "select"
7. Design a TCP concurrent server to echo given set of sentences using poll functions
8. Design UDP Client and server application to reverse the given input sentence

9. Design UDP Client server to transfer a file
10. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into uppercase.
11. Design a RPC application to add and subtract a given pair of integers

TEXT BOOKS:

1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, PearsonEducation.
2. UNIX Network Programming,1stEdition,-W.RichardStevens.PHI.

SCRIPTING LANGUAGES LAB

(Professional Elective–III Lab)

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS3213PE	Elective	L	T	P	C	CIA	SEE	Total
		0	0	2	1	30	70	100
Contact classes: NIL	Tutorial Classes : NIL	Practical classes : 36				Total Classes :36		
Prerequisites: Any High - level programming language (C , C++) Co-requisites: A course on "Scripting Languages"								

Course Objectives:

- To Understand the concepts of scripting languages for developing web based projects
- To understand the applications the of Ruby , TCL , Perl scripting languages

Course Outcomes:

- Ability to understand the differences between Scripting languages and programming languages
- Able to gain some fluency programming in Ruby,Perl,TCL

List of Experiments

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.
3. Write a Ruby script which accept the user's first and last name and print them in reverse order with a space between them
4. Write a Ruby script to accept a file name from the user print the extension of that
5. Write a Ruby script to find the greatest of three numbers
6. Write a Ruby script to printodd numbers from10to1
7. Write a Ruby scirpt to check two integers and return true if one of them is 20 otherwise return their sum
8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100
9. Write a Ruby script to print the elements of a given array
10. Write a Ruby program to retrieve the total marks where subject name and marks of a students to red in a hash
11. Write aTCL script to find thefactorial of a number
12. Write a TCL script that multiplies the numbers from1 to10

13. Write a TCL script for Sorting a list using a comparison function
14. Write a TCL script to (i)createalist (ii)append elements to the list (iii)Traverse the list (iv)Concatenate the list
15. Write a TCL script to comparing the file modified times.
16. Write a TCL script to Copy a file and translate to native format.
17. a) Write aPerl script to find the largest number among three numbers.
    b)Write a Perl script to print the multiplication tables from 1-10 using subroutines.
18. Write a Perl program to implement the following list of manipulating functions Shift, unshift, push
19. a)Write a Perl script to substitute a word, with an other word in a string.
    b)Write aPerl script to validate IP address and email address.
20. Write a Perl script to print the file inreverse order using command line arguments

MOBILE APPLICATION DEVELOPMENT LAB

(Professional Elective–III Lab)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS3214PE	**Elective**	**0**	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites: A course on "Java Progrmming" **Co-requisites: A course on "Mobile Application Development"**								

Course Outcomes:

- Student understands the working of Android OS Practically.
- Student will be able to develop user interfaces.
- Student will be able to develop , deploy and maintain the Android Applications.

List of Experiments

1. Create an Android application that shows Hello+name of the user and run it on an emulator.
   (b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box,when the user clicks the OK button.
2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric) ,Date of Birth (DatePicket), State(Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button .Use
   (a) Linear Layout(b) Relative Layoutand(c) Grid Layout or Table Layout.
3. Developan application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a "Back" button. If the screen is rotated tolandscape mode (width greater than height), then the screen should show list on left fragmentand details on right fragment instead ofsecond screen with back button. Use Fragment transactions and Rotation event listener.
4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked

usingintents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted,it should show a toast with details of the notification.
6. Create an application that uses a text file to store user names and passwords (tab separatedfields and one record per line). When the user submits a login name and password through ascreen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.
7. Create a user registration application that stores the user details in a database table.
8. Create a data base and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.
9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.
11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
12. Create an alarm that rings every Sunday at 8:00AM. Modify it to use a time picker to set alarm time.
13. Create an application that shows the given URL (froma textfield) in a browser.

PYTHON PROGRAMMING LAB

(ProfessionalElective–III Lab)

B.Tech. III Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS3215PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites: A course on"Programming for Problem Solving". **Co-requisites: A course on "Python Programming"**								

Course Objectives

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcome

- Student should be able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object-oriented concepts,and the builtin objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming,Web applications, discrete event simulations

List of Experiments:

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from agiven string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23IST2017"
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program todemonstrate working with dictionaries in python.

8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula :c/5=f-32/9]
10. Write a Python program to construct the following pattern,using a nested for loop

```
*
**
***
****
*****
****
***
**
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from thePythagorean Theorem that in a right triangle, the square of one side equals the sum of thesquaresofthe othertwo sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py**.** This script should prompt the user for the names of two text files.The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x,n)
20. Write a Python class to reverse a string word by word.

CYBER SECURITY

B.Tech. III Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
*MC3002	Mandatory	3	0	0	0	0	100*	100*
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites:NIL								

Course objectives:

- To familiarize various types of cyber-attacks and cyber-crimes
- To give an overview of the cyber laws
- To study the defensive techniques against these attacks

Course Outcomes: The students will be able to understand cyber-attacks, types of cyber crimes, cyber laws and also how to protect themself and ultimately the entire Internet community from such attacks.

COURSE SYLLABUS

UNIT- I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability,threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIATriad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum o fattacks,Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism,Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT- II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace,National CyberSecurity Policy.

Introduction,Historical background of Cyber forensics, Digital Forensics Science,The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email,Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

UNIT- III

Cyber crime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, SecurityChallenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication serviceSecurity, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT- IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, webthreats for organizations, security and privacy implications, social media marketing: security risks andperilsfororganizations, socialcomputingand theassociated challengesfor organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cyber crimes the psychology, mind set and skills of hackers and other cybercriminals.

UNIT- V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Datalinking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains-medical, financial, etc.

Cybercrime: Examples and Mini-Cases

Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket,e-mail spoof inginstances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Fraudsin Cyber Domain.

TEXT BOOKS:

1. Nina God bole and Sunit Belpure, CyberSecurity Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,Wiley
2. B.B.Gupta,D.P.Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications ,and Perspectives ,CRCPress, ISBN9780815371335, 2018.

REFERENCES:

1. Cyber Security Essentials, James Graham, Richard Howardand Ryan Otson, CRC Press.

2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J.DavidIrwin, CRC Press T & FGroup.

INFORMATION SECURITY

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS4101PC	**Core**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Computer Networks"								

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

Course Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

COURSE SYLLABUS

UNIT- I

Security Concepts : Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT- II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Streamciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSAalgorithm, Elgamal Cryptography, Diffie-HellmanKey Exchange, Knapsack Algorithm.

UNIT- III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures, ElgamalDigital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public–Key Infrastructure

UNIT- IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport LayerSecurity, HTTPS, Secure Shell (SSH)

WirelessNetworkSecurity: Wireless Security, Mobile Device Security, IEEE802.11 Wireless LAN, IEEE802.11i Wireless LAN Security

UNIT- V

E-Mail Security: Pretty Good Privacy, S/MIME **IPSecurity:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Crosssite Scripting Vulnerability.

TEXTBOOKS:

1. Cryptography and Network Security- Principles and Practice: William Stallings, Pearson Education ,6th Edition
2. Cryptography and Network Security: Atul Kahate, McGrawHill, 3rd Edition

REFERENCEBOOKS:

1. Cryptography and Network Security: CKShyamala, N Harini, Dr TR Padmanabhan, Wiley India,1st Edition.
2. Cryptography andNetwork Security: Forouzan Mukhopadhyay ,McGrawHill, 3rd Edition
3. Information Security, Principles and Practice: Mark Stamp,Wiley India.
4. Principles of Computer Security:WM.Arthur Conklin, Greg White ,TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography : Bernard Menezes, CENGAGE Learning

DATA MINING

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS4102PC	**Elective**	**2**	**0**	**0**	**2**	**30**	**70**	**100**
Contact classes: 36	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :36**		

Prerequisites:

- **A course on "Database Management Systems"**
- **Knowledge of probability and statistics**

Course Objectives:

- It presents methods for mining frequent patterns, associations, and correlations.
- It then describes methods for data classification and prediction, and data–clustering approaches.
- It covers mining various types of data stores such as spatial, textual, multimedia, streams.

Course Outcomes:

- Ability to understand the types of the data to be mined and present a general classification of tasks and primitives toi ntegrate a data mining system.
- Apply pre processing methods for any given raw data.
- Extract interesting patterns from large amounts of data.
- Discover the role played by datamining in various fields.
- Choose and employ suitable datamining algorithms to build analytical applications
- Evaluate the accuracy of supervised and unsupervised models and algorithms.

COURSE SYLLABUS

UNIT- I

Data Mining: Data–Types of Data–, Data Mining Functionalities– Interestingness Patterns– Classification of Data Mining systems– Datamining Task primitives–Integration of Datamining system with a Data warehouse–Major issues in Data Mining–Data Preprocessing.

UNIT- II

Association Rule Mining: Mining Frequent Patterns–Associations and correlations –Mining Methods–MiningVarious kinds of Association Rules–Correlation Analysis –Constraint based Association mining. Graph Pattern Mining, SPM.

UNIT- III

Classification: Classification and Prediction**–** Basic concepts–Decision tree induction–Bayesian classification, Rule–based classification, Lazylearner.

UNIT- IV

Clustering and Applications: Cluster analysis–Types of Data in Cluster Analysis–Categorization of Major Clustering Methods–Partitioning Methods, Hierarchical Methods– Density–Based Methods, Grid–Based Methods, Outlier Analysis.

UNIT- V

Advanced Concepts: Basic concepts in Mining data streams–Mining Time–series data—Miningsequence patterns in Transactional databases– Mining Object– Spatial– Multimedia–Text and Webdata – Spatial Datamining–Multimedia Datamining–TextMining–Mining the World Wide Web.

TEXTBOOKS:

1. Data Mining– Concepts and Techniques –Jiawei Han & Micheline Kamber, 3rd Edition Elsevier.
2. Data Mining Introductory and Advanced topics – Margaret H Dunham, PEA.

REFERENCE BOOK:

1. Ian H.Witten and Eibe Frank, Data Mining: Practical Machine Learning Toolsand Techniques (SecondEdition), Morgan Kaufmann, 2005.

GRAPH THEORY

(Professional Elective -IV)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS4107PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Pre-requisites: **An understanding of Mathematics in general is sufficient**.								

Course Outcomes:

- Know some important classes of graph theoretic problems;
- Be able to formulate and prove central theorems about trees , matching, connectivity, colouring and planar graphs;
- Be able to describe and apply some basic algorithms for graphs;
- Be able to use graph theory as a modelling tool.

COURSE SYLLABUS

UNIT- I

Introduction-Discovery of graphs, Definitions, Subgraphs, Isomorphic graphs, Matrix representations of graphs, Degree of a vertex, Directed walks, paths and cycles, Connectivity in digraphs, Eulerian and Hamilton digraphs, Eulerian digraphs, Hamilton digraphs, Special graphs, Complements, Largergraphs from smaller graphs, Union, Sum, Cartesian Product, Composition, Graphic sequences, Graph theoretic model of the LAN problem, Havel-Hakimi criterion, Realization of a graphic sequence.

UNIT- II

Connected graphs and shortest paths - Walks, trails, paths, cycles, Connected graphs, Distance,Cut-vertices and cut-edges, Blocks, Connectivity, Weighted graphs and shortest paths, Weighted graphs,Dijkstra"s shortest path algorithm, Floyd-Warshall shortest path algorithm.

UNIT- III

Trees- Definitions and characterizations, Number of trees, Cayley‟s formula, Kircho↵-matrix-tree theorem, Minimum spanning trees, Kruskal‟s algorithm, Prim‟salgorithm, Special classes of graphs, Bipartite Graphs, Line Graphs, Chordal Graphs, Eulerian Graphs, Fleury‟s algorithm, Chinese Postman problem, Hamilton Graphs, Introduction, Necessary conditions and sufficient conditions.

UNIT- IV

Independent sets coverings and matchings– Introduction, Independent sets and coverings: basic equations, Matchings in bipartite graphs, Hall‟s Theorem, K¨onig‟s Theorem, Perfect matchings ingraphs, Greedy and approximation algorithms.

UNIT- V

Vertex Colorings- Basic definitions, Cliques and chromatic number, Mycielski‟s theorem, Greedy coloring algorithm, Coloring of chordal graphs, Brooks theorem, Edge Colorings, Introduction and Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs, Edge-coloring of bipartite graphs, Class-2 graphs, Hajosunion and Class-2graphs ,A scheduling problem and equitable edge-coloring.

TEXT BOOKS:

1. J.A.Bondy and U.S.R.Murty. Graph Theory, volume 244 of Graduate Texts in Mathematics. Springer,1st edition, 2008.
2. J.A.Bondy and U.S.R.Murty.Graph Theory with Applications.

REFERENCE BOOKS:

1. Lecture Videos **:** http://nptel.ac.in/courses/111106050/13
2. Introduction to Graph Theory, Douglas B. West, Pearson.
3. Schaum's Outlines Graph Theory, Balakrishnan, TMH
4. Introduction to Graph Theory, Wilson Robinj, PHI
5. Graph Theory with Applications to Engineering And Computer Science, Narsing Deo, PHI
6. Graphs-An Introductory Approach,Wilson and Watkins

INTRODUCTION TO EMBEDDED SYSTEMS

(Professional Elective- IV)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4108PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites:

1. **A course on"Digital Logic Design and Microprocessors"**
2. **A course on"Computer Organization and Architecture"**

Course Objectives:

- To provide an overview of principles of Embedded System
- To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems.

Course Outcomes:

- Expected to understand the selection procedure of processors in the embedded domain.
- Design procedure of embedded firm ware.
- Expected to visualize the role of real time operating systems in embedded systems.
- Expected to evaluate the correlation between task synchronization and latency issues

COURSE SYLLABUS

UNIT- I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification of Embedded Systems,Major application areas, Purpose of Embedded Systems, Characteristics and Quality attributes of Embedded Systems.

UNIT- II

The Typical Embedded System: Core of the Embedded System, Memory, Sensors and Actuators, Communication Interface, Embedded Firmware, Other System components.

UNIT- III

Embedded Firmware Designand Development: Embedded Firmware Design, Embedded Firmware Development Languages, Programming in Embedded C.

UNIT- IV

RTOS Based Embedded System Design: Operating System basics, Types of Operating Systems,Tasks, Process, Threads, Multiprocessing and Multi-tasking, Task Scheduling, Threads-Processes-Scheduling putting them together, Task Communication ,Task Synchronization, Device Drivers, How to choose an RTOS

UNIT- V

Integration and Testing of Embedded Hardware and Firmware: Integration of Hardware and Firmware, Boards Bring up

The Embedded System Development Environment: The Integrated Development Environment IDE), Types of files generated on Cross-Compilation, Disassembler / Decompiler, Simulators , Emulators and Debugging, Target Hardware Debugging, Boundary Scan.

TEXTBOOK:

1. Shibu KV, “Introduction to Embedded Systems”,Second Edition, McGraw Hill

REFERENCE BOOKS:

1. Rajkamal, Embedded Systems Architecture, Programming and Design,Tata McGraw-Hill
2. Frank Vahid and Tony Givargis,“Embedded Systems Design”- A Unified Hardware/Software Introduction, JohnWiley
3. Lyla,“Embedded Systems”–Pearson
4. David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint2000.

E-COMMERCE

(ProfessionalElective-IV)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4109PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites.								

Course Objectives:

- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and webstore requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

Course Outcomes:

- Ability to identify the business relationships between the organizations and their customers
- Ability to perform various transactions like payment,data transfer and etc.

COURSE SYLLABUS

UNIT- I

Electronic Commerce - Framework, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce-Mercantile Process models.

UNIT- II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter

Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce-work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT- III

Corporate Digital Library-Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing-Information based marketing, Advertising on Internet, on-line marketing process, market research. Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing

UNIT– IV

Web Marketing Strategies, Communicating with Different Market Segments, Beyond MarketSegmentation: Customer Behavior and Relationship Intensity, Advertising on the Web, E-Mail Marketing, Search Engine Positioning and Domain Names, Selling to Businesses Online, Electronic Data Interchange, Supply Chain Management Using Internet Technologies, Electronic Market places and Portals

UNIT- V

E-Business Revenue Models, Revenue Models for Online Business, Changing Strategies: Revenue Models in Transition, Revenue Strategy Issues for Online Businesses, Creating an Effective Business Presence Online, WebSite Usability, Virtual Communities, Mobile Commerce, Online Auctions

TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston,Pearson.(UNITS 1,2,3)
2. E-Business by Gary P.Schneider, -Cengage India Learning(UNITS 4,5)

REFERENCES:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, JohnWiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce–Gary P.Schneider–Thomson.
5. E-Commerce–Business,Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

CLOUD COMPUTING

(Professional Elective- IV)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CS4110PE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Pre-requisites:

1. **A course on"Computer Networks"**
2. **A course on "Operating Systems"**
3. **A course on "Distributed Systems"**

Course Objectives:

- This course provides an insight into cloud computing
- Topics covered include-distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

Course Outcomes:

- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the ways in which the cloud can be programmed and deployed.
- Understanding cloud service providers.

COURSE SYLLABUS

UNIT- I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing,Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT- II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT- III

Cloud Computing Architecture and Management: Cloud architecture, Layer ,Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managingthe Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT- IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Prosand Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service,Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers,Other Cloud ServiceModels.

UNIT-V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, CloudStorage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services,Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service,Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, Share Point, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Salesforce, Sales Cloud, Service Cloud: Knowledge as a Service, Rackspace, VMware, Manjrasoft, Aneka Platform

TEXTBOOK:

1.Essentials of cloud Computing : K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Raj kumar Buyya, James Broberg and Andrzej M.Goscinski , Wiley,2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier,2012.
3. Cloud Security and Privacy :An Enterprise Perspective on Risks and Compliance, Tim Mather,Subra Kumaraswamy, Shahed Latif , O'Reilly, SPD,rp2011.

AD-HOC & SENSOR NETWORKS

(Professional Elective-IV)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4111PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **A course on "Computer Networks"**
2. **A course on "Mobile Computing"**

Course Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

Course Outcomes:

- Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
- Ability to solve the issues in real-time application development based on ASN.
- Ability to conduct further research in the domain of ASN

COURSE SYLLABUS

UNIT- I

Introduction to AdHoc Networks - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-**Proactive**: DSDV; **Reactive**: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-**Location Services**- DREAM, Quorum-based;

Forwarding Strategies : Greedy Packet, Restricted Directional Flooding-DREAM,LAR.

UNIT- II

DataTransmission - Broadcast Storm Problem, **Rebroadcasting Schemes**-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. **Multicasting: Tree-based:** AMRIS, MAODV; **Mesh-based :** ODMRP, CAMP; **Hybrid:** AM Route**,** MCEDAR.

UNIT- III

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-Geo TORA, MGR**.**TCP over AdHoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Adhoc

UNIT- IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications , Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer,Routing Layer.

UNIT- V

Upper Layer Issues of WSN: Transport layer,High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXTBOOKS:

1. AdHoc and Sensor Networks–Theory and Applications, Carlos Corderio Dharma P.Aggarwal,World Scientific Publications, March 2006, ISBN–981–306–681–3.
2. Wireless Sensor Networks: An Information Processing Approach, FengZhao, Leonidas Guibas, Elsevier Science, ISBN –978-1-55860-914-3 (Morgan Kauffman).

ADVANCED ALGORITHMS

(Professional Elective-V)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4112PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Pre-requisites:

1. **A course on" Computer Programming & Data Structures "**
2. **A course on" Advanced Data Structures & Algorithms"**

Course Objectives:

- Introduces the recurrence relations for analyzing the algorithms
- Introduces the graphs and their traversals.
- Describes major algorithmic techniques (divide-and-conquer, greedy, dynamic programming,Brute Force, Transform and Conquer approaches) and mention problems for which each technique is appropriate;
- Describes how to evaluate and compare different algorithms using worst-case, average-case and best-case analysis.
- Introduces string matching algorithms
- Introduces linear programming.

Course Outcomes:

- Ability to analyze the performance of algorithms
- Ability to choose appropriate data structures and algorithm design methods for a specified application
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs

COURSE SYLLABUS

UNIT- I

Introduction: Role of Algorithms in computing, Order Notation, Recurrences, Probabilistic Analysisand Randomized Algorithms. Sorting and Order Statistics: Heap sort, Quick sort and Sorting in LinearTime.

Advanced Design and Analysis Techniques: Dynamic Programming- Matrix chain Multiplication, Longest common Subsequence and optimal binary Search trees.

UNIT- II

Greedy Algorithms-Huffman Codes, Activity Selection Problem. Amortized Analysis.

Graph Algorithms: Topological Sorting, Minimum Spanning trees, Single Source Shortest Paths,Maximum Flowalgorithms.

UNIT- III

Sorting Networks: Comparison Networks, Zero-one principle, bitonic Sorting Networks, MergingNetwork,Sorting Network.

Matrix Operations- Strassen's Matrix Multiplication, Inverting matrices, Solving system of linear Equations

UNIT- IV

String Matching: Naive String Matching, Rabin-Karp algorithm, matching with finite Automata, Knuth-Morris-Pratt algorithm.

UNIT- V

NP-Completeness and Approximation Algorithms: Polynomial time, polynomial time verification,NP-Completeness and reducibility, NP-Complete problems. Approximation Algorithms- Vertex cover Problem, Travelling Sales person problem

TEXTBOOK:

1. Introduction to Algorithms,''T.H.Cormen,C.E.Leiserson,R.L.Rivest,and C.Stein, ThirdEdition,PHI.

REFERENCEBOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt.Ltd.
2. Designand Analysis Algorithms-Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher **:** Pearson
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrichand R.Tomassia, John Wiley and sons.
4. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

REAL TIME SYSTEMS

(Professional Elective-V)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4113PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Computer Organization and Operating System								

Course Objectives:

- To provide broad understanding of the requirements of Real Time Operating Systems.
- To make the student understand, applications of these Real Time features using case studies.

Course Outcomes:

- Be able to explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores.
- Able describe how a real-time operating system kernel is implemented.
- Able explain how tasks are managed.
- Explain how the real-time operating system implements time management.
- Discuss how tasks can communicate using semaphores, mailboxes, andqueues.
- Be able to implement a real-time system on an embedded processor.
- Be able to work with real time operating systems like RT Linux, Vx Works, MicroC /OSII, TinyOs

COURSE SYLLABUS

UNIT–I

Introduction: Introduction to UNIX/LINUX, Overview of Commands, File I/O,(open, create, close, lseek, read, write), Process Control (fork, vfork, exit, wait, waitpid,exec).

UNIT- II

Real Time Operating Systems : Brief History of OS , Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS, Defining a Task, asks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue , States , Content, Storage, Operations and Use

UNIT- III

Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem

UNIT- IV

Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptionsand Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines(ISR), Soft Timers, Operations.

UNIT- V

Case Studies of RTOS : RTLinux, MicroC/OS-II, VxWorks, Embedded Linux, and Tiny OS.

TEXT BOOK:

1.Real Time Concepts for Embedded Systems– Qing Li, Elsevier,2011

REFERENCE BOOKS:

1. Embedded Systems - Architecture, Programming and Design by Rajkamal, 2007, TMH.
2. Advanced UNIX Programming, Richard Stevens
3. Embedded Linux : Hardware, Software and Interfacing–Dr.Craig Hollabaugh

SOFT COMPUTING

(Professional Elective-V)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4114PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Artificial Intelligence"								

Course Objectives:

- Familiarize with soft computing concepts
- Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
- Familiarize the Neuro-Fuzzy modeling using Classification and Clustering techniques
- Learn the concepts of Genetic algorithm and its applications
- Acquire the knowledge of Rough Sets.

Course Outcomes: On completion of this course, the students will be able to:

- Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
- Understand fuzzy logic and reasoning to handle and solve engineering problems
- Apply the Classification and clustering techniques on various applications.
- Understand the advanced neural networks and its applications
- Perform various operations of genetic algorithms, Rough Sets.
- Comprehend various techniques to build model for various applications

COURSE SYLLABUS

UNIT- I

Introduction to Soft Computing : Evolutionary Computing, "Soft "computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT- II

Fuzzy Systems : Fuzzy Sets, FuzzyRelations, Fuzzy Logic, FuzzyRule-Based Systems

UNIT- III

Fuzzy Decision Making, Particle Swarm Optimization

UNIT- IV

Genetic Algorithms : Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT- V

Rough Sets, Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

TEXTBOOK:

1.Soft Computing – Advances and Applications-Jan 2015 by B.K.Tripathy and J.Anuradha– Cengage Learning

REFERENCE BOOKS:

1. S.N.Sivanandam & S.N.Deepa, “Principles of Soft Computing”, 2ndedition, Wiley India, 2008.
2. David E.Goldberg,“Genetic Algorithms-In Search, optimization and Machine learning”, Pearson Education.
3. J.S.R. Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing” ,Pearson Education, 2004.
4. G.J.Klir & B.Yuan, “Fuzzy Sets & Fuzzy Logic”, PHI,1995.
5. Melanie Mitchell, “An Introduction to Genetic Algorithm”,PHI,1998.
6. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw- Hill International editions, 1995

INTERNET OF THINGS

(Professional Elective- V)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4115PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Fundamentals of IOT"								

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

Course Outcomes:

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

COURSE SYLLABUS

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 Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT- II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NET O PEER

UNIT- III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, filehandling, data/timeoperations, classes, Exception handling Python packages-JSON, XML, HTTP Lib, URL Lib, SMTP Lib

UNIT- IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming–Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT- V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communicationAPIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a REST ful web API

TEXTBOOKS:

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

SOFTWARE PROJECT MANAGEMENT

(Professional Elective- V)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4116PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Software Engineering "								

Course Objectives:

- To acquire knowledge on software process management
- To acquire managerial skills for software project development
- To understand software economics

Course Outcomes:

- Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
- Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
- Design and develop software product using conventional and modern principles of software projec tmanagement

COURSE SYLLABUS

UNIT- I

Software ProcessMaturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, TheOptimizingProcess.ProcessReference Models Capability Maturity Model (CMM), CMMI, PCMM, PSP, TSP).

UNIT- II

Software Project Management Renaissance

Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model-based software architectures.

UNIT- III

Work flows and Check points of process Software process work flows, Iteration work flows, Major milestones, minor mile stones, periodic status assessments.

Process Planning Work break down structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT- IV

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.ProjectControl and processinstrumentation

The seven-coremetrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT- V

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process,Watts S.Humphrey, Pearson Education
2. Software Project Management, Walker Royce, Pearson Education

REFERENCE BOOKS:

1. An Introduction to the Team Software Process, Watts S.Humphrey, Pearson Education,2000
2. Process Improvement essentials, JamesR.Persse,O'Reilly, 2006
3. Software Project Management,Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
6. Software Engineering Project Management, Richard H.Thayer & Edward Yourdon, 2nd edition, Wiley India,2004.
7. Agile Project Management, Jim High smith, Pearson education, 2004.

ENVIRONMENTAL IMPACT ASSESSMENT
(Open Elective-II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE4121OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on "Environmental Science"								

Course Objectives: The objectives of the course are to

- Define and Classify Environmental Impacts and the terminology
- Understands the environmental Impact assessment procedure
- Explain the EIA methodology
- List and describe environmental audits

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

- Identify the environmental attributes to be considered for the EIA study
- Formulate objectives of the EIA studies
- Identify the methodology to prepare rapid EIA
- Prepare EI A reports and environmental management plans

COURSE SYLLABUS

UNIT- I

Introduction:The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measureand EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process.Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT- II

EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology,impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Check lists methods,

Matrices methods, Networks methods, Overlays methods. EIA review-Baseline Conditions -Construction Stage Impacts, post project impacts.

UNIT- III

Environmental Management Plan: EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the Conditions , Monitoring Methods, Pre-Appraisal and Appraisal.

UNIT- IV

Environmental Legislation and Life cycle Assessment: Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972,Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste management rules. Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria case studies.

UNIT- V

Case Studies: Preparation of EIA for developmental projects-Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, Nuclear fuel complex, Highway project, Sewage treatment plant,Municipal Solid waste processing plant, Airports.

TEXTBOOKS:

1. Anjaneyulu.Y and Manickam. V. , Environmental Impact Assessment Methodologies, B.S.Publications, Hyderabad, 2007
2. Barthwal,R.R.,Environmental Impact Assessment, New Age International Publishers ,2002

REFERENCE BOOKS:

1. Jain, R.K., Urban,L.V.,Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co.,New York, 1991.
2. Rau, J.G.and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., NewYork,1996.

INDUSTRIAL WASTE WATER TREATMENT
(Open Elective-II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE4122OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Environmental Engineering								

Course Objectives:

- To present the information of waste water generation from various industries.
- To inform about the conventional treatment processes for specific industrial waste waters
- To explain about the new developments in industrial waste water treatment technologies

Course Outcomes:

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

- Identify the characteristics of industrial waste waters
- Describe pollution effects of disposal of industrial effluent
- Identify and design treatment options for industrial waste water
- Formulate environmental management plan

COURSE SYLLABUS

UNIT- I

Introduction: Waste water Characteristics, Standards of Disposal, Treatment Objective and Strategies, Layouts of Primary, Secondary and Advanced Treatment Units.

UNIT- II

Design of Preliminary and Primary Treatment Operations: Screens, Grit Chambers, SkimmingTank, Primary and Secondary Sedimentation Tanks.

UNIT- III

Biological Treatment Processes: Types, Kinetics of Plug Flow and Completely Mixed Systems.Attached Growth Processes: Trickling Filters (Standard Rate, High Rate), Biofilters, Practices, Features and Design, Operational Difficulties and Remedial Measures, Rotating Biological Contactors. Suspended Growth Processes:

UNIT- IV

Activated Sludge Process, Modifications and Design Equations, Process Design Criteria, Oxygen and Nutrient Requirements - Classification and Design of Oxidation Ponds, Lagoons.

UNIT- V

Sludge Treatment and Disposal: Sludge Thickening, Aerobic and Anaerobic Sludge Digestion Processes, Design of Digester Tank, Sludge Dewatering,Ultimate Disposal, Sludge Drying Beds, Other Methods of Sludge Treatment.

TEXTBOOKS:

1. Waste water Treatment–Concepts and Design Approach, by GL Karia and RA Christian, Prentice Hall of India, 2006

2. Environmental Engineering by Gerard Kiely, McGraw Hill Education (India) Pvt Ltd, 2013

3. Environmental Engineering–A Design Approach by A.P. Sincero and GA Sincero, Prentice Hall of India, 2014

REFERENCES:

1. Waste water Engineering-Collection, Treatment, Disposaland Reuse by Metcalf and Eddy,, McGraw Hill Education (India) Pvt Ltd,2013
2. Industrial Waste Treatment by Nelson Leonard Nemerow, Butterworth-Heinemann, 2007.
3. Biological Process Designs for Wastewater Treatment by BenefieldL.D. and Randall C.D.Prentice Hall Pub. Co., 1980.

RENEWABLE ENERGY SOURCES

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EE4121OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Pre-requisites: None								

Course Objectives:

- To recognize the awareness of energy conservation in students.
- To identify the use of renewable energy sources for electrical power generation.
- To collect different energy storage methods.
- To detect about environmental effects of energy conversion.

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

- Understand the principles of wind power and solar photo voltaic power generation, fuel cells.
- Assess the cost of generation for conventional and renewable energy plants.
- Designsuitable power controller for wind and solar applications.
- Analyze the issues involved in the integration of renewable energy sources to the grid.

COURSE SYLLABUS

UNIT- I

Introduction: Renewable Sources of Energy-Grid-Supplied Electricity-Distributed Generation-Renewable Energy Economics-Calculation of Electricity Generation Costs–Demand side Management Options –Supply side Management Options-Modern Electronic Controls of Power Systems.

Wind Power Plants: Appropriate Location-Evaluation of Wind Intensity-Topography -Purpose of the Energy Generated - General Classification of Wind Turbines-Rotor Turbines-Multiple-Blade Turbines Drag Turbines -Lifting Turbines-Generators and Speed Control used in Wind Power Energy Analysis of Small Generating Systems.

UNIT- II

Photovoltaic Power Plants: Solar Energy-Generation of Electricity by Photovoltaic Effect -Dependence of a PV Cell Characteristic on Temperature-Solar cell Output Characteristics - Equivalent Models and Parameters for Photovoltaic Panels-Photovoltaic Systems - Applications of Photovoltaic Solar Energy-Economical Analysis of Solar Energy.

Fuel Cells: The Fuel Cell-Low and High Temperature Fuel Cells-Commercial and Manufacturing Issues Constructional Features of Proton Exchange-Membrane Fuel Cells – Reformers-Electro-lyzer Systems and Related Precautions-Advantages and Disadvantagesof Fuel Cells-Fuel Cell Equivalent Circuit- Practical Determination of the Equivalent Model Parameters-Aspects of Hydrogen as Fuel.

UNIT- III

Induction Generators

Principles of Operation - Representation of Steady-State Operation - Power and Losses Generated- Self-Excited Induction Generator-Magnetizing Curves and Self-Excitation Mathematical Description of the Self - Excitation Process-Interconnected and Stand-alone operation -Speed and Voltage Control - Economical Aspects.

UNIT- IV

Storage Systems: Energy Storage Parameters -Lead – Acid Batteries - Ultra Capacitors - Flywheels – Super conducting Magnetic Storage System-Pumped Hydro electric Energy Storage - Compressed Air Energy Storage - Storage Heat - Energy Storage as an Economic Resource.

UNIT- V

Integration of Alternative Sources of Energy: Principles of Power Injection- Instantaneous Active and Reactive Power Control Approach Integration of Multiple Renewable EnergySources-Islanding and Interconnection Control-DG Controland Power Injection.

Interconnection of Alternative Energy Sources with the Grid: Interconnection Technologies - Standards and Codes for Interconnection - Interconnection Considerations -Interconnection Examples for Alternative Energy Sources.

TEXTBOOKS:

1. Felix A .Farret, M.Godoy Simoes, "Integration of Alternative Sources of Energy", John Wiley & Sons,2006.
2. Solanki: Renewable Energy Technologies: Practical Guide for Beginners, PHI Learning Pvt.Ltd. 2008.

REFERENCES:

1. D. Mukherjee: Fundamentals of Renewable Energy Systems, New Age International publishers, 2007.
2. Remus Teodorescu, Marco Liserre, Pedro Rodríguez: Grid Converters for Photo voltaic and Wind Power Systems, John Wiley & Sons, 2011.
3. Gilbert M.Masters: Renewable and Efficient Electric Power Systems, John Wiley & Sons, 2004.

RELIABILITY ENGINEERING

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EE4122OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Mathematics-III (Laplace Transforms Numerical Methods and Complex variables).								

Course Objectives:

- To introduce the basic concepts of reliability, various models of reliability
- To analyze reliability of various systems
- To introduce techniques of frequency and duration for reliability evaluation of repairable systems

Course Outcomes:

After completion of this course, the student will be able to

- model various systems applying reliability networks
- evaluate the reliability of simple andcomplex systems
- estimate the limiting state probabilities of repairable systems
- apply various mathematical models for evaluating reliability of irreparable systems

COURSE SYLLABUS

UNIT- I

Basic Probability Theory: Elements of probability, probability distributions, Random variables, Density and Distribution functions- Mathematical expected – variance and standard deviation

Binomial Distribution: Concepts, properties, engineering applications.

UNIT- II

Network Modeling and Evaluation of Simple Systems: Basic concepts- Evaluation of network Reliability/Unreliability-Series systems, Parallel systems - Series -Parallel systems - Partially redundant system - Examples.

Network Modeling and Evaluation of Complex Systems

Conditional probability method- tie set, Cut-set approach- Event tree and reduced event tree methods-Relationships between tie and cut-sets-Examples.

UNIT- III

Probability Distributions In Reliability Evaluation: Distribution concepts, Terminology ofdistributions, General reliability functions, Evaluation of the reliability functions, shape of reliability functions – Poisson distribution–normal distribution, exponential distribution,Weibull distribution.

Network Reliability Evaluation Using Probability Distributions: Reliability Evaluation of Series systems, Parallel systems – Partially redundant systems- determination of reliability measure - MTTF forseries and parallel systems – Examples.

UNIT- IV

Discrete Markov Chains: Basic concepts- Stochastic transitional probability matrix- time dependent probability evaluation- Limiting State Probability evaluation- Absorbing states – Application.

Continuous Markov Processes: Modeling concepts- State space diagrams- Unreliability evaluation of single and two component repairable systems

UNIT- V

Frequency and Duration Techniques: Frequency and duration concepts, application to multi state problems, Frequency balance approach.

Approximate System Reliability Evaluation: Series systems – Parallel systems- Networkr eduction techniques - Cut set approach-Common mode failures modeling and evaluation techniques - Examples.

TEXTBOOKS:

1. Roy Billinton and Ronald N Allan, Reliability Evaluation of Engineering Systems, Plenum Press.
2. E.Balagurusamy , Reliability Engineeringby Tata McGraw-Hill Publishing Company Limited

REFERENCES:

1. Reliability Engineering: Theory and Practice by Alessandro Birolini, Springer Publications.
2. An Introduction to Reliability and Maintainability Engineering by Charles Ebeling,TMH Publications.
3. Reliability Engineering by Elsayed A. Elsayed, Prentice Hall Publications.

FABRICATION PROCESSES

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME4121OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives: To understand the philosophies of various Manufacturing process

Course Outcomes: At the end of the course, for given product, one should be able identify the manufacturing process.

COURSE SYLLABUS

UNIT- I

Casting: Steps involved in making a casting–Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.

Methods of Melting-Cruciblemelting and cupolaoperation– Defects in castings; Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting,shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT- II

Welding: Classification – Types of welds and welded joints; Gas welding-Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermite welding.

Inert Gas Welding - TIG Welding, MIG welding, explosive welding, LaserWelding; Soldering andBrazing; Heat affected zone in welding. Welding defects – causes and

remedies; destructive and non - destructive testingof welds.

UNIT- III

Hot working, cold working, strain hardening, recovery, recrystallisation, and grain growth. Stamping, forming, andother cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and coldspinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT- IV

Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and coldextrusion- Forward extrusion and backward extrusion–Impact extrusion –Extruding equipment– Tube extrusion and pipe making, Hydro static extrusion. Forces in extrusion.

UNIT- V

Forging Processes: Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXTBOOKS:

1. Manufacturing Technology, P.N.Rao, McGrawHill
2. Manufacturing Engineering and Technology, KalpakjinS, Pearson.

REFERENCE BOOKS:

1. Metal Casting, T.V Ramana Rao , NewAge
2. Métal Fabrication Technology , Mukherjee, PHI

TOTAL QUALITY MANAGEMENT

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ME4122OE	Eleective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: No Prerequisites								

COURSE SYLLABUS

UNIT- I

Introduction: The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of ProcessQuality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT- II

Customer Focus and Satisfaction: Process vs. Customer, internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships.

Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the benchmarking procedure, pit falls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM : Stratification, check sheet, Scatter diagram, lshikawa diagram, paneto diagram, Kepner & Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT- V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQCQ- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXTBOOK:

1. Total QualityManagement, Joel E. Ross,Taylor and Franscis Limited
2. Total Quality Management, P.N.Mukherjee, PHI

REFERENCE BOOKS:

1. Beyond TQM, Robert L.Flood
2. Statistical Quality Control, E.L.Grant.
3. Total Quality Management : A Practical Approach, H.Lal
4. Quality Management , Kanishka Bedi , Oxford University Press , 2011
5. Total Engineering Quality Management , Sunil Sharma Macmillan

ENERGY MANAGEMENT AND CONSERVATION

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ME4123OE	Elective	3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: No Prerequisites								

Course Objectives: To acquaint the student with the conventional energy sources and their utilization. To understand the importance of heat recovery and energy conservation methods and energyaudit.

Course Outcomes: Students would have a good knowledge about conventional energy sources and their audit.Ability to apply the fundamentals of energy conservation and management.

COURSE SYLLABUS

UNIT- I

Introduction: Global& Indian Energy Scenario- Classification of Energy sources - Energy needs of growing economy - Energy sector reform, Energy and Environment: Global Environmental Concerns, Basics of Energy and its various forms.

UNIT- II

Energy Audit: Types of energy audit, Energy management (audit) approach understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments.

Material and Energy balance: Facility as an energy system, Methods for preparing process flow, Material and energy balance diagrams.

UNIT- III

Energy Action Planning, Financial Management : Financial analysis techniques - Risk and sensitivity analysis- Financing options, Energy performance contracts and role of ESCOs -Energy Monitoring and Targeting: Elements of monitoring & targeting, Data and information -analysis,Techniques-energy consumption, Production, Cumulative sum of differences (CUSUM).

UNIT- IV

Building Envelope – principles of analysis – Envelope performance -Envelope analysis ofExisting and new buildings – Building standards for new and Existing constructions.HVAC Systems types – Energy conservation opportunities – cooling equipment – Domestic hot water Estimating HVAC Energy consumption.

UNIT- V

Principles of Electric Energy Management, Energy Management control systems – Energy systems maintenance. Energy management in water and waste water treatment – solid waste treatment- air pollution control systems .Energy Management in Boilers and Fired systems - Steam and condensate systems – cogeneration –Waste Heat recovery. Energy Management in Process Industries, Energy Security, Codes, Standards, Electricity Act, Energy Conservation Act.

TEXT BOOKS:

1. Energy Management by Murfy

2. General Aspects of Energy Management and Audit, National Productivity Council of India,Chennai(CourseMaterial-National Certification Examination for Energy Management)

REFERENCE BOOKS:

1. Energy Management Handbook, W.C.Turner, 5th Edition, Marcel Dekker, Inc, NewYork, 2005.
2. Guide to EnergyManagement, B.L.Capehart, W.C.Turner, W.J.Kennedy, CRCPress, New York, 2005.
3. Energy Management by O.P.Collagan

PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS

(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EC4121OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes: NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- To understand the concept of computer communication.
- To learn about the networking concept layered protocols.
- To understand various communications concepts.

Course Outcomes:

- The student can get the knowledge of networking of computers, data transmission between computers.
- Will have the exposure about the various communication concepts.
- Will get awareness about the structure and equipmentof computer network structures.

COURSE SYLLABUS

UNIT- I

Over view of Computer Communications and Networking : Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT- II

Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications ,Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT- III

Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals,data rate and bandwidth reduction, Digital Carrier Systems.

UNIT- IV

Physical and data link layer Concepts: The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer, the logical link control and medium access control sub-layers.

UNIT- V

Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PCcards, bridges, switches, switches Vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H.Hancock, Thomson Brooks/Cole.
2. Data Communications and Networking–Behrouz A.Forouzan, Fourth Edition MC GRAW HILL EDUCATION, 2006.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M.Barry Dumas, Morris Schwartz, Pearson.
2. Computer Networking: A Top-DownApproach Featuring the Internet, James F.Kurose, K.W.Ross, 3rd Edition, Pearson Education

PYTHON PROGRAMMING
(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4121OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Programming for Problem Solving"								

Course Objectives:

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

COURSE OUTCOMES:

- Able to write programs using classes and objects
- Able to develop GUI

COURSE SYLLABUS

UNIT- I

Introduction to Python, Installing Python. How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations,Operators. Type conversions, Expressions, More about Data Output. Decision Structures andBoolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, ComparingStrings,Logical Operators,Boolean Variables.

Repetition Structures: Introduction, while loop, forloop ,Calculating a Running Total, Input Validation Loops, Nested Loops.

Data types and Expressions: Strings, Assignment and Comments, Numeric Data Types and Character Sets, Expressions, Functions and Modules.

UNIT- II

Control Statements: Definite Iteration, Formatting Text for Output, Selection, Conditional Iteration.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files,Processing Records,Exceptions.

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to UseFunctions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions-Generating Random Numbers,The math Module, Storing Functionsin Modules.

UNIT- III

Strings and Text Files: Accessing Characters and Substrings in a String, Strings and Number System, String Methods, Basic String Operations, String Slicing, Testing, Searching,and Manipulating Strings. Text Files, Data Encryption,Lists, Introduction to Lists, Listslicing, Finding Items in Lists with the inOperator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists,Two-Dimensional Lists, Tuples Sequences, Tuples. Dictionaries and Sets: Dictionaries, Sets, Serializing Objects. Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

UNIT- IV

Design with Classes: Classes and Objects, Classes and Functions, Classes and Methods, Working with Instances, Inheritance and Polymorphism. Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, techniques for Designing Classes.

UNIT- V

Graphical User Interfaces: Behavior of terminal based programs and GUI-based programs,Coding simple GUI-based programs, other useful GUI resources. GUI Programming : Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Simple Graphics and Image Processing: Overview of Turtle Graphics, Two dimensional Shapes, Colors and RBG System, Image Processing.

TEXT BOOKS:

1. Kenneth A.Lambert, The Fundamentals of Python : First Programs , 2011, Cengage Learning.
2. Think Python First Edition, by AllenB. Downey, Orielly publishing

REFERENCE BOOKS:

1. Introduction to Computation and Programming Using Python. John V. Guttag, The MIT Press.
2. JamesPayne, Beginning Python using Python 2.6 and Python3 , Wrox publishing
3. Paul Gries, Practical Programming: An Introduction to Computer Science using Python3, The Pragmatic Bookshelf, 2nd edition (4Oct.2013)
4. Charles Dierach, Introduction to Computer Science using Python

R PROGRAMMING
(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4122OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Programming for Problem Solving"								

Course Objectives:

- Understanding and being able to use basic programming concepts
- Automate data analysis
- Working collaboratively and openly on code
- Knowing how to generate dynamic documents
- Being able to use a continuous test-driven development approach

Course Outcomes:

- be able to use and program in the programming language R
- be able to use R to solve statistical problems
- be able to implement and describe Monte Carlothe technology
- be able to minimize and maximize functions using R

COURSE SYLLABUS

UNIT–I

Introduction: Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients,Variable names and assignment, Operators, Integers, Factors, Logical operations

UNIT– II

Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists,Data Frames, Classes

Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector usingsubscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Addingand Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations,Vector Indexing, CommonVector Operations

UNIT–III

Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, DATA FRAMES, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations

UNIT- IV

FACTORS AND TABLES, Factors and Levels , Common Functions Used with Factors,Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Subtable,Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products,Minima andMaxima, Calculus, Functions for Statistical Distributions

UNIT- V

OBJECT- ORIENTED PROGRAMMING : S Classes , S Generic Functions, Writing S Classes, Using Inheritance, SClasses , Writing SClasses , Implementing a Generic Functionon an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation

TEXT BOOKS:

1. R Programming for Data Science by Roger D.Peng
2. The Art of R Programming by Prashanthsingh, Vivek Mourya, Cengage Learning India.

JAVA PROGRAMMING
(Open Elective- II)

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4123OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " Programming for Problem Solving"								

Course Objectives:

- To introduce the object-oriented programming concepts.
- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection frame work and I/O classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

COURSE SYLLABUS

UNIT- I

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding,Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Datatypes, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance–Inheritance concept, Inheritance basics, Member

access, Constructors, Creating Multi level hierarchy, super uses, using final with inheritance, Polymorphism-adhoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT- II

Packages-Defining a Package, CLASSPATH, Access protection, importing packages.Interfaces-defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access fileoperations,The Console class, Serialization, Enumerations, auto boxing ,generics.

UNIT- III

Exceptionhandling-Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions,creating own exception sub classes.

Multithreading-Differences between thread-based multitasking and process-based multitasking, Java thread model,creating threads, thread priorities, synchronizing threads,inter threadcommunication.

UNIT- IV

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators,Collection algorithms, Arrays, The Legacy Classes and Interfaces-Dictionary, Hashtable, Properties, Stack, Vector More Utility classes, String Tokenizer, BitSet ,Date, Calendar, Random, Formatter, Scanner

UNIT- V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout,

Grid Bag Layout.

Event Handling- The Delegation event model-Events, Event sources, Event Listeners, Event classes, Handling mouse and key board events, Adapter classes, Innerclasses, Anonymous Innerclasses.

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications , passing parameters to applets. Creatinga Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons**- JButton, JToggle Button, JCheckBox, JRadioButton, JTabbedPane, JScrollPane, JList, JComboBox, SwingMenus, Dialogs.

TEXT BOOKS:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt.Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J. Nino and F.A.Hosch, John Wiley & sons
2. Introduction to Java programming, Y.Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. RadhaKrishna, University Press.
4. Programming in Java, S.Malhotra, S.Chudhary, 2nd edition, Oxford Univ.Press.
5. Java Programming and Object-oriented Application Development, R.A.Johnson, Cengage Learning.

INFORMATION SECURITY AND DATA MINING LAB

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4103PC	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	**0**	**2**	**1**	**30**	**70**	**100**
Contact classes: NIL	**Tutorial Classes : NIL**	**Practical classes : 36**				**Total Classes :36**		
Prerequisites: A course on " Programming for Problem Solving"								

Information Security Lab Experiments:

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.

2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

3. Write a Java program to perform encryption and decryption using the following algorithms
   a. Ceaser cipher b. Substitution cipher c. Hill Cipher

4. Write a C/JAVA program to implement the DES algorithm logic.

5. Write a C/JAVA program to implement the Blow fish algorithm logic.

6. Write a C/JAVA program to implement the Rijndael algorithm logic.

7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blow fish. Create your own key using Java key tool.

8. Write a Java program to implement RSA algorithm.

9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and Java Script.

10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

11. Calculate the message digest of a text using the MD5 algorithmin JAVA.

Data Mining Lab Experiments:

Course Objectives:

- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

List of Sample Problems:

Task1: 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 fore most 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 text book on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules.Here is one such dataset, consisting of 1000 actual cases collected in Germany. Credit dataset (original) Excel spread sheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment.(Unless you really can consult a real loan officer!)

A few notes on the German data set

1. DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (butlooks andacts like aquarter).
2. owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
3. Foreign_worker.There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
4. There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

INTELLECTUAL PROPERTY RIGHTS

B.Tech. IV Year I Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
***MC4001**	**Mandatory**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**0**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

UNIT – I

Introduction to Intellectual property:

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks:

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

UNIT – III

Law of copy rights:

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets:

Trade secretes law, determination of trade secretes status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation. Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V

New development of intellectual property:

New developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.

ORGANIZATIONAL BEHAVIOUR

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
SM4201MS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on " BEFA"								

Course Objectives: The objective of the course is to provide the students with the conceptual frame work and the theories underlying Organizational Behaviour.

COURSE SYLLABUS

UNIT- I:

Introduction to OB-Definition, Nature and Scope – Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organizational Behaviour. Cognitive Processes - I:Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization–Social perception – Attribution Theories– Locus of control – Attribution Errors –Impression Management.

UNIT- II:

Cognitive Processes-II: Personality and Attitudes – Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organizational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation - Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

UNIT- III:

Dynamics of OB-I: Communication – types – interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision-making techniques – creativity and group decision making. Dynamics of OB – II Stress andConflict: Meaning and types of stress – Meaning and types of conflict - Effect of stress

and intra-individual conflict-strategies to cope with stressand conflict.

UNIT- IV:

Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs.Teams – Nature of groups – dynamics of informal groups – dysfunctions of groups and teams – teamsinmodern workplace.

UNIT- V:

Leading High performance: Job design and Goal setting for High performance- Quality of Work Life - Socio technical Design and High-performance work practices-Behavioural performance management: reinforcement and punishment as principles of Learning - Process of Behavioural modification - Leadership theories-Styles, Activities and skills of Great leaders.

REFERENCE BOOKS:

1. Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
2. Mc Shane: Organizational Behaviour,3e, TMH, 2008
3. Nelson: Organizational Behaviour,3/e, Thomson, 2008.
4. Newstrom W.John & Davis Keith, Organisational Behaviour -- Human Behaviourat Work, 12/e, TMH, New Delhi, 2009.
5. Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009.
6. Robbins, P.Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/ Pearson, NewDelhi, 2009.
7. Pareek Udai: Behavioural Processat Work: Oxford & IBH, NewDelhi, 2009.
8. Schermer horn: Organizational Behaviour 9/e, Wiley, 2008.
9. Hitt: Organizational Behaviour, Wiley, 2008
10. Aswath appa: Organisational Behaviour, 7/e, Himalaya, 2009
11. Mullins: Management and Organisational Behaviour, Pearson, 2008.
12. Mc Shane, Glinow: Organisational Behaviour--Essentials, TMH, 2009.
13. Ivan cevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

COMPUTATIONAL COMPLEXITY

(Professional Elective-VI)

B.Tech. IV Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS4203PE	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		

Prerequisites:

1. **A course on "Computer Programming and Data Structures"**
2. **A course on "Discrete Structures and Graph Theory**"

Course Objectives:

- Introduces to theory of computational complexity classes
- Discuss about algorithmic techniques and application of these techniques to problems.
- Introduce to randomized algorithms and discuss how effective they are in reducing time and space complexity.
- Discuss about Graph based algorithms and approximation algorithms
- Discuss about search trees

Course Outcomes:

- Ability to classify decision problems into appropriate complexity classes
- Ability to specify what it means to reduce one problem to another, and construct reductions for simple examples.
- Ability to classify optimization problems into appropriate approximation complexity classes
- Ability to choose appropriate data structure for the given problem
- Ability to choose and apply appropriate design method for the given problem

COURSE SYLLABUS

UNIT- I

Computational Complexity: Polynomial time and its justification, Non trivial examples of polynomial - time algorithms, the concept of reduction (reducibility), Class P Class NP and NP- Completeness, The P versus NP problem and why it' s hard

UNIT- II

Algorithmic paradigms: Dynamic Programming–Longest common subsequence, matrix chain multiplication, knapsack problem, Greedy – 0-1 knapsack, fractional knapsack, scheduling problem, Huffman coding, MST, Branch-and-bound – travelling sales person problem, 0/1 knapsack problem, Divide and Conquer – Merge sort,binary search, quicksort.

UNIT- III

Randomized Algorithms: FingerPrinting, Pattern Matching, Graph Problems, Algebraic Methods, Probabilistic Primality Testing, De-Randomization Advanced Algorithms.

UNIT- IV

Graph Algorithms: Shortest paths, Flow networks, Spanning Trees; Approximation algorithms, Randomized algorithms. Approximational gorithms: Polynomial Time Approximation Schemes.

UNIT- V

Advanced Data Structures and applications: Decision Trees and Circuits, B-Trees, AVL Trees, Red and Black trees, Dictionaries and tries, Maps, Binomial Heaps, Fibonacci Heaps, Disjoint sets, Union by Rank and Path Compression

TEXTBOOKS:

1. T.Cormen, C. Leiserson, R.Rivestand C.Stein, Introduction to Algorithms, Third Edition, McGraw-Hill, 2009.
2. R.Motwaniand P.Raghavan Randomized Algorithms, Cambridge University Press, 1995.
3. J.J. Mc Connell, Analysis of Algorithms: An Active Learning Approach, Jones & Bartlett Publishers, 2001.
4. D.E. Knuth, Art of Computer Programming, Volume 3, Sorting and Searching, Second Edition, Addison- Wesley Professional, 1998.
5. S.Dasgupta, C. H. Papadimitriou and U.V.Vazirani,Algorithms, McGraw-Hill, 2008.

DISTRIBUTED SYSTEMS

(Professional Elective- VI)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4204PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		

Prerequisites

1. **A course on "Operating Systems"**
2. **A course on "Computer Organization & Architecture**"

Course Objectives

- This course provides an insight into Distributed systems.
- Topics include-Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Course Outcomes

- Ability to understand Transactions and Concurrency control.
- Ability to understand Security issues.
- Understanding Distributed shared memory.
- Ability to design distributed systems for basic level applications.

COURSE SYLLABUS

UNIT- I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Inter networking, Inter process Communication , Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study- Java RMI.

UNIT- II

Operating System Support-Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture.

UNIT- III

Peer to Peer Systems – Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies- Squirrel, Ocean Store.
Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.
Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT- IV

Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Time stamp ordering. Distributed Transactions - Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

UNIT- V

Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.
Distributed shared memory, Design and Implementation issues, Consistency models.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kind berg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh,Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Systems–Principles and Paradigms, A.S.Tanenbaumand M.V.Steen, Pearson Education.
2. Distributed Computing, Principles, Algorithms and Systems, Ajay D.Kshemakalyani and MukeshSinghal, Cambridge, rp 2010.

NEURAL NETWORKS & DEEP LEARNING

(Professional Elective- VI)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4205PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: A course on "Machine Learning"								

Course Objectives:

- To introduce the foundations of Artificial Neural Networks
- To acquire the knowledge on Deep Learning Concepts
- To learn various types of Artificial Neural Networks
- To gain knowledge to apply optimization strategies

Course Outcomes:

- Ability to understand the concepts of Neural Networks
- Ability to select the Learning Networks in modeling real world systems
- Ability to use an efficient algorithm for Deep Models
- Ability to apply optimization strategies for large scale applications

COURSE SYLLABUS

UNIT- I

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back-propagation Network.Associative Memory Networks.Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT- II

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter PropagationNetworks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

UNIT- III

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed - forward networks,Gradient-Based learning, Hidden Units, Architecture Design, Back- Propagation and Other Differentiation Algorithms

UNIT- IV

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under -Constrained Problems, Dataset Augmentation, Noise Robustness, Semi -Supervised learning, Multi-task learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Propand Manifold, Tangent Classifier

UNIT- V

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms,Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms

Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing

TEXTBOOKS:

1. Deep Learning: An MIT Press Book By Ian Good fellow and Yoshua Bengioand Aaron Courville
2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall.

HUMAN COMPUTER INTERACTION

(Professional Elective- VI)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4206PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives : To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you within valuable team-work experience.

CourseOutcomes:

- Ability to apply HCI and principles to interaction design.
- Ability to design certain tools for blind or PH people.

COURSE SYLLABUS

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, Webuser – 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.

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 ofinformation – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics– Technological consideration in interface design.

UNIT- III

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- IV

HCI in the software process,The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Gold enrules and heuristics HCI patterns Evaluation techniques,Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method.Universal design, Universal design principles Multi - modal interaction

UNIT- V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus:Getting the size right.

TEXT BOOKS:

1. The essential guide to user interface design,Wilbert O Galitz, Wiley Dream Tech.Units 1,2,3
2. Human – Computer Interaction. AlanDix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg,Pearson Education Units4,5

REFERENCE BOOKS:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece,Rogers, Sharps.Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human–Computer Interaction, D.R.Olsen,Cengage Learning.
5. Human– Computer Interaction, Smith- Atakan, Cengage Learning.

CYBER FORENSICS

(Professional Elective-VI)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4207PE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites : Network Security								

Course Objectives:

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- Inorder to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

Course Outcomes:

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics

COURSE SYLLABUS

UNIT- I

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology –Steps-Activities in Initial Response, Phase after detection of an incident

UNIT- II

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication : Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate /Qualified Forensic Duplicate of a Hard Drive

UNIT- III

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

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools,computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles 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 cellphones and mobile devices.

UNIT- V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft FileStructures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft start up tasks, MS-DOS start up tasks, virtual machines.

TEXTBOOKS:

1. Kevin Mandia, Chris Prosise, “Incident Response and computer forensics”, Tata McGraw Hill,2006.

REMOTE SENSING AND GIS
(Open Elective-III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CE4231OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: **Surveying**								

Course Objectives: This course will make the student to understand about the principles of GIS, Remote Sensing, Spatial Systems, and its applications to Engineering Problems.

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

- Retrieve the information content of remotely sensed data
- Analyze the energy interactions in the atmosphere and earth surface features
- Interpret the images for preparation of the matic maps
- Apply problem specific remote sensing data for engineering applications
- Analyze spatial and attribute data for solving spatial problems
- Create GIS and cartographic outputs for presentation

COURSE SYLLABUS

UNIT– I

Introduction to Photogrammetry: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT– II

Remote Sensing: Basic concept of remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process. Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil,water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite ,introduction to digital data, elements of visual interpretation techniques.

UNIT– III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input-Attribute data Management–Data display-Data Exploration-Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters- Commonly used Map Projections -Projected coordinate Systems

UNIT– IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object BasedVector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT– V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, DataEditing

TEXT BOOKS:

1. Remote Sensing and GIS Lilles and and Kiefer , JohnWilley2008.
2. Remote Sensing and GIS B.Bhatta by Oxford Publishers 2015.
3. Introduction to Geographic Information System–Kang-Tsung Chang, McGraw-Hill 2015

REFERENCES:

1. Concepts & Techniques of GIS by C.P. Lo Albert, K.W.Yonng, Prentice Hall (India) Publications.
2. Principals of Geophysical Information Systems – Peter A Burragh and Rachael A.Mc Donnell, Oxford Publishers 2004.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

DISASTER MANAGEMENT
(Open Elective-III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE4232OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- The subject provides different disasters, tools and methods for disaster management.

Course Outcomes:

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

- Understand Disasters, man-made Hazards and Vulnerabilities
- Understanding disaster management mechanism
- Understanding capacity building concepts and planning of disaster managements

COURSE SYLLABUS

UNIT- I

Understanding Disaster: Concept of Disaster - Different approaches- Concept of Risk – Levels of Disasters –Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency andforewarning 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 : Capacity Building : Concept-Structural and Non structural Measures Capacity Assessment; Strengthening Capacity for Reducing Risk - 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. Manual on Disaster Management, National Disaster Management, Agency Govt of India.

2. Disaster Management by Mrinalini Pandey Wiley 2014.

3. Disaster Science and Management by T.Bhattacharya, Mc Graw Hill Education (India) Pvt Ltd Wiley 2015

REFERENCES:

1. Earth and Atmospheric Disasters Management, N.Pandharinath, CK Rajan, BS Publications 2009.

2. National Disaster Management Plan, Ministry of Home affairs, Government of India (http : //www.ndma.gov.in /images /policyplan /dmplan/draftndmp.pdf)

INSTRUMENTATION AND CONTROL

(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
EE4231OE	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisite: Basic Electrical Engineering, Analog Electronics, Mathematics								

Course objectives:

- To introduce the basic principles of all measuring instruments
- To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.
- To understand the basic concepts of Control Engineering

Course Outcomes :

After completion of this course, the student able to

- Understand different types of measuring instruments, their construction, operation and characteristics
- Identify the instruments suitable for typical measurements
- Apply the knowledge about transducers and instrument transformers to use them effectively.
- Apply the knowledge of basic control engineering.

COURSE SYLLABUS

UNIT–I

Characteristics of Signals : Measuring Systems, Performance Characteristics-Static characteristics, Dynamic Characteristics; Errors in Measurement- Gross Errors, Systematic Errors, Statistical Analysis of Random Errors.

UNIT–II

Oscilloscope: Cathode ray oscilloscope - Cathode ray tube-time base generator-horizontal and vertical amplifiers - CRO probes-applications of CRO-Measurement of phase and frequency-lissajous

patterns - Sampling oscilloscope - analog and digitaltype.

UNIT–III

Transducers: Definition of transducers, Classification of transducers, Advantages of electrical transducers, Characteristics and choice of transducers; Principle of operation of resistor, inductor, LVDT and capacitor transducers.

UNIT–IV

Measurement of Non-Electrical Quantities: Measurement of strain, Gauge sensitivity, Displacement, Force Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure,Vacuum,Flow

UNIT–V

Introduction to Control System: Concepts of Control Systems- Open Loop and closed loop control systems and their differences - Different examples of control systems-Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations - Impulse Response and transfer functions - Translational and Rotational mechanical systems.

TEXTBOOKS:

1. G.K.Banerjee,"Electrical and Electronic Measurements",PHI Learning Pvt.Ltd.,2nd Edition, 2016
2. S.C.Bhargava,"Electrical Measuring Instruments and Measurements", BS Publications, 2012.
3. B.C.Kuo, "Automatic Control System", Prentice Hall,1995

REFERENCES:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co.Publications, 2005.
2. R.K.Rajput, "Electrical & Electronic Measurement & Instrumentation", S.Chandand Company Ltd., 2007.
3. Buckinghamand Price,"Electrical Measurements", Prentice–Hall, 1988.
4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", NewAge International(P) Limited Publishers,1st Edition 2010.
5. E.W.Goldingand F.C.Widdis, "Electrical Measurements and measuring Instruments", fifth Edition,Wheeler Publishing, 2011.

ENERGY STORAGE SYSTEMS
(Open Elective - III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EE4232OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisite: Electro chemistry								

Course Objective:

- To enable the student to understand the need for energy storage, devices and technologies available and their applications.

Course Outcomes:

After completion of this course,the student will be able to

- Analyze the characteristics of energy from various sources and need for storage.
- Classify various types of energy storage and various devices used for the purpose.
- Identify various real time applications.

COURSE SYLLABUS

UNIT- I

Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and theroles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in powergrids, Transmission by cable.

UNIT- II

Needs for Electrical Energy Storage: Emerging needs for EES, More renewable energy, less fossil fuel, Smart Griduses, The roles of electrical energy storage technologies, The roles from the view point of a utility, The roles from the view point of consumers, The roles from the view point of generators of renewable energy.

UNIT- III

Features of Energy Storage Systems: Classification of EES systems , Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Fly wheel energy storage (FES), Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2), Synthetic naturalgas(SNG).

UNIT- IV

Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors (DLC), Super conducting magnetic energy storage(SMES), Thermal storage systems, Standards for EES, 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.

TextBooks:

1. "James M.Eyer, Joseph J.Iannucci and Garth P.Corey","Energy Storage Benefits and Market Analysis", Sandia National Laboratories, 2004.
2. The Electrical Energy Storage by IEC Market Strategy Board.

Reference Book:

1."Jim Eyer, Garth Corey", Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Sandia National Laboratories, Feb201

RELIABILITY ENGINEERING
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME4231OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites : Mathematics II								

Course Objectives:

- To introduce the basic concepts of reliability, various models of reliability
- To analyze reliability of various systems
- To introduce techniques of frequency and duration for reliability evaluation of repairable systems.

Course Outcomes:

After completion of this course, the student will be able to

- model various systems applying reliability networks
- evaluate the reliability of simple and complex systems
- estimate the limiting state probabilities of repairable systems
- applyvarious mathematical models for evaluating reliability of irreparable systems

COURSE SYLLABUS

UNIT- I

Basic Probability Theory: Elements of probability, probability distributions, Random variables, Densityand Distribution functions-Binomial distribution-Expected value and standard deviation

- Binomial distribution, Poisson distribution, normal distribution, exponential distribution, Weibull distribution.

Definition of Reliability: Definition of terms used in reliability, Component reliability, Hazardrate, derivation of the reliability function in terms of the hazard rate. Hazard models - Bath tubcurve, Effect of preventive maintenance. Measures of reliability: Mean Time to Failure and Mean Time between Failures.

UNIT–II

Network Modeling and Evaluation of Simple Systems: Basic concepts- Evaluation of network Reliability / Unreliability - Series systems, Parallel systems- Series-Parallel systems partially redundant systems-Examples.

Network Modeling and Evaluation of Complex systems: Conditional probability methodtieset, Cutset approach- Event tree and reduced event tree methods- Relationships between tie and cutsets - Examples.

UNIT–III

Time Dependent Probability: Basic concepts-Reliability function f(t).F(t), R(t) and h(t)- Relationship between these functions.

Network Reliability Evaluation Using Probability Distributions: Reliability Evaluation of Series systems, Parallel systems – Partially redundant systems-determination of reliability measure- MTTF forseries and parallel systems–Examples.

UNIT–IV

Discrete Markov Chains: Basic concepts-Stochastic transitional probability matrix- time dependent probability evaluation-Limiting State Probability evaluation-Absorbing states – Examples.

Continuous Markov Processes: Modeling concepts-State space diagrams- Unreliability evaluation of single and two component repairable systems

UNIT–V

Frequency and Duration Techniques: Frequency and duration concepts, application to multistate problems, Frequency balance approach.

Approximate System Reliability Evaluation: Series systems – Parallel systems- Networkr eduction techniques - Cut set approach - Common mode failures modeling and evaluation techniques - Examples.

TEXT BOOKS:

1. Roy Billinton and Ronald N Allan, Reliability Evaluation of Engineering Systems, Plenum Press, 1983.
2. E.Balagurusamy, Reliability Engineering by Tata McGraw- Hill Publishing Company Limited, 2002.

REFERENCE BOOK:

1. K.K.Agarwal, Reliability Engineering-Kluwer Academic Publishers, 1993.

INDUSTRIAL MANAGEMENT
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
ME4232OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course objectives:

- Understand the philosophies of management gurus
- Understand the various types of organization structures and their features, and theiradvantages and disadvantages.
- Learning various Industrial Engineering Practices like Operations Management techniques, work study, statistical quality control techniques, Job evaluation techniques and network analysis techniques.

Course outcomes:

- Able to apply principles of management
- Able to design the organization structure
- Able to apply techniques for plant location, design plant layout and value analysis
- Able to carry out work study to find the best method for doing the work and establish standard time for a given method
- Able to apply various quality control techniques and sampling plans
- Able to do job evaluation and network analysis.

COURSE SYLLABUS

UNIT-I

Introduction to Management : Entrepreneurship and organization- Nature and Importance of Management,

Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management

UNIT-II

Designing Organizational Structures: Departmentalization and Decentralization, Types of Organization structures- Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

UNIT-III

Operations Management: Objectives-productde sign process - Processselection -Types of production system (Job, batch and Mass Production), Plant location- factors-Urban -Ruralsites comparison - Types of Plant Layouts - Design of product layout - Line balancing (RPW method) Value analysis - Definition-types of values - Objectives - Phases of value analysis- Fast diagram

UNIT-IV:

Work Study: Introduction-definition-objectives-steps in work study-Method study-definition, objectives-steps of method study.Work Measurement - purpose - types of study-

stop watch methods-steps-key rating-allowances-standard time calculations -work sampling.

Statistical Quality Control: variables-attributes, Shewart control charts for variables- chart, Rchart, - Attributes- Defective-Defect- Charts for attributes - p-

chart - c chart (simple Problems), Acceptance Sampling - Single sampling-Double sampling plans-OC curves.

UNIT-V

Job Evaluation: Methods of job evaluation - simple routing objective systems - classification method factor comparison method, point method, benefits of job evaluation and limitations. Project Management(PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project with in given time, Project Cost Analysis, Project Crashing. (Simple problems)

TEXT BOOKS:

1. Industrial Engineering and Management, O.P.Khanna, Khanna Publishers.
2. Industrial Engineering and Management Science

T.R. Banga and S.C.Sarma, KhannaPublishers.

REFERENCE BOOKS:

1. Motion and Time Study by Ralph M Barnes! John Willey & SonsWork Study by lLO.
2. Humanfactors in Engineering & Design, Ernest JMc Cormick, TMH.
3. Production & Operation Management, Paneer Selvam, PHI.
4. Industrial Engineering Management, NVSRaju, Cengage Learning.
5. Industrial Engineering Hand Book, Maynard.
6. Industrial Engineering ManagementI Ravi Shankar, Galgotia.

RENEWABLE ENERGY SOURCES
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME4233OE	**Elective**	**3**	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites : No Prerequisites								

Course Objectives:

- To explain the concepts of Non-renewable and renewable energy systems
- To outline utilization of renewable energy sources for both domestic and industrial applications
- To analyse the environmental and cost economics of renewable energy sources incomparison with fossil fuels.

Course Outcomes:

- Understanding of renewable energy sources
- Knowledge of working principle of various energy systems
- Capability to carryout basic design of renewable energy systems

COURSE SYLLABUS

UNIT-I

Global and National Energy Scenario: Over view of conventional & renewable energy sources, need & development of renewable energy sources, types of renewable energy systems, Future of Energy Use, Global and Indian Energy scenario, Renewable and Non-renewable Energy sources, Energy for sustainable development, Potential of renewable energy sources, renewable electricityand key elements, Global climate change, CO2 reduction potential of renewable energy-concept of Hybrid systems.

UNIT-II

Solar Energy: Solar energy system, Solar Radiation, Availability, Measurement and Estimation, Solar Thermal Conversion Devices and Storage, Applications Solar Photovoltaic Conversion solar photo voltaic, solar thermal, applications of solar energy systems.

UNIT-III

Wind Energy: Wind Energy Conversion, Potential Wind energy potential measurement, Sites election, Types of wind turbines, Wind farms, wind Generation and Control. Nature of the wind, power in the wind, factors influencing wind, wind data and energy estimation, wind speed monitoring, classification of wind, characteristics, applications of wind turbines, off shore wind energy-Hybrid systems, wind resource assessment, Betzlimit, site selection, wind energy conversion devices. Safety and environmental aspects, wind energy potential and installation in India.

UNIT-IV

Biogas: Properties of biogas (Calorific valueand composition), bio gas plant technology andstatus, Bio energy system, design and constructional features. Bio mass resources and their classification, Biomass conversion processes, Thermo chemical conversion, direct combustion, biomass gasification, pyrolysis and liquefaction, biochemical conversion, anaerobic digestion,types of biogas Plants, applications, alcohol production from biomass, bio diesel production, Urban waste to energy conversion, Bio mass energy programme in India.

UNIT-V

Ocean Energy: Ocean wave energy conversion, principle of Ocean Thermal Energy Conversion (OTEC), ocean thermal power plants, tidal energy conversion, Tidal and wave energy its scope and development, Scheme of development of tidal energy.

Small hydro Power Plant: Importance of small hydro power plants and their Elements, types of turbines for small hydro, estimation of primary and secondary power.

Geo thermal Energy: Geothermal power plants, types of geothermal resources, hot springs and steamejection.

TEXT BOOKS:

1. Renewable Energy Sources /Twidell, J.W.and Weir,A./ EFN Spon Ltd.,1986.
2. Non-Conventional Energy Sources /G.D Rai /Khanna Publishers

REFERENCE BOOKS:

1. Kishore VVN, Renewable Energy Engineering and Technology, Teri Press, New Delhi, 2012
2. Godfrey Boyle, Renewable Energy, Power for a Sustainable Future, Oxford University Press, U.K, 1996.
3. Non-Conventional Energy Resources by EH Khan

ELECTRONIC MEASURING INSTRUMENTS
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
EC4231OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

1. It provides an understanding of various measuring systems functioning and metrics for performance analysis.
2. Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signalan alyzers, recorders and measuring equipment.
3. Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

Course Outcomes: On completion of this course student can be able to

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

COURSE SYLLABUS

UNIT- I

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

UNIT- II

Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Squarewave Generators, Function Generators, Arbitrary Wave form Generator, and Specifications.

UNIT- III

Measuring Instruments: DC Voltmeters, D'Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohm meters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments. CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes.

UNIT- IV

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

UNIT- V

Transducers: Classification, Strain Gauges, Bounded, unbounded; orceand Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperatures ensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

TEXTBOOKS:

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

REFERENCES:

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

MACHINE LEARNING
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4231OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand arange of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

Course Outcomes :

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity

COURSE SYLLABUS

UNIT–I

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology. Overview of Machine learning, related areas and applications. Linear Regression, Multiple Regression, Logistic Regression, logistic functions. **Concept Learning**: Version spaces. Inductive Bias. Activequeries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

UNIT– II

Decision Tree Learning: - Minimum Description Length Principle. Occam's razor. Learning with active queries Introduction to information theory, Decision Trees, Cross Validation and Over fitting. **Neural Network Learning**: Perceptions and gradient descent back propagation, multilayer networks and back propagation.

UNIT–III

Sample Complexity and Over fitting: Errors in estimating means. Cross Validation and jack knifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

Support Vector Machines: functional and geometric margins, optimum margin classifier,constrained optimization, Lagrange multipliers, primal/dual problems, KKT conditions, dualofthe optimum margin classifier, soft margins, and kernels.

Bayesian Approaches: The basics Expectation Maximization. Bayes theorem, Naïve Bayes Classifier, Markov models, Hidden Markov Models

UNIT- IV

Instance-based Techniques: Lazy vs. eager generalization. K nearest neighbor, case- basedreasoning.

Clustering and Unsupervised Learning: K-means clustering, Gaussian mixture density estimation, model selection

UNIT- V

Genetic Algorithms:Different search methods for induction - Explanation-based Learning : using prior knowledge to reduce sample complexity.

Dimensionality reduction : feature selection, principal component analysis, linear discriminant analysis, factor analysis, independent component analysis, multidimensional scaling, manifold learning

TEXTBOOKS:

1. Tom Michel, Machine Learning, McGrawHill,1997
2. Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements of Statically Learning, Springer Verlag, 2001

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge UnivPress.
2. Richardo. Duda, Peter E.Hartand David G.Stork, pattern classification, John Wiley & Sons Inc.,2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

CLOUD COMPUTING

(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS4232OE	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact classes: 60	Tutorial Classes : NIL	Practical classes : NIL				Total Classes :60		
Prerequisites: No Prerequisites								

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes:

- Ability to underst and the virtualization and cloud computing concepts.

COURSE SYLLABUS

UNIT- I

Systems Modeling, Clustering and Virtualization : Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT- II

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT- III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS /SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments usingaclusterasa Service,Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT- IV

Monitoring, Management and Applications : An Architecture for Federated Cloud Computing , SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Cloud s, Resource Cloud Mashups.

UNIT- V

Governance and Case Studies: Organizational Readiness and Change management in the Cloudage, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXTBOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M.Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, JackJ. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, To by J.Velte, Robert Elsenpeter, Tata Mc Graw Hill , rp 2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese,O'Reilly,SPD, rp 2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather,Subra Kumaraswamy, Shahed Latif, O' Reilly, SPD, rp 2011.

NATURAL LANGUAGE PROCESSING
(Open Elective- III)

B.Tech. IV Year II Semester								
Course Code	**Categery**	**Hours / Week**			**Credits**	**Maximum Marks**		
CS4233OE	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**30**	**70**	**100**
Contact classes: 60	**Tutorial Classes : NIL**	**Practical classes : NIL**				**Total Classes :60**		
Prerequisites: No Prerequisites								

Course Objectives:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
- Able to manipulate probabilities, construct statistical models over strings andtrees,and estimate parameters using supervised and unsupervised training methods.
- Able to design, implement,and analyze NLP algorithms
- Able to design different language modeling Techniques.

COURSE SYLLABUS

UNIT- I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Findingthe Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT- II

Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure , Parsing Algorithms, Models for Ambiguity Resolutionin Parsing, Multilingual Issues

UNIT- III

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms,Word Sense Systems, Software.

UNIT- IV

Predicate- Argument Structure, Meaning Representation Systems,Software.

UNIT- V

Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure **Language Modeling :** Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling

TEXTBOOKS:

1. Multilingual natural Language Processing Applications : FromTheory to Practice–Daniel M.Bikeland Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval : Tanvier Siddiqui, U.S.Tiwary

REFERENCE BOOK:

1.Speech and Natural Language Processing-Daniel Jurafsky & James HMartin, Pearson Publications