ACADEMIC REGULATIONS - 2020

1. Award of B.Tech. Degree

A student will be declared eligible, for the award of the B. Tech. degree, if he/she fulfills the following academic regulations.

(a) B.Tech. Program (Regular scheme of 4 Year):

- Effective for the students admitted into first year from the academic year 2020-2021 and onwards
- Pursued a course of study for not less than four academic years and not more thaneight academic years.
- Students, who fail to complete their four years course of study within eight years or fail to acquire **160** Credits for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Program and their admission shall stand cancelled.
- Students can also register for a greater number of credits from elective courses, however only one elective will be considered from that group to get the total **160**credits.
- A student shall be eligible for the award of B.Tech degree with Honors or Minor ifhe/she earns 20 credits in addition to the 160 credits. A student shall be permittedto register either for Honors or for Minor and not for both simultaneously.

(b) B.Tech. Program (Lateral Entry Scheme of 3 Year)

- Effective for the students admitted into second year under lateral entry schemefrom the academic year 2020-2021 and onwards.
- Pursued a course of study for not less than three academic years and not more thansix academic years.
- Registered for 121 credits and secured 121 credits with compulsory subjects.
- Students can also register for more number of electives from the group of electivesunder any elective course. However, only one elective course of the group will be considered for awarding credits.

2. Award of Honors Degree

- Students of a Department/Discipline are eligible to opt for Honors Programee offered by the same Department/Discipline. A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired a minimum of 8.0 SGPA up to the end of 2nd semesterwithout any backlogs. In case of the declaration of the 3rd semester results after the commencement of the 4th semester and if a student fails to score the required minimum of 8 SGPA, his/her registration for Honors Programme stands cancelledand he/she shall continue with the regular Programme.
- Students can select the additional and advanced courses from their respective branch in which they are pursuing the degree and get an honors degree in the same. Example: ***If an Electrical & Electronics Engineering student completes the selected advanced courses from same branch under this scheme, he/she will be awarded B.Tech. (Honors) in Electrical & Electronics Engineering.***

- In addition to fulfilling all the requisites of a Regular B.Tech Programme, a studentshall earn 20 additional credits to be eligible for the award of B. Tech (Honors) degree. This is in addition to the credits essential for obtaining the Under GraduateDegree in Major Discipline (i.e. 160 credits).
- Of the 20 additional Credits to be acquired, 16 credits shall be earned by undergoing specified courses listed as pools, with four courses, each carrying 4 credits. The remaining 4 credits must be acquired through two Massive Open Online Courses (MOOCs), which shall be domain specific, each with 2 credits and with a minimum duration of 8/12weeks as recommended by the Board of studies.
- It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. The courses offered in each pool shall be domain specific courses and advanced courses.
- The concerned Board of Studies (BoS) shall decide on the minimum enrolments foroffering Honors program by the department. If minimum enrolments criteria are not met then the students shall be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation withBoS.
- Each pool can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately. The concerned BoS shall explore the possibility of introducing virtual labs for such courses with lab component.
- MOOC courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from theagencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade tobe assigned will be as decided by the college academic council.
- The concerned BoS shall also consider courses listed under professional electives of the respective B. Tech programs for the requirements of B. Tech (Honors). However,a student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.
- If a student drops or is terminated from the Honors program, the additional creditsso far earned cannot be converted into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.
- In case a student fails to meet the CGPA requirement for Degree with Honors at any point after registration, he/she will be dropped from the list of students eligible for Degree with Honors and they will receive regular B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

- Honors must be completed simultaneously with a major degree program. A student cannot earn Honors after he/she has already earned bachelor's degree.

3. Award of Minor Degree

- a) Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parent department. For example, If Electrical & Electronics Engineering student selects subjects from other Engineering branches under this scheme, he/she will get Major degree of Electrical & Electronics Engineering with minor degree of other Engineering branches.

  (b) Student can also opt for Industry relevant tracks of any branch to obtain the Minor Degree, for example, a B.Tech Electrical & Electronics Engineering student can opt for the industry relevant tracks proposed by the departments.

- The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the minor tracks can be the fundamental courses in EEE, CSE, CSDS, CSBS ECE,CE,ME etc or industry tracks such as Electric Vehicles (EV), Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, , Robotics, VLSI etc.
- The list of disciplines/branches eligible to opt for a particular industry relevant minor specialization shall be clearly mentioned by the respective BoS.
- The College offers minor programs in emerging technologies based on expertise in the respective departments or can explore the possibility of collaborating with the relevant industries/agencies.
- The concerned BoS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BoS.
- A student shall be permitted to register for Minors program at the beginning of 4th semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 8 SGPA (Semester Grade point average) up to the end of 2nd semester without any history of backlogs. It is expected that the 3rd semester results may be announced after the commencement of the 4th semester. If a student fails to acquire 8 SGPA up to 3rd semester or failed in any of the courses, his registration for Minors program shall stand cancelled. An SGPA of 8 has to be

maintained in the subsequent semesters without any backlog in order to keep the Minors registration active.

- A student shall earn additional 20 credits in the specified area to be eligible for the award of B. Tech degree with Minor. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits).
- Out of the 20 Credits, 16 credits shall be earned by undergoing specified courses listed by the concerned BoS along with prerequisites. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. If a course comes with a lab component, that component has to be cleared separately. A student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.
- In addition to the 16 credits, students must pursue at least 2 courses through MOOCs. The courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned as decided by the college academic council.
- Student can opt for the Industry relevant minor specialization as approved by the concerned departmental BoS. Student can opt the courses from Skill Development Corporation (APSSDC) or can opt the courses from an external agency recommended and approved by concerned BOS and should produce course completion certificate. The Board of studies of the concerned discipline of Engineering shall review such courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest skills based on industrial demand.
- A committee should be formed at the level of College/Universities/department to evaluate the grades/marks given by external agencies to a student which are approved by concerned BoS. Upon completion of courses the departmental committee should convert the obtained grades/marks to the maximum marks assigned to that course. The controller of examinations can take a decision on such conversions and may give appropriate grades.
- If a student drops (or terminated) from the Minor program, they cannot convert the earned credits into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such

cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.

- In case a student fails to meet the CGPA requirement for B.Tech degree with Minorat any point after registration, he/she will be dropped from the list of students eligible for degree with Minors and they will receive B. Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.
- Minor must be completed simultaneously with a major degree program. A studentcannot earn the Minor after he/she has already earned bachelor's degree.

4. Industrial Collaborations (Case Study)

Industry-Institution linkages refer to the interaction between firms and college orpublic research centers with the goal of solving technical problems, working on R&D, innovation projects and gathering scientific as well as technological knowledge. It involves the collaboration of Industries and Universities in various areas that would foster the research ecosystem in the country and enhance growthof economy, industry and society at large.

The college is permitted to design any number of Industry oriented minor tracks as the respective BoS feels necessary. In this process the college can plan to have industrial collaborations in designing the minor tracks and to develop the content and certificate programs. Industry giants such as IBM, TCS, WIPRO etc., may be contacted to develop such collaborations. The college shall also explore the possibilities of collaborations with major Industries in the core sectors and professional bodies to create specialized domain skills.

5. Courses of study

The following programs of study are offered at present for specialization in the B.Tech.

S. No.	Branch	Abbreviation
01	Civil Engineering	CE
02	Electrical & Electronics Engineering	EEE
03	Mechanical Engineering	ME
04	Electronics and Communication Engineering	ECE
05	Computer Science Engineering	CSE
06	Information Technology	IT
07	Computer Science Engineering (Data Science)	CSE-DS
08	Computer Science Engineering & Business Systems	CSE-BS

a) Attendance Requirements

1. A student shall be eligible to appear for end semester examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects.
2. Condonation of shortage of attendance in aggregate up to 10% (65% and above andbelow 75%) in each semester for genuine reasons and shall be approved by a committee duly appointed by the principal.
3. A student shall be eligible to claim for condonation of attendance shortage for a maximum of two times during the four-year (eight semesters) course work of regular B. Tech / three-year (six semesters) course work of B. Tech, Lateral Entry. The college academic committee has to recommend case-by-case based on genuinity.
4. A Student will not be promoted to the next semester (i.e. detained in the same semester) unless she /she satisfy the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.
5. A stipulated fee shall be payable towards condonation of shortage of attendance tothe college. (a) A student is eligible to write the end examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects.
6. **Shortage of attendance below 65% in aggregate shall be condoned, in NO case.**
7. Students, who do not condone the shortage of attendance in any semester, are not eligible to take their end examination of that class and their registration shall standcancelled.

b) Promotion Policy

B.Tech. (Regular) 4-Year Program	
To get promoted to III Year from II year	▪ A student has to acquire 33 credits (40%) out of total 82 credits from both regular and supplementary examinationsof first year and second year respectively. ▪ However, attendance requirement mentioned in item No.2 (a) is mandatory.
To get promoted to IV year from III year	▪ A student has to acquire 50 credits (40%) out of total 125 credits from both regular and supplementary examinationsof first year, second year and third year respectively. ▪ However, attendance requirement mentioned in item No.2 (a) is mandatory.
B.Tech. (Lateral Entry) 3-Year Program	
To get promoted to III Year from II year	A student has to put up the minimum required attendance inthe second year as mentioned in item No.2 (a)
To get promoted to IV year from III year	▪ A Student has to acquire 35 credits (40%) out of total 86 credits from both regular and supplementary examinationsof second year and third year respectively. ▪ However, attendance requirement mentioned in item No.2 (a) is mandatory.

c) Course Pattern

1. The entire B.Tech. program study (under regular scheme) is of four academic years and each year will have two semesters (Total of **eight** semesters).
2. The entire B.Tech. program study (under Lateral entry scheme) is of three academic years and each year will have two semesters (Total of **six** semesters).
3. A student, eligible to appear for the end examination in a subject/lab, but absent forit or has failed in the end examination, may appear for that subject's / lab's supplementary examinations, when offered.
4. When a student detained due to lack of credits / shortage of attendance, he/she may be re-admitted when the semester is offered, after fulfillment of academic regulations. Whereas the academic regulations hold good, with the regulations he/she first admitted.
5. Every course of B. Tech. (UG) Program shall be placed in one of the nine categoriesas listed in table below:

R20 Crouse Curriculum Components and No. of Credits			
1	Humanities and Social Science including Management Courses	HSMC	10.5
2	Basic Science Courses	BSC	21
3	Engineering Science Courses	ESC	24
4	Professional Core Courses	PCC	51
5	Open Elective Courses	OEC	12
6	Professional Elective Courses	PEC	15
7	Internship, Seminar, Project Wok	PROJ	16.5
8	Mandatory Courses	MC	Non-Credit
9	Skill Oriented Courses	SOC	10
		TOTAL	160

d) Internal Assessment

1. Each theory course shall be evaluated for a total of 100 marks through two modesof assessments in the following proportion.

Internal Assessment	External Assessment (Semester End Examination)
30 Marks	**70 Marks**

2. The internal assessment will be as carried out as given below.

Internal assessment (30 Marks)			
Components			**Marks**
MID Examination			
MID-I	• Subjective test (15 M)	**MID Marks awarded as: 0.8 (Max. of MID − I &II) + 0.2 (Min. of MID − I &II)**	**20**
	• Objective test (5M)		
MID-II	• Subjective test (15 M)		
	• Objective test (5 M)		

Assignment		
• Two Individual Assignments (10 M) • One Group Assignment (10 M) • One Case Study (10 M)	**Assignment marks awarded as average marksof all three**	**10**
	Total	**30**

3. For theory subjects, during the semester, there shall be two **MID** examinations andtheir syllabus for subjective and objective parts should be as given below.

Name of Examination	Syllabus	Subjective	Objective (Online mode)
I MID	I, II and III Units	Duration: 90 min. 3 Q × 5 M	Duration: 20 min. 20 MCQ × $\frac{1}{4}$ M
II MID	IV, V and VI Units		

4. For the subjects such as Engineering Graphics, Engineering Drawing, Machine Drawing, Design & Drawing of R.C. structures, Steel structures, Irrigation structures, Estimation Cost and Valuation, Building Planning and drawing etc., thedistribution of marks for internal and external evaluation shall be as given below.

Internal evaluation		External evaluation	
Component	**Marks**	**Component**	**Marks**
Day to day work	15	Semester end examination	70
Internal test (Best of two internal tests in a semester)	15		
Total	30	Total	70

e) External Assessment

1. For all the theory subjects, the semester end examination pattern will be as given below. Students has to answer all the questions.

Name of Examination	Syllabus	Subjective	Marks
Semester end examination	All Units (I to VI Units)	Duration: 180 min. Part-A: 5 Q × 2 M Part-B: 6 Q with choice × 10 M	70

2. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical, design or drawing subject or project, if he/she secures not less than 35% of marks in the end examination anda minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
3. For subjects like Engineering Drawing / Engineering Graphics Machine Drawing, Building Planning & Drawing, etc., the pattern of semester end examination will begiven along with the syllabus of respective subject and has to be conducted for 70 marks.

d) Laboratory Assessment

For practical or laboratory subjects the distribution of marks shall be as follows:

Internal evaluation (30 Marks)		**External evaluation (70 Marks)**	
Component	**Marks**	**Component**	**Marks**
Day-to-day performance	10	Semester End Examination script	30
Record work	5	Conduction of experiment	30
Internal lab exam	5	Viva-voce	10
Conduction of experiment	5		
Viva-voce	5		
Total	30	Total	70

e) Skill Assessment

For skill development courses, the distribution shall be 30 marks for internal evaluationand 70 marks for end examination and further split in marks shown in the table.

Internal evaluation (30 Marks)		**External evaluation (70 Marks)**	
Component	**Marks**	**Component**	**Marks**
Assignment	5	End examination script	25
Descriptive examination	5	Conduction of experiment	25
Day-to-day performance	5	Skill Project report	10
Lab test	5	Viva-Voce	5
Seminar with skill report	10	Seminar	5
Total	30	Total	70

f) Internship/Mini Project/Audit Course Assessment

1. Two summer internships each with a minimum of six weeks duration, done at the end of second and third years, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, construction agencies,Industries, Hydel and thermal power projects and also in software MNCs.
2. Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee. The report and the oral presentation shall carry 40% and 60% weightages respectively.
3. In the final semester, the student should mandatorily undergo internship and parallelly he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report onthe work carried out during the internship. The project report shall be evaluatedwith an external examiner.
4. The College shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

The evaluation will be as mentioned below.

Evaluation by Internal evaluation committee for 100 Marks		
Internal evaluation committee members are:	Components	Marks
1. Supervisor of the project 2. Project coordinator 3. Head of the department	Seminar	30
	Project Report	50
	Viva-voce	20
	Total	**100**

1. For Audit courses, there should be an internal evaluation for 50 marks. A candidatehas to secure a minimum of 50% of marks to be declared successful. There shall beNO external evaluation. For noncredit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA

g) Project Work Assessment

1. The final project work shall be carried out during the eighth semester and will be evaluated for 100 marks. Out of 100 marks, 30 marks shall be for Internal evaluation and 70 marks for the external evaluation and the components of evaluation are asgiven in the table.

Internal evaluation (30 Marks)		**External evaluation (70 Marks)**	
Project committee members: • Supervisor of the project, • Project coordinator (senior faculty) • Head of the Department		**Project committee members:** • External Examiner • Head of the Department • Supervisor of the project	
Component	**Marks**	**Component**	**Marks**
Seminar-I	10	Project Report	30
Seminar-II	20	Project Presentation (Seminar)	20
		Viva-Voce	20
Total	30	Total	70

h) Paper Setting & Paper Evaluation

1. Setting of end examination question papers will be done by experienced faculty working/worked in reputed public (IIT/NIT/Central/State Universities / private autonomous institutions and other reputed institutions.
2. External experienced faculty should do a minimum of 75% evaluation and remaining by internal experienced faculty.

i) Award of Class

1. After satisfying the requirements prescribed for the completion of the program, thestudent shall be eligible for the award of B. Tech Degree and shall be placed in oneof the following grades:

Marks Range	Marks Range	Level	Letter Grade	Grade Point
90% to 100%	90% to 100%	Outstanding	A+	10
80% to <90%	80% to <90%	Excellent	A	9
70% to <80%	70% to <80%	Very Good	B	8
60% to <70%	60% to <70%	Good	C	7
50% to <60%	50% to <60%	Fair	D	6
40% to <50%	---	Satisfactory	E	5
Below 40%	Below 50%	Fail	F	0
Absent	Absent	Absent	AB	0

2. The performance of each student at the end of each semester is indicated in terms of SGPA. The SGPA is calculated as given below:

$$SGPA = \frac{\sum(C \times GP)}{\sum C} \quad \text{for each semester}$$

Where,

C = Credits of a course

GP = Grade Points awarded for a course

* SGPA is calculated for a candidate who passed all the courses in that semester.

3. Award of class for UG Programme

CLASS AWARDED	CGPA
First class with distinction	>= 7.75
First Class	>=6.75 &< 7.75
Second Class	>= 5.75 &< 6.75
Pass Class	>=4.75 &<5.75

Equivalent Percentage = (CGPA-0.75) ×10

6. Revaluation

Student can submit the application for revaluation, along with the prescribed fee receipt for revaluation of his answer scripts (S) of theory course) as per the notification issued by the Controller of Examination.

7. Re-Admission/Re-Registration/Re-Appearance

(a) Re-Admission for discontinued students

Students who have discontinued the Degree Programme due to any reasons whatso ever, may be considered for re-admission in to the same Degree Programme with the regulations prevailing at the time of re-admission, with prior permission fromthe concerned authorities.

(b) Re-Registration for Detained students

When any student is detained due to shortage of attendance in any semester, he/she may be permitted to re-register for the same or equivalent subject (as suggested by the Board of Studies of that Department as when offered in the subsequent semester following the same regulations with which he/she got admitted, with prior permission from the concerned authorities.

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

A student who is following JNTUK curriculum, transferred from other college to

his college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be requiredto pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester on wards to be eligible forthe 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 student has to clearhis backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK 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 previous semester under JNTUK regulations and the credits prescribed for thesemester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. 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 JNTUK)

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 college. A student, who is transferred from the other autonomous colleges to this college in second year first 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 semesteron wards 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/she 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/she is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomousstream. The class will be awarded based on the academic performance of a studentin the autonomous pattern.

(e) Withholding of Results

If the student has not paid dues to college, or if any case of indiscipline is pendingagainst him/her, the result of the candidate may be withheld and he/she will notbe allowed to go into the next higher Semester. The award or issue of the degree may also be withheld in such cases.

8. Minimum Instruction Days

The minimum instruction days for each semester shall be 90 clear instruction days.

9. General

- The academic regulation should be read as a whole for the purpose of anyinterpretation.
- In the case of any doubt or ambiguity in the interpretation of the above rules, thedecision of the college academic committee is final.

- The Principal may change or amend the academic regulations or syllabi at any timeand the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.
- The college reserves the right of altering the Academic Regulations and/or Syllabus/Course Structure, as and when necessary. The modifications or amendments may be applicable to all the candidates on rolls, as specified by the college.
- Wherever the words ‘he’ or ‘him’ or ‘his’ occur in the above regulations, they will also include ‘she’ or ‘her’ or ‘hers’.
- Wherever the word ‘Subject’ occurs in the above regulations, it implies the ‘TheorySubject’, ‘Practical Subject’ or ‘Lab.’ and ‘Seminar’.

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

I B.Tech. **I Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20H02001	Engineering Mathematic-I	BSC	3	0	0	3
2	20H03001	Applied Physics	BSC	3	0	0	3
3	20E05002	Digital Logic Design	ESC	3	0	0	3
4	20M02301	Engineering & IT workshop	ESC	1	0	4	3
5	20C01001	Programming in C for Problem Solving	ESC	3	0	0	3
6	20E05302	Digital Logic Design Lab	ESC	0	0	3	1.5
7	20H03301	Applied Physics Lab	BSC	0	0	3	1.5
8	20C01301	Programming in C for Problem Solving Lab	ESC	0	0	3	1.5
						Total	**19.5**

I B.Tech. **II Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20H02003	Numerical Methods & Transforms	BSC	3	0	0	3
2	20H04001	Applied Chemistry	BSC	3	0	0	3
3	20H01001	Communicative English	HSC	3	0	0	3
4	20C01002	Python Programming	ESC	3	0	0	3
5	20G01002	Fundamentals of Electrical & Electronics Engineering	ESC	3	0	0	3
6	20H01301	English Communication Skills Lab	HSC	0	0	3	1.5
7	20H04301	Applied Chemistry Lab	BSC	0	0	3	1.5
8	20G01302	Electrical & Electronics Engineering Lab	ESC	0	0	3	1.5
9	20C01302	Python Programming Lab	ESC	0	0	3	1.5
10	20H07003	Universal Human Values (Mandatory Course)	MC	2	0	0	0
						Total	**21**

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
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COURSE STRUCTURE

II B.Tech. **I Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20A02002	Managerial Economics and Financial Analysis	HSC	3	0	0	3
2	20H02004	Discrete Mathematical Structures	BSC	3	0	0	3
3	20H02008	Probability and Statistics Applications	ESC	3	0	0	3
4	20C05001	Data structures and Algorithms	PCC	3	0	0	3
5	20C01003	Object Oriented Programming through Java	PCC	3	0	0	3
6	20C01304	R Programming Lab	ESC	0	0	3	1.5
7	20C05301	Data structures and Algorithms Lab	PCC	0	0	3	1.5
8	20C01303	Object Oriented Programming through Java Lab	PCC	0	0	3	1.5
9	SDC-I	Skill Oriented Course-1	SOC	1	0	2	2
10	20H05001	Environmental Science (MC)	MC	2	0	0	0
						Total	**21.5**

II B.Tech. **II Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20C01004	Formal Languages & Automata Theory	PCC	3	0	0	3
2	20C10001	Computer Organization & Architecture	BSC/PCC	3	0	0	3
3	20C03001	Data Base Management Systems	PCC	3	0	0	3
4	20C09001	Software Engineering	PCC	3	0	0	3
5	20C06001	Operating Systems & Unix Programming	PCC	3	0	0	3
6	20C06301	Operating Systems & Unix Programming Lab	PCC	0	0	3	1.5
7	20C03301	Data Base Management Systems Lab	PCC	0	0	3	1.5
8	20C12301	Case Tools Lab	PCC	0	0	3	1.5
9	SOC-II	Skill Oriented Course - II	SOC	1	0	2	2
						Total	**21.5**
Honors / Minor Courses				4	0	0	4

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

III B.Tech. **I Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20E08001	Computer Networks	PCC	3	0	0	3
2	20C02001	Design and Analysis of algorithms	PCC	3	0	0	3
3	20C01005	Internet Programming	PCC	3	0	0	3
4	20C13004	Professional Elective Course - I	PEC-I	3	0	0	3
5	20M08001	Open Elective Course - I	OEC-I	3	0	0	3
6	20E08301	Computer Networks Lab	PCC	0	0	3	1.5
7	20C01305	Internet Programming Lab	PCC	0	0	3	1.5
8	SAC - I	Skill Advanced Course - I	SAC	1	0	2	2
9	20H07001	Constitution of India	MC	2	0	0	0
10	Internship	Summer Internships (2 months)	INTRN	0	0	0	1.5
						Total	**21.5**
	Honors / Minor Courses			4	0	0	4

III B.Tech. **II Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	20C11006	Machine Learning	PCC	3	0	0	3
2	20C11003	Artificial Intelligence	PCC	3	0	0	3
3	20C07001	Compiler Design	PCC	3	0	0	3
4	20C13005	Professional Elective Course - II	PEC-2	3	0	0	3
5	20E02019	Open Elective Course - II	OEC-2	3	0	0	3
6	20C11303	Machine Learning Lab	PCC	0	0	3	1.5
7	20C11302	Artificial Intelligence Lab	PCC	0	0	3	1.5
8	20C07301	Compiler Design Lab	PCC	0	0	3	1.5
9	SDC	Skill Advanced Course - II	SAC	1	0	2	2
10		Essence of Indian Traditional Knowledge	MC	2	0	0	0
	Total						**21.5**
	Honors / Minor Courses			4	0	0	4
	MOOC Courses - I			2	0	0	2

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

IV B.Tech. **I Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	PEC	Professional Elective Course - III	PEC-3	3	0	0	3
2	PEC	Professional Elective Course - IV	PEC-4	3	0	0	3
3	PEC	Professional Elective Course - V	PEC-5	3	0	0	3
4	OEC	Open Elective Course - III	OEC-3	3	0	0	3
5	OEC	Open Elective Course - IV	OEC-4	3	0	0	3
6		Humanities and Social Science Elective	HSSE	3	0	0	3
7	SSC	Soft Skill Course	SSC	1	0	2	2
8	Internship	Industrial/Research Internship	INTR	0	0	0	3
						Total	**23**
	Honors / Minor Courses			4	0	0	4
	MOOC Courses - II			2	0	0	2

IV B.Tech. **II Semester**

S. No.	Code	Course Title	Cat	L	T	P	C
1	Project	Industrial Project/R&D Project/Start-up Project	MP	0	0	0	12
						Total	**12**

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF PROFESSIONAL ELECTIVE COURSES

Professional Elective Course (PEC)-I		
S. No.	**Code**	**Course Title**
1	20C13004	Data Ware Housing and Data Mining
2	20C01006	Scripting Languages
3	20E08002	Cryptography and Network security
4	20C11005	Artificial Neural Networks
Professional Elective Course (PEC) -II		
S. No.	**Code**	**Course Title**
1	20C13005	Big Data Analytics
2	20C12001	Software Design with UML
3	20C02002	Block Chain Technology
4	20C11007	Natural Language Processing
Professional Elective Course (PEC) -III		
S. No.	**Code**	**Course Title**
1	20C11008	Deep Learning
2	20C11009	Human Computer Interaction
3	20C11010	Applications of AI
4	20C11011	Bioinformatics and Computational Genomics
Professional Elective Course (PEC) -IV		
S. No.	**Code**	**Course Title**
1	20C13006	Cloud Computing
2	20C08001	Computer Animation
3	20C09003	Object Oriented Software Engineering
4		Advanced Computer Networks
Professional Elective Course (PEC) -V		
S. No.	**Code**	**Course Title**
1	20C10002	Internet of Things
2	20C09002	Soft Computing
3	20C12002	Virtual Reality: Interface Application and Design
4	20C02003	IT Support Technologies

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF OPEN ELECTIVE COURSES

Open Elective Course (OEC) –I		
S. No.	**Code**	**Course Title**
1		Water Resource Engineering
2	20V07003	Renewable Energy Sources
3	20M08001	Robotics & Automation
4	20E04001	Introduction to Embedded Systems
Open Elective Course (OEC) –II		
S. No.	**Code**	**Course Title**
1	20V02006	Civil Engineering Materials
2		Electrical Estimation and Costing
3	20M04004	Material Properties & it's Applications
4	20E02019	Communication Engineering
Open Elective Course (OEC) – III		
S. No.	**Code**	**Course Title**
1	20V07008	Disaster Management
2		Utilization of Electrical Energy
3	20M02009	Manufacturing Technologies
4		Semiconductor Opto-Electronics
Open Elective Course (OEC) – IV		
S. No.	**Code**	**Course Title**
1	20V07009	Air Pollution and Control
2		Energy Conservation and Audit
3	20M02010	Computer Aided Design and Manufacturing
4		Data Communication and Networking

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF SKILL ORIENTED & ADVANCED COURSES

Skill Oriented Course (SOC) -I		
S. No.	**Code**	**Course Title**
1	20C06S01	Fundamentals of Mobile Application Development
2	20C04S01	Fundamentals of Web Application Development
3	20C13S02	Fundamentals of Data Science using Python
4	20C10S01	Fundamentals of Computer Networking Infrastructure Management using NS2
Skill Oriented Course (SOC) -II		
S. No.	**Code**	**Course Title**
1	20C06S01	Fundamentals on Android Technologies
2	20C04S01	Fundamentals of Sever Side Concepts
3	20C13S02	Fundamentals of Data Science Libraries in Python
4	20C10S01	Fundamentals of Organizational Local Area Networks using NS2
Skill Advanced Course (SAC) - I		
S. No.	**Code**	**Course Title**
1	20C06S02	Advanced Android Technologies
2	20C04S02	Advanced Sever Side Concepts
3	20C13S03	Advanced concepts of Data Science Libraries in Python
4	20C10S02	Advanced Organizational Local Area Networks using NS2
Skill Advanced Course (SAC) - II		
S. No.	**Code**	**Course Title**
1	20C06S03	SQLite
2	20C04S03	Databases for Web Applications
3	20C13S04	Machine Learning using Python
4	20C10S03	Protocol Simulation using NS2

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST HUMANITIES AND SOCIAL SCIENCE ELECTIVE OF COURSES

Humanities and Social Science Elective (HSSE) -I		
S. No.	**Code**	**Course Title**
1	20A01005	Fundamentals of Management for Engineers
2	20A06010	Basics of Financial Institutions, Markets & Services
3	20A10010	Essentials of Leadership & Change Management
4	20A07010	Customer Relationship Management for Engineers

LIST OF SOFT SKILL COURSES

Soft Skill Course (SSC) -I		
S. No.	**Code**	**Course Title**
1		Technical Communication and soft skills
2		Global Education & Professional Career
3		Leadership in Management

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF INTERNSHIP PROGRAMS

Internship		
S. No.	**Code**	**Course Title**
1	20C12I01	Internship in Mobile Application Development
2	20C12I02	Internship in Web Application Development
3	20C12I03	Internship in Data Science
4	20C12I04	Internship in Computer Networking Infrastructure Management

MAJOR PROJECT WORK

Project Work		
S. No.	**Code**	**Course Title**
1	20C12P01	Project in Mobile Application Development
2	20C12P02	Project in Web Application Development
3	20C13P01	Project in Data Science
4	20E08P01	Project in Computer Networking Infrastructure Management

LIST OF MANDATORY COURSES (AICTE)

S. No.	**Code**	**Course Title**
1	20H07003	Universal Human Values
2	20H05001	Environmental Science
3	20H07001	Constitution of India
4		Essence of Indian Traditional Knowledge

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF HONORS

Honors- IV, V, VI, VII

S. No.	Code	Title	L	T	P	C
Semester IV						
1		**POOL 1:**	4	0	0	4
20C01007		Advanced JAVA and J2EE				
20C13007		Advanced Data Structures & Algorithms				
20C04001		Introduction to Networks and CISCO Devices				
20C02004		Blockchain Components and Architecture				
Semester V						
2		**POOL 2:**	4	0	0	4
20C01008		JavaScript, CSS and HTML				
20C13008		Introduction to RDBMS				
20C04002		Introduction to Cyber Security Tools and Attacks				
20C02005		Digital Currencies & Blockchain (BITCOIN)				
Semester VI						
3		**POOL 3:**	4	0	0	4
20C01009		DevOps Foundation				
20C13009		Data Science and Data Security				
20C04003		IT Application and Data Security				
20C02006		Dynamic Paradigm in BCT				
Semester VII						
4		**POOL 4:**	4	0	0	4
20C01010		Full Stack Development				
20C13010		Social Mobile Analysis & Cloud				
20C04004		Cyber Forensic Analytics				
20C02007		SOLANA – Complete Blockchain Development				

QIS COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE

LIST OF MINORS

Minors- IV, V, VI, VII

S. No.	Code	Title	L	T	P	C
Semester IV						
1		**POOL 1: (Coding and Algorithm Design)**	4	0	0	4
20C01011		HTML, XML & CSS				
20C01012		JavaScript				
20C01013		Database Management Systems				
20C01014		PHP				
20C01015		Advanced Java Programming				
20C01016		R Programming				
20C01017		Advanced Python Programming				
20C01018		Data Structures and Algorithms				
20C01019		Ruby Programming Language				
20C01020		Mobile Application Development				
Semester V						
2		**POOL 2: (AI&ML Application)**	4	0	0	4
20C11012		Introduction to Artificial Intelligence				
20C11013		Machine Learning Algorithms				
20C11014		Applications of AI				
20C13011		Soft Computing				
20C08002		Computer Vision				
20C02002		Blockchain Technology				
20C11012		Data Mining				
20C08003		Game Programming				
20C11008		Deep Learning				
20C07001		Compiler Design				

Semester VI						
3		**POOL 3: (Data Analysis and Management)**	4	0	0	4
		Introduction to Data Science				
		Data Analysis using Python				
		Data Handling and Visualization				
		Statistical Foundations of Data Science				
		Data Science Tools and Techniques				
		Text Analytics				
		Human Computer Interaction				
		Mobile Computing				
		Computer Graphics				
		Web Analytics and Development				
Semester VII						
4		**POOL 4: (Cyber Security)**	4	0	0	4
		Introduction to Cyber Security				
		Information Security				
		Fundamentals of Network Security				
		IT Security Evaluation Criteria				
		Database Security				
		Digital Forensics				
		Cyber Security Tools & Attacks				
		Applied Cryptography				
		Secure Software Design & Enterprise Computing				
		Ethical Hacking				

I B.Tech.	ENGINEERING MATHEMATICS - I	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To acquaint the students with principles of mathematics through differential equations.
2. To provide a foundations in solving the linear differential equations.
3. To provide students with a solid foundation in mathematical fundamentals such as multiple calculus.
4. To provide students with a solid foundation in mathematical fundamentals such as multiple Integrals.
5. To acquire the fundamentals of Eigen values and Eigen vectors required for different branches of engineering.
6. To get knowledge on quadratic forms using different methods.

COURSE OUTCOMES

Student will be able to

1. Use analytical techniques to compute solutions of ordinary differential equations.
2. Apply the knowledge of solving higher order linear ordinary differential equations in some engineering problems like Electrical circuits, Deflection of beams, Mechanical oscillatory systems, Simple harmonic motion etc.
3. Compute maxima and minima of two variables by applying the technique of partial differentiation.
4. Compute double & triple integrals over a sector.
5. Solve the linear system of equations encountered in various engineering problems and use the concepts of Eigen values and Eigen vectors in engineering problems.
6. Solve the quadratic forms encountered in various engineering problems.

UNIT I: FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS:

Equations of first order and first degree: Linear – Bernoulli – Exact - Reducible to Exact.
Applications: Orthogonal trajectories.

UNIT II: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER:

Second order linear differential equations with variable coefficients: Method of variation of parameters, linear differential equations of higher order with constant coefficients with RHS term of the type $e^{ax}, sinax, cosax$, polynomials in x, $e^{ax}v(x), xv(x)$.
Applications: LCR circuits.

UNIT III: MULTIVARIABLE CALCULUS:

Limit – continuity – Partial Derivative - Total derivative-Chain rule - Functional dependence - Jacobian.
Applications: Maxima and Minima of functions of two variables.

UNIT IV: MULTIPLE INTEGRALS:

Double integrals - Change of order of integration in double integrals - Change of variables - Triple integrals.
Applications: Area enclosed by a Plane curve, Volume as a double and triple integral

UNIT V: LINEAR SYSTEM OF EQUATIONS, EIGEN VALUES & EIGEN VECTORS:

Rank – Echelon form, Normal form – Solutions of Homogeneous and Non Homogeneous linear system of equations - Gauss seidal method. Eigen values - Eigen vectors – Properties.

UNIT VI: QUADRATIC FORMS:

Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem - Quadratic forms-Reduction of quadratic form to canonical form – Rank, Nature, Index, Signature of a Quadratic form.

TEXT BOOKS

1. B.S.GREWAL, **Higher Engineering Mathematics**, 42nd Edition, Khanna Publishers
2. ERWIN KREYSZIG, **Advanced Engineering Mathematics**, 9th Edition, Wiley-India

REFERENCE BOOKS

1. H.K. DAS & RAJNISH VERMA, **Higher Engineering Mathematics**, S. Chand publications
2. GREENBERG, **Advanced Engineering Mathematics**, 2nd edition, Pearson edn
3. DEAN G. DUFFY, **Advanced engineering mathematics with MATLAB**, CRC Press
4. PETER O'NEIL, **Advanced Engineering Mathematics**, Cengage Learning.

WEBLINKS

1. www.scilab.org/ - SCI Lab
2. www.allmathcad.com/ -MathCAD
3. www.wolfram.com/mathematica/ - Mathematica
4. https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaAoddHoPig

I B.Tech.	APPLIED PHYSICS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To enhance the fundamental knowledge in physics and its applications relevant to computer science Engineering and technology.
2. To learn the fundamentals of Lasers and Fiber optics.
3. To gain a knowledge on electromagnetic waves and Maxwell equation.
4. To study about Band theory and Electron theory.
5. To learn the basics of Semiconductor Physics.
6. To learn the different Nano materials and its types.

COURSE OUTCOMES

Student will be able to

1. Understand the basic knowledge of Physical optics.
2. Understand the basic knowledge of Lasers and Fiber Optics.
3. Understand the basic knowledge of Electrostatics, Electromagnetic waves
4. Understand the basic knowledge of Electron theory of metals and Band Theory of solids.
5. Understand the basic knowledge of Semiconductor Physics.
6. Understand the basic Knowledge of Nano materials

UNIT I: WAVE OPTICS

Interference : Principle of superposition of waves-coherent sources- interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings.
Diffraction: Introduction**,** differences between Interference and Diffraction, Fresnel and Fraunhofer diffraction, Farunhofer diffraction from a single slit and a circular Aperture (Qualitative treatment) Diffraction gratings and their resolving power.

UNIT II: LASERS & FIBER OPTICS

Lasers: Characteristics-stimulate demission, - Einstein's A&B coefficients -Derivation, - pumping schemes – Ruby laser - He-Ne laser and Applications of Lasers.
Fiber Optics: Principle and propagation of light in optical fibers, Numerical aperture and acceptance angle and acceptance cone, Types of optical fibers (refractive index), Fiber optical communication system in data communication (Block diagram) and Applications.

UNIT III: ELECTRO STATICS, MAXWELL EQUATIONS AND ELECTRO MAGNETIC WAVES

Electro statics: Coulomb's law, Electric field ,Electric field intensity due to different charges, Electric flux density, Electro static potential, Divergence of electric field, Laplace and Poisson's equations for electro static potential and Gauss theorem in Electro statics ,Capacitors.
Maxwell's equations and Electromagnetic waves:
Gauss's theorem in magneto statics, faraday's law of electromagnetic induction, Ampere's law, Displacement current, Maxwell's equation in vacuum, Electromagnetic wave equation in dielectric medium, velocity of propagation of electromagnetic wave, Poynting theorem and Poynting vector.

UNIT IV: FREE ELECTRON THEORY AND BAND THEORY OF SOLIDS

Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function –Fermi energy - Density of states.

Band Theory of Solids:

Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT V: SEMICONDUCTOR PHYSICS

Introduction– Intrinsic semiconductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT VI: INTRODUCTION TO NANOMATERIALS

Introduction, basics of nanomaterials, Preparation of Nanomaterials: Top-down, Bottom-Up process, Ball milling, chemical vapour deposition method, Sol-gel method, Characterization of nanomaterials for various properties – carbon nanotubes-Applications of nanomaterials.

TEXT BOOKS

1. M.N. Avadhanulu, P.G.Kshirsagar "**A Text book of Engineering Physics**",S.Chand Publications, 2017.
2. D.K.Bhattacharya and PoonamTandon, "**Engineering Physics**", Oxford press (2015).
3. R.K Gaur and S.L Gupta, "**Engineering Physics**", DhanpatRai publishers, 2012.
4. Palanisamy, "**Engineering Physics**", Scitech Publishers.
5. K. K. Chatopadyayaand A.N. Benarjee, "**Introduction to Nano Science and Nano Technology**", Prentice Hall of IndiajIst edition.
6. K. K. Chatopadyaya and A.N. Benarjee, "**Introduction to Nano Science and Nano Technology**", Prentice Hall of India, 1st Edition.

REFERENCE BOOKS

1. M. R. Srinivasan, "**Engineering Physics**", New Age international publishers (2009).
2. AjoyGhatak, "**Optics**", 6th Edition McGraw Hill Education, 2017.
3. A. J. Dekker, "**Solid State Physics**", Mc Millan Publishers (2011).
4. Richard P Feynman, "**Lectures on Physics**", Pearson Publishers, New Millennium Eds.
5. B B Laud, "**Lasers and Non-linear Optics**", New Age International Publishers, 3rd Edition.
6. J. Pradeep, "**The essential understanding Nano science and Nano Technology**", Mcgraw Hill publishing company ltd 2007.

WEBLINKS

1. http://jntuk-coeerd.in
2. http://www.youtube.com

I B.Tech.	DIGITAL LOGIC DESIGN	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
2. To get knowledge on Boolean algebra and logic gates.
3. To prepare students to perform the analysis and design of various digital electronic circuits.
4. To design a cost effective logic circuits.
5. To learn and develop a sequential logic circuits using logic gates.
6. To develop a circuit using Shift registers and trouble shoot digital circuits.

COURSE OUTCOMES

Student will be able to

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. Understand and examine the structure of various number systems and its application in digital design.
3. Understand, analyze and design various combinational and sequential circuits.
4. Identify basic requirements for a design application and propose a cost-effective solution.
5. Identify and prevent various hazards and timing problems in a digital design
6. Develop skill to build and troubleshoot digital circuits.

UNIT I: NUMBER SYSTEMS

Binary, Octal, Decimal, Hexadecimal Number Systems. Conversion of Numbers from One Radix to another Radix, r's Complement and (r-1)'s Complement Subtraction of Unsigned Numbers, Problems, Signed Binary Numbers, Weighted and Non weighted codes

UNIT II: LOGIC GATES AND BOOLEAN ALGEBRA

Basic Gates NOT, AND, OR, Boolean Theorems, Complement And Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates

UNIT III: GATE LEVEL MINIMIZATION

SOP, POS, Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum upto Four Variables, POS and SOP, Simplifications with Don't Care Conditions Using K-Map.

UNIT IV: COMBINATIONAL LOGIC CIRCUITS

Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, RippleAdder/Subtractor Using Ones and Twos Complement Method. Design of Decoders, Encoders, Multiplexers, Demultiplexers, Higher Order Demultiplexers and Multiplexers, Priority Encoder, Code Converters.

UNIT V: SEQUENTIAL LOGIC CIRCUITS

Classification of Sequential Circuits, Basic Sequential Logic Circuits: Latch and Flip-Flop, RS-Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D Flip Flops, Truth and

Excitation Tables, Conversion of Flip Flops. Flip Flops with Asynchronous Inputs (Preset and Clear).

UNIT VI: REGISTERS AND COUNTERS

Design of Registers, Buffer Register, Control Buffer Registers, Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Synchronous Counters and Variable Modulus Counters, Ring Counter.

TEXT BOOKS

1. M. Morris Mano, Michael D Cilett, "**Digital Design**" ,4th edition, PEA
2. Roth "**Fundamentals of Logic Design**", 5th edition, Cengage.

REFERENCE BOOKS

1. Kohavi, Jha "**Switching and Finite Automata Theory**", 3rd edition, Cambridge.
2. Leach, Malvino, Saha, "**Digital Logic Design**", McGraw Hill.
3. R.P. Jain "**Modern Digital Electronics**", McGraw Hill

WEB LINKS

1. http://www.tutorialspoint.com/computer_logical_organization/logic_gates.htm
2. http://www.asic-world.com/digital/seq.html
3. http://www.facstaff.bucknell.edu/mastascu/elessonshtml/logic/logic1.html

I B.Tech.	ENGINEERING & IT WORKSHOP	L	T	P	C
I Semester		1	0	4	3

It is consisting of 2 parts:
Part I: IT Workshop;
Part II: Mechanical Workshop

COURSE OBJECTIVES

1. To understand the internal structure and layout of the computer system.
2. To learn to diagnose minor problems with the computer functioning.
3. To know the proper usage and threats of the World Wide Web.
4. To study in detail about the various features of Ms-Word, Excel, PowerPoint.
5. To impart hands-on training on basic engineering trades and skills.
6. To use tin smithy tools & amp; Black Smithy tools.

COURSE OUTCOMES

Student will be able to
1. Identify the major components of a computer and its peripherals. They are capable of assembling a personal computer.
2. Perform installation of system software like MS Windows and required device drivers.
3. Detect and perform minor hardware and software level troubleshooting.
4. Acquire the basic electrical engineering knowledge for house wiring practice.
5. Practice on manufacturing of components using fitting & carpentry.
6. Make the simple jobs as per specification using tin smithy tools & Black Smithy tools.

PART I : IT WORKSHOP

LIST OF EXPERIMENTS

Task- 1: PC HARDWARE
Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripherals. Functions of Mother board. Assembling and Disassembling of PC. System software and application software installation.

Task- 2: TROUBLE SHOOTING
Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem. Software Troubleshooting: 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.

Task 3: INTERNET
Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers.
Antivirus downloads, Protection from various threats.

MS OFFICE
Task 4: MICROSOFT WORD
Introduction to Word Processor, Editing and Formatting features, overview of toolbars, saving files, Using help and resources, rulers, fonts, styles, format painter, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and colors, Inserting Header and Footer, Using

Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Excel Orientation: The importance of Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Excel formulae &Functions: formulae, logical functions, text functions, statistical functions, mathematical functions, lookup functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features:- Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features:- Cell Referencing, Formulae and functions in excel)

Task 6: MICROSOFT POWER POINT

Basic power point utilities and tools, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Drawing toolbar-Lines and Arrows, Text boxes, Clipart, Insertion of images, slide transition, Custom animation, Hyperlinks.

PART II: MECHANICAL WORKSHOP

Note: At least two exercises to be done from each trade.

CARPENTRY		**BLACK SMITHY**	
1	T-Lap Joint	1	Round rod to Square
2	Cross Lap Joint	2	S-Hook
3	Dovetail Joint	3	Round Rod to Flat Ring
4	Mortise and Tenon Joint	4	Round Rod to Square headed bolt
FITTING		**HOUSE WIRING**	
1	V Fit	1	Parallel / Series Connection of three bulbs
2	Square Fit	2	Stair Case wiring
3	Half Round Fit	3	Florescent Lamp Fitting
4	Dovetail Fit	4	Measurement of Earth Resistance
TIN SMITHY			
1	Taper Tray	3	Open Scoop
2	Square Box without lid	4	Funnel

TEXT BOOKS

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Kate J.Chase, “PC Hardware and A+ Handbook” - PHI(Microsoft)
3. Bernd held, Theodor Richardson, “Excel Functions and Formulas”, 3rd Edition.

4. John K.C, “Mechanical Workshop Practice Paperback”, Second Edition 2010.

REFERENCE BOOKS

1. Bruce J Black, Taylor and Francis, “**Workshop processes, practices and materials”,** 4th Edition.
2. K C John, “**Mechanical Workshop Practice”**, PHI learning Private Limited, Technology and Engineering Lab manual, 1980.

WEB LINKS

1. https://edu.gcfglobal.org/en/subjects/office/
2. https://www.tutorialspoint.com/word/index.htm
3. https://agpworkshops.com/workshops/carpentry-workshop-basics-and-intermediate/
4. https://www.electricaltechnology.org/2013/09/electrical-wiring.html

I B.Tech.	PROGRAMMING IN C FOR PROBLEM SOLVING	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand branching, iteration and data representation using arrays.
2. To know about different looping and functions.
3. To learn modular programming and recursive solution formulation.
4. To understand pointers and dynamic memory allocation.
5. To analyze the characteristics of dynamic memory allocation.
6. To study about comprehension of file operations.

COURSE OUTCOMES

Student will be able to

1. Use different data types in a computer program.
2. Design programs involving decision structures, loops and functions.
3. Explain the difference between call by value and call by reference
4. Understand the dynamics of memory by the use of pointers
5. Use different data structures and create/update basic data files.
6. Design programs involving files.

UNIT I: INTRODUCTION TO PROGRAMMING

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Programming Languages - Machine Language, Assembly Language, Low - and High - Level Languages. Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. Structure of a C program, compilation and linking processes.

UNIT II: DECISION MAKING AND CONTROL STATEMENTS

Constants, Variables, Identifiers, Data Types and sizes, Arithmetic, relational and logical operators, Increment and decrement operators, conditional operator, Assignment operator, and Bit-wise operators, Expressions using operators in C, Type Conversions. Decision Making – if, if-else, nested if-else, else-if ladder, switch. Loop statements – while, do-while, for, break, continue, goto statements.

UNIT III: ARRAYS & BASIC ALGORITHMS

Arrays: Arrays (1-D, 2-D), Character arrays and Strings. Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection.

UNIT IV: FUNCTIONS

Functions (including built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, Recursion, Example programs, such as Finding Factorial, Fibonacci series.

UNIT V: STRUCTURES & POINTERS

Structures, defining structures and Array of Structures, Idea of pointers, defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

UNIT VI: FILE HANDLING

Input and output – concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs.

TEXT BOOKS

1. Byron Gottfried, "**Schaum's Outline of Programming with C"**, McGraw Hill
2. E. BalaguruSwamy, "**Programming in ANSI C"**, McGraw Hill

REFERENCE BOOK

1. Brian W. Kernighan and Dennis M. Ritchie, "**The C Programming Language"**, Prentice Hall of India.

WEBLINKS

1. https://www.tutorialspoint.com/cprogramming/index.htm
2. https://www.programiz.com/c-programming
3. https://www.w3schools.in/c-tutorial/

I B.Tech.	DIGITAL LOGIC DESIGN LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To design and implementation of combinational and sequential digital logic circuits is explained.
2. To describe and explain the operation of fundamental digital gates.
3. To investigate the operation of several digital circuits combinational and sequential.
4. To report findings and evaluate results.
5. To know the basic functionality of flip-flop and analyze its timings.
6. To deploy the devices to design the logic circuits.

COURSE OUTCOMES

Student will be able to

1. Analyze and design basic digital circuits with combinational and sequential logic circuits using VHDL.
2. Provide hands-on experience in digital circuits, which can be constructed by using standard integrated circuits (ICs).
3. Analyze the operation of medium complexity standard combinational circuits like the encoder, decoder, multiplexer, demultiplexer and adder.
4. Analyze the operation of a flip-flop and examine relevant timing diagrams
5. Analyze the operation of counters and shift registers
6. Design and operate practical digital logic circuits

CONDUCT THE FOLLOWING EXPERIMENTS USING BOTH IC'S AND HDL PROGRAMMING

1. Logic gates
2. 3-8 decoder and 8-3 encoder
3. 8*1 mux and 1*8 demux
4. 4-bit comparator
5. D - flip-flop
6. JK - flip-flop
7. Counter
8. Shift register
9. Half and Full Adder
10. Half and Full Subtractor
11. Realization of PLA using HDL
12. Realization of PAL using HDL

WEBLINKS

1. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/
2. https://www.electronics-tutorials.ws/logic/logic_10.html
3. https://www.d.umn.edu/~tkwon/course/1315/lab/Rocio/lab-man-part2.pdf

I B.Tech.	APPLIED PHYSICS LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To develop practical skills in handling optical, electrical, electronic and mechanical equipment for engineering applications.
2. To find the acceleration of gravity and study the characteristics of thermistor.
3. To learn MFS and dielectric constant in a current carrying coil.
4. To find the frequency of tuning fork and calculating the carrier concentrations.
5. To measure thickness of a wire, radius of curvature of lens.
6. To learn the fundamentals of Zener diode break down voltages.

COURSE OUTCOMES

Student will be able to
Acquire analytical skills in the determination of

a) Rigidity modulus of the wire.
b) Young's modulus of the wire.
c) Acceleration due to gravity at a given place
d) Characteristics of Thermistor.
e) Magnetic field Strength (H) of a current carrying coil
f) Dielectric constant of given material.
g) Wavelength of Laser.
h) Unknown frequency of the tuning fork.
i) Unknown frequency of the tuning fork.
j) Calculating Mobility, Hall coefficients and carrier concentrations.
k) Thickness of given wire.
l) Band gap of semiconductor.
m) Radius of curvature of Plano-convex lens.
i) I-V Characteristics and Break down voltage of Zener diode.

LIST OF EXPERIMENTS

1. Determination of Rigidity modulus of a material - Torsional Pendulum.
2. Determination of Young's modulus by method of single cantilever oscillations.
3. Determination of Acceleration due to Gravity and Radius of Gyration - Compound Pendulum.
4. Characteristics of Thermistor – Temperature Coefficients
5. Determination of Acceptance angle and Numerical aperture in an optical fiber
6. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
7. Determination of resistivity of semiconductor by Four probe method
8. Determination of dielectric constant by charging and discharging method
9. Determination of wavelength of Laser by diffraction grating
10. Determination of Velocity of sound – Volume Resonator.
11. Study of characteristics of LED.
12. Determination of frequency using meld's experiment.
13. Determination of Hall coefficient, mobility and carrier concentration using Hall Effect
14. Determination of thickness of a spacer using wedge film and parallel interference Fringes.
15. Determination of band gap of a semiconductor
16. Newton's rings – Radius of Curvature of Plano - Convex Lens.
17. Study of Current - Voltage (I-V) characteristics of Zener diode.

TEXT BOOKS

1. Dr.P.Mohan babu, "**Engineering Physics LAB Manual**", Vijayam Publications.
2. S. Ramesh and P. Apparao, "**Engineering Physics LAB Manual**", Lorven Publications.

REFERENCE BOOKS

1. C.V.Madhusudhana Rao, "**Physics Lab Manual**", Scitech Publications (India) Pvt.Ltd.
2. Dr. Y. Aparna & Dr. K. Venkateswara Rao, "**Laboratory Manual cum record for Engineering Physics**", V. G. S. Technologies.

WEBLINKS

1. http://www.youtube.com
2. http://en.wikipedia.org
3. http://nptel.ac.in/syllabus/122106027/

I B.Tech.	PROGRAMMING IN C FOR PROBLEM SOLVING LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions.
2. To know about Arrays, Strings, Functions, Pointers, Structures and File programming.
3. To acquire knowledge about the basic concept of writing a program.
4. To aware Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
5. To make use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
6. To know the Role of Functions involving the idea of modularity.

COURSE OUTCOMES

Student will be able to

1. Formulate simple algorithms for arithmetic and logical problems.
2. Translate the algorithms to programs (in C language).
3. Implement conditional branching, iteration and recursion.
4. Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
5. Use arrays, pointers and structures to formulate algorithms and programs.
6. Design programs involving files

LIST OF EXPERIMENTS

1. Write a C Program to Simulate 3 Laws at Motion
2. Write a C Program to convert Celsius to Fahrenheit and vice versa
3. Write a C Program to Find Whether the Given Year is a Leap Year or not.
4. Write a C Program to Add Digits & Multiplication of a number
5. Write a C Program to Find Whether the Given Number is
   i) Prime Number ii) Armstrong Number
6. Write a C program to print Pascal Triangle
7. Write a C Program demonstrating of parameter passing in Functions and returning values.
8. Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion
9. Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case
10. Write a C Program to convert decimal to binary and hex (using switch call function the function)
11. Write a C Program to compute the values ofsin x and cos x and e^x values using Series expansion.
12. Implementation of the following programs
    a. Search-Linear.
    b. Sorting-Bubble, Selection.
    c. Operations on Matrix.
13. Write a C Program to Access Elements of an Array Using Pointer.
14. Write a C Program to find the sum of numbers with arrays and pointers.
15. Write a C Program to Store Information of a Movie Using Structure
16. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

17. Implementation of string manipulation operations with library function.
    i) copy ii) concatenate iii) length iv) compare
18. Implementation of string manipulation operations without library function.
    i) copy ii) concatenate iii) length iv) compare
19. Write a C programming code to open a file and to print it contents on screen.
20. Write a C program merges two files and stores their contents in another file.

TEXT BOOK

1. Divya Gautam, "C **& Assembly Language Programming: Lab Manual**", Gullybaba.

REFERENCE BOOK

1. Brian W. Kernighan / Dennis Ritchie, "**The C Programming Language**", 2nd edition, Pearson Education

WEBLINKS

1. https://www.w3resource.com/c-programming-exercises/
2. http://www.learntosolveit.com/

I B.Tech.	NUMERICAL METHODS & TRANSFORMS	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To code various numerical methods in a modern computer language
2. To use Laplace transform methods to solve differential equations.
3. To Sketch simple curves in space.
4. To compute double & triple integrals over a sector.
5. To solve linear differential equations using Laplace transformation.
6. To solve linear differential equations using Z – transformation.

COURSE OUTCOMES

Student will be able to

1. Use numerical method to solve equations in one variable.
2. Use different numerical methods for Interpolation.
3. Able to apply numerical methods for differentiation and integration.
4. Able to solve differential equation using an iterative numerical technique.
5. Use the method of Laplace transforms to solve initial-value problems on linear differential equations with constant coefficients.
6. Use the method of Z- transforms to solve initial-value problems on linear difference equations

UNIT I: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Introduction - Intermediate value theorem - Bisection Method – Method of False Position – Iteration Method – Newton Raphson's Method.

UNIT II: INTERPOLATION

Introduction - Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation– Gauss's formulae for interpolation -Interpolation with unevenly spaced points – Lagrange's Interpolation formula.

UNIT III: NUMERICAL DIFFERENTIATION & INTEGRATION

Numerical differentiation using Newton's forward and Backward Interpolation, Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

UNIT IV: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Solution by Taylor's series method-Euler's method-Euler's modified method-Runge-Kutta methods.

UNIT V: LAPLACE TRANSFORMS

Laplace transforms of standard functions - Shifting Theorems - Transforms of derivatives and integrals – Unit step function –Dirac's delta function – Periodic function. Inverse Laplace transforms - Partial fractions - Convolution theorem.
Application: Solutions to Ordinary differential equations of higher order with constant coefficients using Laplace Transforms.

UNIT VI: Z-TRANSFORMS

Z-Transformations of some basic sequences-Damping rule-Shifting Rule,-Initial & Final value theorems, Inverse z-transforms

Application: Applications of Z-transforms to difference equations.

TEXT BOOKS

1. B.S.GREWAL, "**Higher Engineering Mathematics**", 42nd Edition, Khanna Publishers
2. ERWIN KREYSZIG, "**Advanced Engineering Mathematics**", 9th Edition, Wiley-India

REFERENCE BOOKS

1. H.K. DAS & RAJNISH VERMA, "**Higher Engineering Mathematics**", S.Chand publications
2. GREENBERG, "**Advanced Engineering Mathematics**", 2nd Edition, Pearson education
3. DEAN G. DUFFY, "**Advanced engineering mathematics with MATLAB**", CRC Press
4. PETER O'NEIL, "**Advanced Engineering Mathematics**", Cengage Learning.
5. Atkinson - Han, "**Elementary Numerical Analysis**", Wiley Student Edition.
6. S.S. Sastry, "**Introductory Methods of Numerical Analysis**", PHI

WEBLINKS

1. https://global.oup.com/uk/orc/biosciences/maths/reed/01student/numerical_tutorials/
2. https://www.classcentral.com/course/swayam-numerical-methods-for-engineers-14213#:~:text=Numerical%20Methods%20use%20computers%20to,interest%20to%20scientists%20and%20engineers.
3. https://www.mathtutordvd.com/public/The-Laplace-Transform-Tutor.cfm

I B.Tech.	APPLIED CHEMISTRY	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES:

1. To acquire the knowledge on hard water and its disadvantages, softening methods & corrosion
2. To acquire the knowledge on types of fuels, calorific value and flue gas analysis
3. To acquire knowledge on organic reactions and applications of electromagnetic radiations.
4. To make the students conversant with basics of polymer chemistry
5. To make the student acquire sound knowledge on laws of thermodynamics and importance in engineering applications in all disciplines.
6. To understand the demand of energy and hence use of natural resources as source.

COURSE OUTCOMES:

Student will be able to;

1. Outline the purification of hard water for industries and corrosion caused by hard water in industries.
2. Outline the process of combustion of fuels for conservation and environmental pollution.
3. Understand the spectroscopic techniques to identify the unknown compounds.
4. Acquire knowledge on polymers and interpret mechanism of conducting polymers and fibers to design advanced materials.
5. Understand the concepts thermodynamics in physical and chemical process.
6. Understand the importance of materials like liquid crystals and nanomaterials. Understand the design sources of energy by natural resources.

UNIT I – WATER TECHNOLOGY& CORROSION

Introduction to hard water and calculation of hardness. Introduction to boiler feed water-requirements-formation of deposits (scale and sludge) in steam boilers and heat exchangers-disadvantages and prevention of deposits, caustic embrittlement -boiler corrosion- priming and foaming. Softening of hard water -external treatment (zeolite method) and demineralization.
Corrosion: types - dry and wet corrosion, factors effecting corrosion.

UNIT II– MATERIAL CHEMISTRY

Non-elemental semiconducting materials: - Stoichiometric, controlled valency & chalcogen photo/ semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).
Insulators & magnetic materials: electrical insulators- ferro and ferri magnetism- Hall effect and its applications.

UNIT III: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Electronic spectroscopy: Principle- electronic transitions- selection rules- instrumentation, applications.
Infrared spectroscopy: Principle- selection rules- instrumentation. Fundamental modes of vibrations- applications of IR spectroscopy in the characterization of functional groups.
NMR Spectroscopy: principle- application of NMR in medicine (MRI and CT scan).

UNIT IV –POLYMER CHEMISTRY

Introduction, Functionality – Degree of polymerization. Classification of polymers -natural and synthetic; thermoplastic and thermosetting. Properties of polymers (physical and mechanical).

Fibers: Introduction- preparation, properties and applications of Nylon, Nomex and Kevlar.
Composite materials: Fiber reinforced plastics, conducting polymers and biodegradable polymers.

UNIT V – USE OF FREE ENERGY IN CHEMICAL EQUILIBRIA

Introduction, terminology of thermodynamics, first law of thermodynamics, Joule-Thomson effect, enthalpy, entropy, free energy, emf, Cell potentials, the Nernst equation and applications. Gibbs Helmholtz equation, Clausius-Clapeyron equation, Maxwell relations, Vant-Hoff isotherm.-isochore.

UNIT VI: ADVANCED TOPICS IN CHEMISTRY

Liquid crystals: Introduction, types, applications of liquid crystals as LCD and LED.
Nano materials: Introduction. Preparation and applications of carbon nanotubes, fullerenes.
Non-Conventional Energy Sources: Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower and geothermal power.

TEXT BOOKS

1. Jain P.C. and Monica Jain, "**Engineering Chemistry**", Dhanpat Rai Publishing Company (P) Ltd. New Delhi, 2010.
2. Srinivasulu Doddaga, Ashima Srivastava, Roli sharma, "**A Text book of Engineering Chemistry-II**", Parshva Publishers private limited, 2011.
3. Kannan P., Ravi krishnan A., "**Engineering Chemistry**", Sri Krishna Hi-tech Publishing Company Pvt. Ltd. Chennai, 2009.
4. Y.R.Sharma, "**Elementary Organic Spectroscopy**", S.Chand & Company (P) Ltd, New Delhi (revised edition)

REFERENCE BOOKS

1. Dara S.S, Umare S.S, "**Engineering Chemistry**", S. Chand & Company Ltd., New Delhi 2010
2. Sivasankar B., "**Engineering Chemistry**", Mc Graw Hill Publ Co, Ltd., New Delhi, 2008.
3. Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, "**Polymer Science**", New Age International P (Ltd.,), Chennai, 2006.
4. B.S Murthy, P.Shankar, Baldev Raj, B.B Rath and james Murday.
5. C. N. Banwell, "**Fundamentals of Molecular Spectroscopy**"

WEBLINKS

1. https://www.icheme.org/career/training/online-courses/
2. https://www.coursera.org/courses?query=chemical%20engineering

I B.Tech.	COMMUNICATIVE ENGLISH	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To improve basics of grammar and hone LSRW skills.
2. To enhance competencies in writing essays, resume, formal and informal letters and emails.
3. To develop the creativity of the students related to verbal ability and reading skills.
4. To enhance communication skills of the students and make them overcome barriers to communication.
5. To make students to use English without the negative influence of mother tongue.

COURSE OUTCOMES

Student will be able to

1. Assess their language skills and apply them to real life situations.
2. Identify and apply writing principles to various assignments, design formal and informal formats of letters, emails and resumes and face interviews with confidence.
3. Employ pre-reading, skimming and pre-writing techniques and develop confidence in their ability to read, comprehend, organize, and retain written information.
4. Apply the communication principles effectively to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
5. Analyze and present their views effectively in group discussions and society at large.
6. Speak at every opportunity effectively by using improved verbal ability.

UNIT I: ENGLISH GRAMMAR & USAGE

1.1 Subject-verb agreement,
1.2 Noun pronoun agreement,
1.3 Articles
1.4 Prepositions
1.5 Voice of Verbs
1.6 Direct and Indirect Speech

UNIT II: WRITING SKILLS

2.1 Note Making
2.2Information Transfer
2.3 Essay writing
2.4Letter Writing
2.5 Email Writing
2.6 Resume writing

UNIT III: READING SKILLS

3.1 Introduction to Reading
3.2 Types of reading: Skimming, Scanning, Intensive & Extensive Reading.
3.3 Effective Reading-Tips.
3.4 Sudha Murthy from Trailblazers.
3.5 Vikram Sarabhai from Trailblazers.
3.6 Effective Reading practice worksheets-**Black Friday, Humming Bird and Metal Detectors**

UNIT IV: FUNDAMENTAL OF COMMUNICATION

4.1 Introduction to Communication
4.2 Verbal communication
4.3 Nonverbal communication
4.4 Barriers to communication

UNIT V: MAN AND SOCIETY

5.1 In London from English Essentials.
5.2 Knowledge Society from English Essentials.

UNIT VI: VOCABULARY BUILDING

6.1 Word formation Process in English
6.2 Prefixes and suffixes
6.3Vocabulary: Synonyms, antonyms
6.4 One word substitutes.

TEXT BOOK

1. Sanjay Kumar and Pushp Lata, "**Communication Skills**", Oxford University Press. 2018.

SUGGESTED READINGS

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. My Experiments with Truth- Mohandas K. Gandhi,
6. English Essentials- Ravindra Publishing House
7. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
8. English Vocabulary in Use- Stuart Redman
9. Trailblazers – Board of Editors – Orient Blackswan
10. English Vocabulary in Use by Michael McCarthy, Felicity O'Dell,
11. English Collocations in Use by Michael McCarthy, Felicity O'Dell

WEBLINKS

1. **Reading Comprehension Module -1: Black Friday** - http://www.ereadingworksheets.com/reading-comprehension-worksheets/nonfiction-reading-test-black-friday.htm
2. **Reading Comprehension Module -2: Humming Bird-** http://www.ereadingworksheets.com/reading-comprehension-worksheets/nonfiction-reading-test-hummingbirds.htm
3. **Reading Comprehension Module -3: Metal Detectors-** http://www.ereadingworksheets.com/reading-comprehension-worksheets/nonfiction-reading-test-metal-detectors.htm

I B.Tech.	PYTHON PROGRAMMING	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES:

1. To give students a basic introduction to object-oriented and procedural programming, using Python.
2. To learn the basic looping and conditional statements.
3. To be familiar in working with links and string manipulations.
4. To understand the basic tuples and dictionaries available in Python programming language.
5. To know about parameter passing functions.
6. To develop and perform file operations in Python.

COURSE OUTCOMES:

Student will be able to

1. Understand principles of Python
2. Understand the pros and cons on scripting languages vs. classical programming languages
3. Be fluent in the use of procedural statements — assignments, conditional statements, loops, function calls — and sequences. Be able to design, code, and test small Python programs that meet requirements expressed in English. This includes a basic understanding of top-down design.
4. Understand the concepts of object-oriented programming as used in Python: classes, subclasses, inheritance, and overriding. Understand the basics of OO design.
5. Have knowledge of basic searching and sorting algorithms, and knowledge of the basics of vector computation
6. Understand how Python can be used for application development as well as quick networking, QA and game programming

UNIT-I

Introduction to Python: Introduction, A Brief History Of Python, why Python, when not to use Python, Python Versions, Installing Python, Environment Variables, Setting Up Path, Executing Python From The Command Line, IDLE, Editing Python Files, Python Reserved Words, Naming Conventions

Basic Python Syntax: Basic Syntax, Comments, Strings, Numeric Data Types, Conversion Functions, Simple Output, Simple Input, The % Method, The Print Function, Global variables and global constants

UNIT-II

Language Components: Indenting Requirements, Relational And Logical Operators, Bit Wise Operators. Conditional Statements: If, If- Else, Nested If-Else. Looping: For, While, Nested Loops

Control Statements: Break, Continue, Pass.

UNIT-III

String Manipulation: String Values, String Methods, The Format Method, String Operators, Accessing Strings, Basic Operations, String Slices

Lists: Introduction, Accessing List, Operations, Working With Lists, Function And Methods

UNIT-IV

Tuple: Introduction, Accessing Tuples, Operations, Working, Sets.

Dictionaries: Introduction, Accessing Values In Dictionaries, Working With Dictionaries, Properties, Functions

UNIT-V

Functions: Functions, Introduction, Defining a Functions, Parameters, Function Documentation, Keyword And Optional Parameters, Passing Collections To A Function, Variable Number Of Arguments, Scope, Passing Functions To A Function, Inner Functions

Modules: Importing Module, Standard Modules – Sys, Standard Modules – Math, Standard Modules – Time, Random Module, The Dir Function, Packages, Composition, Standard Library

UNIT-VI

Input-Output: Data Streams, Creating Your Own Data Streams, Access Modes, structured Text files, Structured Binary files, Printing On Screen, Reading Data From Keyboard, Opening And Closing File, Reading And Writing Files, Functions

Exception Handling: Errors, Runtime Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Raise, Assert, Except Clause, Try? Finally, Clause, User Defined Exceptions

TEXT BOOK

1. Allen B. Downey, "**Python for Software Design: How to Think Like a Computer Scientist**", Cambridge University Press, 2009.

REFERENCE BOOKS

1. Bill Lubanovic, "**Introducing Python: Modern Computing In Simple Packages**", Oreilly Publication, 2014.
2. Magnus Lie Hetland , "**Beginning Python: From Novice To Professional**", 2nd Edition , Apress Publication.
3. Jason Cannon, "**Python Programming For Beginners: An Introduction To The Python Computer Language And Computer Programming (Python, Python 3, Python Tutorial)**", 2014.

WEBLINKS

1. https://developers.google.com/edu/python/lists
2. http://www.programiz.com/python-programming
3. http://www.tutorialspoint.com/python/
4. http://www.learnpython.org/en/Loops

I B.Tech.	FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand and analyse basic electric DC circuits and theorems.
2. To analyse the basic AC circuits and three phase connections
3. To study the working principles of transformer and three phase connections.
4. To understand the working principles of DC machines and its characteristics
5. To understand the working principles of AC machines and its characteristics
6. To study the working principles of electronics devices and basic power converters

COURSE OUTCOMES

Students will be able to

1. Understand and analyze basic electric DC circuits and network theorems
2. Analyze the behavior of single phase AC circuits with R, L, C, RL, RC, RLC combinations
3. Understand the working principle of single phase and three phase transformer connections and Calculate the efficiency of a transformer
4. Understand the working principle of various types of DC machines and analyze the characteristics
5. Understand the construction and working principle of AC machines and analyze its characteristics
6. Analyze the various converters and basic principles of power electronics devices.

UNIT I: DC CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT II: AC CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. 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, OC and SC Test of single-phase transformer, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT IV: DC MACHINES

Construction and working principle of DC Generator, EMF equation and Types of DC Generators, Working principle of DC motor, types of DC motors, torque-speed characteristic and speed control of separately excited dc motor.

UNIT V: AC MACHINES

Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Losses, efficiency, starting, and speed control of induction motor.

UNIT VI: POWER CONVERTERS

Diode, Transistor, working of single-phase diode bride rectifier (half wave and full wave), Single-phase bridge voltage source inverters, 1-phase AC voltage controller with R-Load.

TEXT BOOKS

1. Sudhakar & Shyam Mohan, **Electric Circuits**, 3rd Edition, McGraw Hill Company, 2007.
2. Subramanyam, **Electrical Circuit Analysis**, IK publications, 2006
3. Rajendra Prasad, **Fundamentals of Electrical Engineering**, PHI Publications, 2nd Edition.
4. Nagsarkar, Sukhija, **Basic Electrical Engineering**, Oxford Publications, 2nd Edition.
5. B. Basavaraj & H. N. Shiva Shankar, **Basic Electronics**, Universities Press, 2nd Edition.
6. N. K. De & Dipu Sarkar, **Basic Electrical Engineering**, Universities press.
7. S. K. Bhattacharya, **Basic Electrical and Electronics Engineering**, Pearson Education, India, 2011

REFERENCE BOOKS

1. Surinder Pal Bali, **Electrical Technology**, Pearson Publications.
2. John Bird, Routledge, **Electrical Circuit Theory and Technology.** Taylor & Francis Group

WEBLINKS

1. https://www.tutorialspoint.com/index.htm
2. https://www.circuitlab.com/
3. https://electrical-engineering-portal.com/
4. https://www.allaboutcircuits.com/

I B.Tech.	ENGLISH COMMUNICATION SKILLS LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
2. To improve the students' fluency in English 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.
3. To train the students to attain the ability to give impromptu speeches and JAM sessions.
4. To train students to use language effectively in everyday conversations, to participate in group discussions effectively.
5. To develop experience and confidence in one's presentational skills.
6. To impart the skills required for facing interviews effectively

COURSE OUTCOMES

Student will be able to

1. Attain the ability of speaking with proper accent by using Received Pronunciation.
2. Evaluate their ability in using the language for day to day conversations.
3. Shed their inhibitions and take active part in different speaking activities like JAM sessions, impromptu speech etc with proper body language.
4. Present their views in group discussions effectively.
5. Speak at every opportunity and give presentations effectively and attain Speaking skills with clarity and confidence which in turn enhances their employability skills.
6. Prepare their resumes and face interviews with confidence.

UNIT 1

Pure Vowels, Diphthongs, Consonants, Accent, Rhythm and Intonation

UNIT 2

Greeting and Introductions, Asking for information and Requests, Invitations, Commands and Instructions and Suggestions and Opinions

UNIT 3

JAM, Dialogues and Body Language

UNIT 4

Group Discussions

UNIT 5

Presentation Skills

UNIT 6

Interviews and Telephonic Interviews

TEXT BOOK

1. "**Strengthen your Communication Skills - Part-A**", Maruthi Publications

REFERENCE BOOKS

1. Raman, Meenakshi & Sangeetha Sharma, "**Technical Communication: Principles and Practice**", Oxford University Press, New Delhi. 2011.
2. Regional Institute of English, "**English for Engineers**", Cambridge University Press, NewDelhi, 2006.
3. Rizvi, Ashraf. M, "**Effective Technical Communication**", McGraw Hill, New Delhi, 2005.
4. Rutherford, Andrea. J, "**Basic Communication Skills for Technology**", Pearson, New Delhi, 2001.
5. Viswamohan, Aysha,"**English for Technical Communication**", McGraw Hill, New Delhi. 2008

PRESCRIBED SOFTWARE: K-Van Solutions

WEBLINKS

1. https://www.englishlab.co.in/
2. https://www.languagelabsystem.com/
3. https://www.britishcouncil.in/

I B.Tech.	APPLIED CHEMISTRY LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To get knowledge about estimation of hardness, alkalinity.
2. To acquire quantitative analysis of water through volumetric and instrumental analysis.
3. To acquire practical skills in the wet chemical and instrumental methods.
4. To get basic knowledge on chemistry related computer software.
5. To have practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
6. To make the student acquire practical skills in the wet chemical and instrumental methods

COURSE OUTCOMES

Student will be able to
1. Quantitative chemical analysis of water quality related parameters.
2. Synthesize a small drug molecule or polymer.
3. Application of electrodes for the measurement of conductance, pH and redox potential.
4. Basic knowledge on chemistry related computer software.
5. Detect the sample qualitatively in a given mixture.
6. Analyze the quality of oil or soap and food materials.

LIST OF EXPERIMENTS

1. Determination of alkalinity in water sample
2. Determination of total, temporary & permanent hardness of water by EDTA method
3. Estimation of copper content of the given solution by EDTA method
4. Determination of DO content of water sample by Winkler's method.
5. Conduct metric titration of strong acid vs strong base.
6. Estimation of Vitamin – C
7. Preparation of polymer/ Drug
8. Determination of strength of given hydrochloric acid using P^H meter
9. Potentiometry - determination of redox potentials.
10. Saponification/acid value of an oil
11. Determination of the rate constant of a reaction
12. Introduction to Thin layer chromatography.
13. Introduction to Chemdraw software (Virtual laboratory).
14. Introduction to gas chromatography (Virtual laboratory).

TEXT BOOKS

1. Jeffery G.H., Bassett J., Mendham Jand Denny Vogel's R.C, "**Organic Chemistry"**, LBS Singapore 1994.
2. Longman, "**Text book of quantitative analysis chemical analysis"**, ELBS, 5th Edition. Singapore publishers, Singapore, 1996.
3. Kolthoff I.M., Sandell E.B. et al., "**Quantitative chemical analysis"**, McMillan, Madras, 1980.

REFERENCE BOOKS

1. Daniel R. Palleros, "**Experimental organic chemistry",** John Wiley & Sons, Inc., New York 2001.
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "**Vogel's Textbook of practical"**.

WEBLINKS

1. https://www.acs.org/content/acs/en/education/students/highschool/chemistryclubs/activities/simulations.html
2. https://www.vlab.co.in/broad-area-chemical-engineering
3. https://www.lccc.edu/academics/science-and-engineering/science-in-motion/labs-equipment/chemistry-lab-experiments

I B.Tech.	ELECTRICAL & ELECTRONICS ENGINEERING LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To verify ohms law in DC circuits and KVL,KCL in DC circuits
2. To verify superposition, thevenins and nortons theorems for DC circuits
3. To determine performance of single phase transformers with different tests.
4. To analyze the speed control mechanism on DC shunt machines.
5. To determine the performance of 3 phase induction motor
6. To construct the half wave and full wave rectifier circuits.

COURSE OUTCOMES

Student will be able to

1. Verify the ohms law in DC circuits and KVL, KCL in DC circuits.
2. Verify and demonstrate various theorems and resonance for different circuits
3. Understand the performance of single-phase transformer.
4. Determine and draw the performance curves of dc motor and induction motor
5. Construct and study the output waveforms of Rectifier circuits.
6. Conduct a brake test of shunt and Induction motors.

LIST OF EXPERIMENTS

1. Verification of ohms law in DC circuits
2. Verification of KVL and KCL in DC circuits
3. Verification of Superposition theorem for DC circuits
4. Verification of Thevenin's and Norton's Theorems for DC circuits.
5. Load test on single phase transformer
6. OC and SC test of Single-phase transformer
7. Speed control of DC shunt motor
8. Brake test of DC shunt motor
9. Brake test on 3 Phase Induction motor
10. Single phase half wave rectifier
11. Single phase full wave rectifier

TEXT BOOK

1. A.M. Zungeru, J.M. Chuma, H.U. Ezea, and M. Mangwala, "**Handbook of Laboratory Experiments in Electronics Engineering: Vol-1"**, Notion Press.

REFERENCE BOOK

1. Yaduvir Singh, "Electrical and Electronics Science – Lab Experiments", Narosa Publishing House.

WEBLINKS

1. https://www.iare.ac.in/sites/default/files/lab2/EEE%20LAB.pdf
2. https://www.pdfdrive.com/basic-electrical-and-electronics-engineering-lab-18ees101j-e126869485.html
3. https://webstor.srmist.edu.in/web_assets/srm_mainsite/files/2018/18EES101J-basic-electrical-engineering-eee.pdf

II B.Tech.	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the concept and nature of Managerial Economics and its relationship with other disciplines, Concept of Demand and Demand forecasting.
2. To understand the concept of Production function, Input Output relationship
3. To understand different Cost Concepts and Concept of Cost-Volume-Profit Analysis.
4. To understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.
5. To know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles.
6. To understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation.

COURSE OUTCOMES

Student will be able to

1. The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand
2. One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs
3. One has to understand the nature of different markets and Price Output determination under various market conditions
4. One should equip with the knowledge of different Business Units
5. The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
6. To understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation.

UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types- Determents - Law of Demand its Exception-Elasticity of Demand-Types and Measurement-Demand forecasting and its Methods.

UNIT II: PRODUCTION

Production function- ISO Quants and ISO costs-Law of Variable proportions-Cobb-Douglas Production Function-Economics of Sale

UNIT III: COST ANALYSIS

Cost Concepts-Opportunity Cost-Fixed Vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit Analysis-Determination of Break-Even Point (Simple problem)

UNIT IV: INTRODUCTIONTO MARKETS & PRICING POLICIES

Market Structures: Perfect Competition, Monopoly- Monopolistic and Oligopoly - Features - Price, Output Determination – Methods of Pricing

UNIT V: TYPES OF BUSINESS ORGANIZATION

Features and Evaluation of Sole Trader - Partnership - Joint Stock Company - State/Public Enterprises and their Functions.

UNIT VI: INTRODUCTION TO ACCOUNTING & FINANCING ANALYSIS:

Introduction to Double Entry Systems - Preparation of Financial Statements Analysis and Interpretation of Financial Statements-Ratio Analysis.

TEXT BOOKS

1. Dr. A. R. Aryasri – **Managerial Economics and Financial Analysis**, TMH 2011
2. Dr. N. Appa Rao, Dr. P. Vijay Kumar: **Managerial Economics and Financial Analysis**, Cengage Publications, New Delhi –2011

REFERENCE BOOKS

1. Maheswari: **Managerial Economics**, Sultan Chand
2. Suma Damodaran: **Managerial Economics**, Oxford2011
3. VanithaAgarwal: **Managerial Economics**, Pearson Publications2011
4. Sanjay Dhameja: **Financial Accounting for Managers**, Pearson.
5. Maheshwari: Financial Accounting, Vikas Publications
6. A. Siddiqui & A. S. Siddiqui: **Managerial Economics and Financial Analysis**, New Age International Publishers, 2012.

WEBLINKS

1. Managerial Economics and Financial Analysis notes
   https://www.smartzworld.com/notes/managerial-economics-and-financial-analysis-mefa/International Publishers, 2012.
2. Production and cost analysis https://slideplayer.com/slide/5708722/
   Accounting analysis
3. https://www.readyratios.com/reference/accounting/accounting_analysis.html
4. https://nptel.ac.in/courses/11010100

II B.Tech.	DISCRETE MATHEMATICAL STRUCTURES	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To know the notations used in the Discrete mathematics associated with computer science & Engineering.
2. To learn the fundamentals of elementary mathematical reasoning.
3. To learn the logic and Boolean algebra and relating it to Computer Science applications.
4. To understand basic set-theory notations and relate it to computer science applications.

COURSE OUTCOMES

1. Understand set theory notation and fundamentals of first order predicate logic.
2. Understand and use counting and combinatory techniques.
3. Understand and solve recurrence relations.
4. Understand lattice theory concepts.
5. Understand the graph theory concepts.
6. Understand basic data types & structures such ass tree used in computer algorithms and systems.

UNIT I: MATHEMATICAL LOGIC

Propositions and Connectives, negation, conjunction, disjunction, conditional and bi-conditional, well-formed formulae, tautologies, equivalence of formulae, duality, rules of inference, indirect method of proof, Conditional proof.

UNIT II: RELATIONS AND FUNCTIONS

Cartesian Products and Relations, Properties of Relations**,** Hasse Diagrams, Equivalence Relations and Partitions. Relation Matrix and Digraph, Paths in Relations and Digraphs, Functions – Plain and One-to-One, Onto Functions. The Pigeon-hole Principle, Function Composition, Inverse Functions and Permutation Function. Characteristics function of a set with Theorems.

UNIT III: GROUP THEORY

Binary Operations, Properties, Semi groups, Monoids, Sub semi group, Sub monoid, Isomorphism & Homomorphism, Groups (only definitions and examples) Subgroups and Homomorphism, Cosets and Lagrange's Theorem, Normal subgroups.

UNIT IV: RINGS, LATTICES & BOOLEAN ALGEBRA

Rings, Fields, Integral Domain, Ring Homomorphism (definitions & examples), Lattices: Properties, Types of Lattices, Sub lattices, Isomorphic Lattices, Complemented & Modular Lattices (definitions & examples).

UNIT V: GRAPHS

Basic concepts of Graph Theory, Digraphs, Basic definitions, Representation of Graphs, Paths and Circuits, Reachability and Connectedness, Subgraphs, Isomorphic digraphs & Transitive Closure digraph, Euler's Path & Circuit, Hamiltonian Graphs

UNIT VI: TREES

Trees, Binary Tree, Representation of trees, Binary tree traversal techniques, Spanning Trees of Connected Relations, Weighted Graphs, Minimal Spanning Trees by Prim's Algorithm & Kruskal's Algorithm.

TEXT BOOKS

1. Tremblay &Manohar, **Discrete Mathematical Structures with Applications to Computer Science**, Tata McGraw- Hill.
2. Mott, Kandel, Baker, **Discrete Maths for Computer Scientists & Mathematicians**.

REFERENCE BOOKS

1. Kolmab, Busby Ross, **Discrete Mathematical Structures**, 3rd Edition, PHI.
2. K.H. Rosen, **Discrete Mathematics and its Applications withCombinatory and Graph Theory**, 7thEdition, Tata McGraw Hill.
3. C. L. Liu, **Elements of Discrete Mathematics**.
4. Lipschutz, **Discrete Mathematics**.
5. R. Johnsonbaugh, **Discrete Mathematics**.
6. B.S. Grewal, **Higher Engineering Mathematics**, 40thEdition, Khanna Publication

WEB LINKS

1. www.inf.ed.ac.uk/teaching/courses/dmmr/slides/13-14/Ch1a.pdf
2. www.mayr.in.tum.de/konferenzen/Jass03/presentations/kapralov.pdf
3. http://www.jmilne.org/math/CourseNotes/GT.pdf

II B.Tech.	PROBABILITY AND STATISTICS APPLICATIONS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand & analyze data using suitable statistical tools.
2. To expose the students to apply certain statistical concepts in practical applications of computer science areas.
3. To be familiar with basic concepts of probability and random variables
4. To have knowledge on distribution of random variables, correlation and regression analysis.
5. To know the concepts of sampling, tests based on hypothesis.
6. To have a knowledge on applying queuing theory.

COURSE OUTCOMES

Students should be able to

1. Use probability as a tool for Statistical Analysis.
2. Understand basics of random variables and distributions.
3. Evaluate expectation and variance for random variables
4. Testing of hypotheses using suitable test statistics.
5. Apply queuing theory in real world.
6. Learn queuing theory and using it.

UNIT I: PROBABILITY THEORY

Probability Theory: Sample spaces, Events & Probability: Union, intersection and compliments of events; Conditional probability; Baye's theorem

UNIT II: RANDOM VARIABLES AND DISTRIBUTION

Random variables and distribution: Random variables Discrete Probability Distributions, Continuous probability distributions, Binomial, Poisson, Uniform, Exponential, Normal

UNIT III: MOMENTS

Expectations and higher order moments – Moment Generating Function, Characteristic Functions, Sampling distribution: Populations and samples - Sampling distributions of mean (σ known and unknown) proportions, sums and differences.

UNIT IV: CORRELATION & REGRESSION

Tests of significance – Z-test, t-test, F-test, $\chi 2$ test.
Correlation: Linear & non – linear correlation – Types of correlation – Karl Pearson's Correlation coefficient- Spearman's Rank Correlation Coefficient Regression – Definition –linear regression; Non-Linear regression. -Regression equations – Properties

UNIT V: CURVE FITTING

Curve Fitting - Least square fit-Fitting of Straight line – Second Degree polynomial – Exponential and power curves

UNIT VI: QUEUING THEORY

Queuing theory – Markov Chains – Introduction to Queuing systems – Elements of a queuing model – Exponential distribution – Pure birth and death models. Generalized Poisson Queuing model – Specialized Poisson Queues

TEXT BOOKS:

1. Dr. K. Murugesan & P. Guruswamy, **"Probability, Statistics and Random Processes",** Anuradha Agencies, Deepti Publications.
2. T. Veerajan, **"Probability, Statistics and Random Processes",** TMH, India.

REFERENCE BOOKS:

1. Miller and Freund, **"Probability and Statistics for Engineers",** PHI.
2. Trivedi, **"Probability, Statistics and Queuing Theory Applications",** 2nd ed, John Wiley and Sons

II B.Tech.	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To design and implementation of various basic data structures.
2. To design and implementation of advanced data structures.
3. To perform different stack and queue operations.
4. To implement operations involved in different data structures like linked list.
5. To implements different types of trees.
6. To implement various searching and sorting techniques.

COURSE OUTCOMES

Student will be able to

1. Understand the concepts of data types, algorithms and its analysis.
2. Analyze implement and compare searching and sorting Techniques.
3. Analyze example programs with data structures using analyzing tools.
4. Develop &analyze the algorithms for stack and queue operations leading to applications.
5. Design & analyze algorithms for operations on Binary Search Trees & AVL Trees data structures.
6. Evaluate Graph traversal and minimum cost spanning tree algorithms and compare hashing methods on hash table data structure.

UNIT I: INTRODUCTION TO DATA STRUCTURE

Preliminaries of Algorithm: Algorithm Analysis and Complexity. **Data Structure:** Definition, Types of Data structures. **Recursion:** Definition and Types of Recursion, GCD Computation, Fibonacci sequence, Towers of Hanoi. **Attributes in ER model:** Multiple attribute key.

UNIT II: HASHING & SORTING TECHNIQUES

Hashing: Basic Concepts, Hash Table, Hash Functions, Collision resolution techniques-Separate Chaining, Open addressing. **Sorting Techniques**: Basic concepts, sorting by insertion (Insertion sort), Selection (heap sort), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithms.

UNIT III: STACKS AND QUEUES

Stack: Introduction, Basic Stack Operations, and Representation of a Stack using Arrays and Linked Lists, Stack Applications: Infix to postfix Transformation, Evaluating Arithmetic Expressions. **Queues:** Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Applications of Queues-Circular Queues.

UNIT IV: LINKED LISTS

Introduction, Single Linked List, Representation of a Linked List in Memory, Operations on Single Linked List, Reversing a Single Linked List, Applications of Single Linked List to Represent Polynomial Expressions and Sparse Matrix Manipulations, Circular Linked List, Double Linked List**.**

UNIT V: TREES

Basic Tree Concepts, Binary Trees: Properties, Representation of Binary Trees Using Arrays and Linked Lists, Operations on a Binary Tree, Binary Tree Traversals (Recursive), Creation of Binary Tree from In, Pre And Post Order Traversals-Advanced Concepts of Trees: Binary Search Tree and Operations, AVL Trees and Operations.

UNIT VI: GRAPHS

Basic Concepts, Representations of Graphs: Using Linked List and Adjacency Matrix. Graph Traversals (BFS & DFS), Applications: Dijkstra's Algorithm, Minimum Spanning Tree using Prim's Algorithm, Kruskal's Algorithm, and Floyd-Warshall's Algorithm.

TEXTBOOKS

1. G.A.V. Pai, **Data Structures and Algorithms**, 2008, McGraw Hill.
2. Mark Allen Weiss, **Data structures and algorithm analysis in C**, 2nd Edition.
3. Reema Thareja, **Data Structures using C**, Oxford.

REFERENCE BOOKS

1. Seymour Lipschutz, **Data Structure with C**, McGraw Hill
2. Debasis, Samanta, **Classic Data Structures**, 2nd Edition, PHI,2009.
3. Horowitz, Sahni, Anderson Freed, **Fundamentals of Data Structure in C**, 2nd Edition, University Prees.
4. Richard F, Gilberg, Forouzan, **Data Structures**, 2nd Edition, Cengage.

WEB LINKS

1. https://www.studytonight.com/data-structures/introduction-to-data-structures
2. http://web.stanford.edu/class/cs166/

II B.Tech.	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. Programming in the Java programming language,
2. Knowledge of object-oriented paradigm in the Java programming language,
3. The use of Java in a variety of technologies and on different platforms.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solve specified problems.
6. Be able to use the Java SDK environment to create, debug and run simple Java programs.

COURSE OUTCOMES

Student will be able to

1. knowledge of the structure and model of the Java programming language, (knowledge)
2. use the Java programming language for various programming technologies (understanding)
3. develop software in the Java programming language, (application)
4. evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
5. propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

UNIT-I

Introduction to OOP – Principles of OOP, Java buzzwords, Sample java program, Compilation and Execution of java program, JDK, JRE, JVM, java 1.8 features (Lamda expression and function interface).

Java programming - History of Java, comments, data types, variables, constants, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements, arrays, strings.

UNIT-II

Classes and Objects: classes, creation of object, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection.

Inheritance - Inheritance hierarchies, super and sub classes, super keyword, final keyword, the Object class and its methods. dynamic binding, method overriding.

UNIT-III

Abstract classes &Interfaces – abstract classes and abstract methods, Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces.

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

UNIT-IV

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

Multithreading - Difference between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, procedure consumer pattern.

UNIT-V

Collection Framework in Java - Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes and interfaces: Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Properties

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-VI

Dynamic programming: Introduction, Characteristics, Elements, Components of dynamic programming, Development, Applications.

JDBC: JDBC Fundamentals, Establishing Connectivity and Working with Connection Interface, Working with Statements, Creating and Executing SQL Statements, Working with ResultSet Objects.

TEXT BOOKS:

1. Java Fundamentals - A comprehensive Introduction, Herbet Schidt and Dale Srien, TMH.

REFERENCES BOOKS:

1. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR) Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
2. Object Orientd Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, Bruce Eckel, Pearson Education
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.

WEB LINKS

1. http://www.tutorialspoint.com/java/
2. http://www.javatpoint.com/java-tutorial
3. http://www.w3schools.in/java/

II B.Tech.	R PROGRAMMING LAB	L	T	P	C
I Semester		0	1	2	2

COURSE OBJECTIVES

1. To gain knowledge about R language
2. To help students to know structure and data types used in R.
3. To understand various features in C.
4. To strengthen C which provide n students with the means of writing
5. To be efficient, maintainable and portable code.
6. To represent the solutions in form of charts.

COURSE OUTCOMES

Students should be able to

1. Understand the fundamentals of R programming.
2. Apply and practice different scenarios
3. Understand and apply the in-built functions and customized functions for solving the problems.
4. Understand and apply the solutions in different chart types.
5. Design solution for different problems.
6. Represent the solution in visualizations.

LIST OF PROGRAMS

1. Write a program to illustrate Binomial Distribution in R.
2. Write a program to illustrate Poisson Distribution in R.
3. Write a program to illustrate Normal Distribution in R.
4. Write a program to illustrate Uniform Distribution in R
5. Write a program to illustrate Exponential Distribution in R.
6. Write a program to illustrate t test in R.
7. Write a program to illustrate F test in R
8. Write a program to illustrate Chi –square test in R.
9. Write a program to illustrate Correlation coefficient in R.
10. Write a program to illustrate Regression analysis in R
11. Write a program to illustrate fitting of straight line in R
12. Write a program to plot Histogram in R.
13. Write a program to plot Bar chart in R.
14. Write a program to plot Pie chart in R.
15. Write a program to plot Scatter plot in R.
16. Write a program to plot Box plot in R.

II B.Tech.	DATA STRUCTURES AND ALGORITHMS LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To implement algorithms of different data structures like Lists
2. To implement algorithms of different data structures like Stacks
3. To implement algorithms of different data structures like Queues
4. To implement algorithms of different data structures like Trees.
5. To implement shortest path algorithm.
6. To perform different tree traversal for finding the elements.

COURSE OUTCOMES

Student will be able to

1. Implement & test the performance of searching and sorting techniques.
2. Implement & test the performance of linked list.
3. Implement & test the performance of different data structures stacks and queues.
4. Implement & test the performance of tree traversal techniques.
5. Implement & test the performance of graph traversal techniques.
6. Implement & test the performance of shortest paths.

EXPERIMENTS

1. Write a C program to implement i) Linear Search ii) Binary Search.
2. Write a C program to implement i) Bubble sort ii) insertion sort.
3. Write a C program to implement Quick sort.
4. Write a C Program to implement Merge Sort
5. Write a C program to Heap sort
6. Write a C program to implement a stack using array &linked list
7. Write a C program to implement a queue using arrays and linked list
8. Write a C program to implement various operations on Single linked List
9. Write a C program to construct a binary tree and do in order, Preorder and Post order traversals, printing the sequence of nodes visited in each case.
10. Write a C program to implement AVL Tree.
11. Write a C program to implement the following graph traversals a) DFS b) BFS
12. Write a C program to implement the Dijkstra's algorithm.

II B.Tech.	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

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

COURSE OUTCOMES

Student will be able to

1. Able to write programs for solving real world problems using java collection frame work.
2. Able to write programs using abstract classes.
3. Able to write multithreaded programs.
4. Apply the concept of polymorphism and inheritance.
5. Implement exception handling
6. Able to write GUI programs using swing controls in Java.

LIST OF EXPERIMENTS

1. Implement a java program for finding roots of quadratic equation.
2. Implement a java program to display the Fibonacci sequence.
3. Implement a java program to multiply two matrices.
4. Implement a java program to check whether given string is palindrome or not.
5. Implement a java program for finding the total numbers of objects created of a class.
6. Implement a java program to demonstrate static variables, methods, and blocks.
7. Implement a java program that illustrates simple inheritance and multi-level inheritance.
8. Implement a java program for runtime polymorphism.
9. Implement a java program demonstrating the difference between method overloading, constructor overloading and method overriding.
10. Implement a java program to give the example for ‘super’ keyword.
11. Implement a java program to give a simple example for abstract class.
12. Implement a java program illustrating multiple inheritance using interfaces.
13. Implement a java program to create a package named my pack and import it in circle class.
14. Implement a java program for example of try, catch and finally block. In this check whether the given array size is negative or not.
15. Implement a java program for creation of user defined exception.
16. Implement a java program for creation of multiple threads.
17. Implement a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
18. Implement a java program to add and display the group of different objects using ArrayList.
19. Implement a java program that displays number of characters, lines and words in a text file.
20. Implement an applet that displays a simple message

21. Implement a java program for creation of buttons and labels.
22. Implement a java program to create a border layout control and grid layout control.
23. Implement a java program to create a simple calculator.

II B.Tech.	SKILL ORIENTED COURSE-I FUNDAMENTALS OF DATA SCIENCE	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

1. To understand R programming language.
2. To expose in working with R language.
3. To solve different data science problems.
4. To understand classification models.
5. To understand various regression models.

COURSE OUTCOMES

Student will be able to

1. Design a simple applications and represent the solution as visualization.
2. Know the difference between correlation and covariance.
3. Understand multiple regression models.
4. Install relevant packages for classification models.
5. Apply regression Model techniques to predict the data on above dataset.
6. Plot clustering algorithms for unsupervised classification.

LIST OF EXPERIMENTS:

1. Calculator Application using R.
2. Descriptive statistics in R
3. Reading and writing different types of datasets.
4. Visualizations.
5. Correlation and Covariance.
6. Regression Model
7. Multiple Regression Model.
8. Regression model for Prediction.
9. Classification Model.
10. Clustering Model.

WEBLINKS

1. http://www.r-bloggers.com/how-to-perform-a-logistic-regression-in-r/
2. http://www.ats.ucla.edu/stat/r/dae/rreg.htm
3. http://www.coastal.edu/kingw/statistics/R-tutorials/logistic.html
4. http://www.ats.ucla.edu/stat/r/data/binary.csv

II B.Tech.	SKILL ORIENTED COURSE-I FUNDAMENTALS OF WEB APPLICATION DEVELOPMENT	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

1. To create awareness on the server side technologies like PHP, Servlets, and JSP.
2. To understand the XML Document and processing of XML Data with Java.
3. To introduce basic concepts of Java Servlets and concepts of JDBC.
4. To understand the use of JSP over Java Servlets and how to interact with DB from JSP.
5. To create awareness on client side scripting with JavaScript and AJAX.
6. Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS

COURSE OUTCOMES

Student will be able to
1. Use LAMP Stack for web applications
2. Use Tomcat Server for Servlets and JSPs
3. Develops programs to interact with the Data Base using Java Servlets
4. Write simple applications with Technologies like HTML, Javascript, AJAX, HP Servlets and JSPs
5. Connect to Database and get results
6. Parse XML files using Java (DOM and SAX parsers)

LIST OF EXPERIMENTS:

1. Install the following on the local machine.
   a) Apache Web Server (if not installed)
   b) Tomcat Application Server locally
   c) Install MySQL (if not installed)
   d) Install PHP and configure it to work with Apache web server and MySQL

2. Write an HTML page including javascript that takes a given set of integer numbers and shows them after sorting in descending order.

3. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.

4. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

6. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser Implement the following web applications using PHP, (b) Servlets and (c) JSP:

7. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.

8. Modify the above program to use an xml file instead of database.

9. Modify the above program to use AJAX to show the result on the same page below the submit button.

10. A simple calculator web application that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands.

11. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.

12. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

13. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit this site” message, where <name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to this site” message.

14. A web application for implementation:
    The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.
    If name and password matches, serves a welcome page with user's full name.
    If name matches and password doesn't match, then serves “password mismatch” page If name is not found in the database, serves a registration page, where user’s full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

15. A web application that lists all cookies stored in the browser on clicking “List Cookies” button. Add cookies if necessary.

REFERENCE BOOKS

1. Steven Holzner, **The Complete Reference PHP**, McGraw-Hill
2. Chris Bates, **Web Programming, building internet applications**, 2nd edition, Wiley Dreamtech
3. Hans Bergsten, **Java Server Pages**, SPD O'Reilly
4. D.Flanagan, **Java Script**, O'Reilly, SPD.
5. Dietel and Nieto, **Internet and World Wide Web – How to program**, Pearson.

II B.Tech.	SKILL ORIENTED COURSE-I FUNDAMENTALS OF MOBILE APPLICATION DEVELOPMENT	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

1. To work with SQLite Database and content providers.
2. Understand & communicate requirements and progress to Technical and Non-Technical team members.
3. Collaborate with cross-functional teams to define, design, and ship new features.
4. Unit-test code for robustness, including edge cases, usability, and general reliability
5. Work on bug fixing and improving application performance
6. Continuously discover, evaluate, and implement new technologies to maximize development efficiency

COURSE OUTCOMES

Student will be able to,

1. To design and implement Database Application and Content providers.
2. To design and implement Objective-C or Swift, XCode, SQLite database, Web services, JSON and XML, Cocoa Touch
3. To design and implement offline storage, threading, and performance tuning.
4. To design and implement APIs to connect iOS applications to back-end services.
5. K To design and implement other web technologies and UI/UX standards
6. To design and implement Apple's design principles and interface guidelines

EXPERIMENTS

1. SQLite Data Types
2. SQLite Data Definition Commands
3. SQLite Data Manipulation Commands
4. SQLite Select statement
5. SQLite clauses
6. SQLite Joins
7. SQLite Grouping data
8. SQLite Set Operators
9. SQLite Transactions
10. Views
11. Indexes
12. Triggers
13. SQLite Tools
14. SQLite Functions

WEBLINK

1. http://www.sqlitetutorial.net/

II B.Tech.	SKILL ORIENTED COURSE-I	L	T	P	C
I Semester	FUNDAMENTALS OF NETWORKING	1	0	2	2

COURSE OBJECTIVES

1. To build an understanding of the fundamental concepts of computer networking.
2. To familiarize the student with the basic taxonomy
3. To understand the terminology of the computer networking area.
4. To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
5. To gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
6. To have a real-time implementation strategies.

COURSE OUTCOMES

Student will be able to,

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network
6. Understand and building the skills of subnetting and routing mechanisms.

LIST OF EXPERIMENTS

1. Study on Computer Networks, Types of Networks, Cabling, Topology Structures, Device Management
2. Study and Manual configuration on Subnet masking and Network Segmentation
3. Study on Cisco router & switch and Router Components and their Functions
4. Study Packet Tracer Interface using a Hub Topology.
5. Experiments on adding multiple devices on Hub using packet tracer.
6. Experiments on network device IP configuration
7. Experiments on basic packet transfer mechanisms
8. Experiments on Basic router configuration
9. Experiments on following Configuration using packet tracer
    a. Packet Tracer Terminal to establish a console session with a Cisco IOS
    b. Router/Switch.
    c. HyperTerminal to establish a console session with a Cisco IOS router/switch.
    d. Cisco router global configuration settings.
    e. Cisco router password access.
    f. Cisco router interfaces.
10. Experiments on Testing TCP/IP Network Connectivity
11. Experiments on Address Resolution Protocol (ARP)
12. Study and experiments on Variable Length Subnet Mask (VLSM) using packet tracer
13. Experiments on cisco static routing.

TEXT BOOKS:

1. Andrew S. Tanenbaum, "Computer Networks", Third Edition

REFERENCES:

1. Behrouz A. Forouzan, "Data Communications and Networking", Fourth Edition.

WEB LINKS:

1. http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Communication%20network/New_index1.html

II B.Tech.	ENVIRONMENTAL SCIENCE (Mandatory Course)	L	T	P	C
I Semester		2	0	0	0

COURSE OBJECTIVES

1. To understand concepts of the natural resources.
2. To gain knowledge on the ecosystem and its diversity
3. To acquaintance on various environmental challenges included due to unplanned anthropogenic activities.
4. To know environmental impact of developmental activities.
5. To aware on the social issues, environmental legislation and global treaties.
6. To understand the concepts of environmental management.

COURSE OUTCOMES

Student will be able to

1. Recognize the natural resources and their importance for the sustenance of the life and need to conserve the natural resources.
2. Understand concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in food web.
3. The biodiversity of India and the threats to biodiversity and conservation practices to protect the biodiversity.
4. Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.
5. Social issues both rural and urban environment and the possible means to combat the challenges.
6. The environment legislations of India and the first global initiatives towards sustainable development.

UNIT I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit – Global Environmental Challenges: Global warming and climate change. Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in environment and human health.

Ecosystems: Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT II: NATURAL RESOURCES

Natural resources and associated problems Forest resources – Use and over _ exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Literate, Coal, Sea and River sands.

Food resources: Worlds food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT III: BIODIVERSITY AND ITS CONSERVASION

Definition: genetic, species and ecosystem diversity, classification – Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation – Hot-spots of biodiversity – threats to biodiversity: habitat loss, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT IV: ENVIRONMENTAL POLLUTION

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, nuclear hazards. Role of an individual in prevention of pollution – Pollution case studies, Sustainable Life Studies.
Solid Waste Management: Sources, Classification, effects and control measure of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e-waste management.

UNIT V: SOCAIL ISSUES AND THE ENVIRONMENT

Urban problems related to energy – Water conservation, rain water harvesting – Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation, Public awareness.

UNIT VI: ENVIRONMENTAL MANAGEMENT

Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green Business and Green politics.
The student should Visit and Industry/Ecosystem and submit a report individual on any issues related to Environmental Studies course and make power point presentation.

II B.Tech.	FORMAL LANGUAGES & AUTOMATA THEORY	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand concepts of Finite automata theory and its applications.
2. To discuss finite Automata with ϵ- Transitions, Regular expressions, and Regular languages.
3. To know the properties of Regular languages and Context-free grammars
4. To understand push-down automata, Context-free languages and its properties.
5. To learn Turing machines and Undesirability.

COURSE OUTCOMES

1. Able to design finite state machines.
2. Able to design ϵ-NFA, conversion between Finite automata and Regular expressions.
3. Able to apply pumping lemma for Regular languages, construct parse trees for CFG and ambiguous grammars.
4. Able to construct push-down automata and apply pumping lemma for CFL.
5. Able to design Turing Machines and analyze undesirability.
6. Able to convert from Push Down Automata to Context –Free Grammars and Vice Versa

UNIT I: AUTOMATA

Introduction to Automata, Fundamental Concepts of Automata Theory-Alphabets, Strings, Languages, Finite Automata: Types - DFA, NFA, Equivalence between DFA and NFA, NFA with Epsilon Transitions, Significance, Equivalence between NFA with €-Transitions to NFA without €-Transitions, Moore and Mealy Machines-Examples.

UNIT II: REGULAR EXPRESSIONS AND LANGUAGES

Regular expressions, Finite automata and regular Expressions, Algebraic laws of regular expressions-Examples

UNIT III: PROPERTIES OF REGULAR LANGUAGES

Proving Languages Are Not Regular-Pumping Lemma for Regular Languages, Applications of The Pumping Lemma, Closure Properties of Regular Languages, Equivalence Between RE And DFA, Myhill-Nerode Theorem-Minimization Of DFA.

UNIT IV: CONTEXT FREE GRAMMARS

Introduction to CFG, Definition and Classification of Grammars, Parse Tree -Derivations (LMD&RMD)-Constructing Parse Tree-Ambiguous Grammars, -Simplification of CFG's-Normal Forms, Context Free Languages-Closure Properties of CFL's-Pumping Lemma for CFL's, Membership Algorithm (CYK).

UNIT V: PUSHDOWN AUTOMATA

Introduction to PDA-Definition-Model of PDA-Types of PDA-Equivalence between Acceptance by Empty State and Acceptance by Final State, Equivalence of CFG and PDA.

UNIT VI: TURING MACHINES

Introduction to TM-TM as Acceptor, TM as a Computing Device-Techniques for construction of TM, Universal TM-Types of Turing machines, Recursive and Recursively enumerable languages.

TEXT BOOKS

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, **Introduction to Automata theory, Languages and computations**, 3rd Edition, Pearson 2008.
2. Kamal Krithiyasan and Rama R, **Introduction to Formal languages, Automata theory and computation**, Pearson education,2009

REFERENCE BOOKS

1. Nasir S.F. B, P.k.Srimani, **A Text book on automata theory**, Cambridge University Press.
2. Hopcroft, Ullman, **Introduction to Automata Theory Languages & Computation**, 3rd Edition, Pearson Edition.
3. Thomson, **Introduction to Theory of Computation**, 2nd Edition.
4. C.K.Nagpal, **Formal languages and automata Theory**, Oxford University Press.
5. K.V.N. Sunitha and N. Kalyani, **Formal Languages and automata Theory**, Pearson education,2010

WEBLINKS

1. http://www.montefiore.ulg.ac.be/~pw/cours/psfiles/calc-chap2.pdf
2. http://www.tutorialspoint.com/Automata_Theory/Context_free_grammar_introduction.html
3. http://www.tutorialspoint.com/Automata_Theory/Pushdown_Automata_Introduction.htm
4. http://www.tutorialspoint.com/Automata_Theory/Turing_Machine_Introduction.htm

II B.Tech.	COMPUTER ORGANIZATION & ARCHITECTURE	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. Students will be able to make use of the binary number system to translate values between the binary and decimal number systems, to perform basic arithmetic operations (i.e. addition, subtraction, multiplication, and division) and to construct machine code instructions.
2. Students will be able to design logical expressions and corresponding integrated logic circuits for a variety of problems including the basic components of a CPU such as adders, multiplexers, the ALU, a register file, and memory cells.

COURSE OUTCOMES

1. Able to understand the Basic structure of computer.
2. Able to understand register transfer, micro operations such as arithmetic logic ad shift.
3. Able to analyze the basic concepts and elements of a computer system.
4. Able to learn how to design a CPU.
5. Able to perform arithmetic operations.
6. Able to study memory and I/O management

UNIT I: INSTRUCTION SET ARCHITECTURES

Levels of Programming Languages Assembly Language Instructions Instruction Set Architecture Design, A Relatively Simple Instruction Set Architecture.

UNIT II: COMPUTER ORGANIZATION

Basic Computer Organization, CPU Organization, Memory Subsystem Organization and Interfacing, I/O Subsystem Organization and Interfacing, A Relatively Simple Computer-Register Transfer Languages: Micro-operations and Register Transfer Language, Using RTL to Specify Digital Systems, More Complex Digital Systems and RTL.

UNIT III: CPU DESIGN

Specifying a CPU, Design and Implementation of a Very Simple CPU, Design and Implementation of a Relatively Simple CPU.

UNIT IV: COMPUTER ARITHMETIC

Unsigned Notation, Signed Notation, Binary Coded Decimal, Specialized Arithmetic Hardware, Floating Point Numbers

UNIT V: MEMORY ORGANIZATION

Hierarchical Memory Systems, Cache Memory, Virtual Memory, Beyond the Basics of Cache and Virtual Memory, Memory Management in a Pentium/Windows Personal Computer.

UNIT VI: INPUT/OUTPUT ORGANIZATION

Asynchronous Data Transfers, Programmed I/O Interrupts., Direct Memory Access, I/O Processors, Serial Communication, and Serial Communication Standards.

TEXT BOOKS

1. John D. Carpinelli, **Computer Systems Organization and Architecture**, PEA, 2009

REFERENCE BOOKS

1. Carl Hamacher, ZvonksVranesic, SafeaZaky, **Computer Organization**, 5th Edition, MCG, 2002.
2. William Stallings, **Computer Organization and Architecture**, 8th Edition, PEA, 2010.
3. M.Moris Mano, **Computer Systems Architecture**, 3rd Edition, PEA, 2007.

II B.Tech.	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. Provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.
2. The logical design, physical design and implementation of relational databases are covered.

COURSE OUTCOMES

1. Define a Database Management System Structure
2. Understand the applications of Databases
3. Know the advantages and disadvantages of the different models
4. Compare relational model with the Structured Query Language (SQL)
5. Know the constraints and controversies associated with relational database model.
6. Know the rules guiding transaction ACID and understand the issues in transaction processing, analysing different Concurrency and recovery strategies of DBMS.

UNIT I: INTRODUCTION TO DBMS & ER MODEL

Overview, File system vs DBMS, Advantages of DBMS, Storage data, queries, Transaction Management, DBMS structure, Brief introduction of different Data Models; Three tier schema architecture for data independence.

E-R model: Entities, Attributes and Entity sets, Relationship and Relationship sets, Features of ER model, Conceptual database design with ER model.

UNIT II: RELATIONAL MODEL & SQL

Integrity constraints over relations and enforcement, querying relation data, Logical database design, views, destroying/altering tables and views**. Relational** algebra and calculus. Basic SQL, Query, union, intersection, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, Cursors, ODBC and JDBC, Triggers and Active database, designing active databases.

UNIT III: ADVANCED SQL - COMMON TABLE EXPRESSIONS

Introduction to CTE, Recursive CTE, Temporary functions, pivoting data with "when" case, Except vs NotIN, Self joins, Rank vs Dense Rank vs row number, calculating delta values, running totals, date-time manipulations.

UNIT IV: SCHEMA REFINEMENT AND NORMAL FORMS

Schema refinement, functional Dependencies, reasoning normal forms, normalization up to 3rd & BC normal forms, lossless join & dependency preserving decomposition

UNIT V: TRANSACTION MANAGEMENT& CONCURRENCY CONTROL

Transaction concept, transactions and schedules, concurrent execution of transactions, lock – based concurrency control.

Concurrency control: Lock management, specialized locking techniques, concurrency control without locking**. Crash Recovery:** Aries, recovering from a system crash, media recovery.

UNIT VI: STORAGE AND INDEXING

Database file organization, file organization on disk, heap files and sorted files, hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

TEXTBOOKS

1. Raghu ram Krishnan, Johannes Gehrke, **Database Management Systems**, 3rd Edition, McGraw Hill.
2. Ramez Elmasri, Shamkant B. Navathe, **Database Management System**, 6th Edition, PEA.

REFERENCE BOOKS

1. Silberschatz, Korth, **Database System Concepts,** 5th Edition, TMH.
2. C J Date, **Introduction to Database Systems**, 8th Edition, PEA.
3. NarainGehani, **The Database book principles &practice using Oracle/MySQL**, University Press.
4. Corlos Coronel, Steven Morris, Peter Robb, **Database Principles, Fundamentals of Design Implementation and Management**, Cengage Learning.

WEBLINKS

1. http://beginnersbook.com/2015/04/dbms-tutorial/
2. http://www.eazynotes.com/pages/database-management-system/notes.html

II B.Tech.	SOFTWARE ENGINEERING	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the software life cycle models.
2. To understand the software requirements and SRS document.
3. To understand the importance of modeling and modeling languages.
4. To design and develop correct and robust software products.
5. To understand the quality control and how to ensure good quality software.

COURSE OUTCOMES

Student will be able to

1. Define and develop a software project from requirement gathering to implementation.
2. Obtain knowledge about principles and practices of software engineering.
3. Focus on the fundamentals of modeling a software project.
4. Obtain knowledge about software testing
5. Focus on the fundamentals of quality management.
6. Obtain knowledge about estimation and maintenance of software systems

UNIT I: SOFTWARE AND SOFTWARE ENGINEERING

The Nature of Software, The Unique Nature of Web Apps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT II: REQUIREMENTS ANALYSIS AND SPECIFICATION

Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification. Software Design: Overview of the Design Process, How to Characterize of a Design? Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT III: **FUNCTION-ORIENTED SOFTWARE DESIGN**

Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object-Oriented design. User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT IV: CODING AND TESTING

Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

UNIT V: INTRODUCTION TO UML

Importance of Modeling, Principles of Modeling, object-oriented modeling: structural, behavioral and advanced behavioral modeling, conceptual model of the UML.

UNIT VI: SOFTWARE MAINTENANCE

Software maintenance, Maintenance Process Models, Maintenance Cost, Software Configuration Management. Software Reuse: what can be reused? Why almost No Reuse So Far? Basic Issues in Reuse Approach, Reuse at Organization Level.

TEXT BOOKS

1. Roger S. Pressman, "**Software engineering: A practitioner's Approach"**, 7th Edition Mc Graw Hill International Edition.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "**The Unified Modeling Language User Guide"**, Pearson Education.

REFERENCE BOOKS

1. Waman S Jawadekar, **Software Engineering: A Primer**, Mc Graw Hill, 2008
2. Pankaj Jalote, **Software Engineering- A Precise Approach**, Wiley India, 2010.
3. Deepak Jain, **Software Engineering, Principles and Practices**, Oxford University Press.

WEB LINKS

1. https://www.ece.rutgers.edu/~marsic/books/SE/links/
2. http://www.rspa.com/spi/

II B.Tech.	OPERATING SYSTEMS & UNIX PROGRAMMING	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

Student will be able to,

1. Have a control access to a computer and the files that may be shared
2. Demonstrate the knowledge of the components of computer and their respective roles in computing.
3. Recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT – I: INTRODUCTION TO UNIX:

Introduction, Architecture of UNIX, Features of UNIX, UNIX file system, Basics of vi editor, UNIX Commands – man, echo, printf, script, passwd, who, date, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, touch.

UNIT – II: UNIX UTILITIES

Security by file permissions-chmod , Text processing utilities: tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, comm, cmp, diff.

Introduction to SHELL: what is shell, Shell responsibilities, shell meta characters, shell variables, shell commands, environment Variables, control structures, shell script examples.

UNIT - III: INTRODUCTION TO OPERATING SYSTEM

Definition, Types of Operating Systems, Functions/Services of Operating System, Operating System Structure, System call, Threads, Multithreading models.

Process Management: Process Concept, Process Scheduling, Inter-process communication, CPU Scheduling Criteria, Scheduling algorithms, Algorithm evolution

UNIT-IV

Process Synchronization: Background, The Critical-Section Problem, Peterson's solution, Semaphores, Classic Problems of Synchronization, and Monitors.

Dead Locks: Definition, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT-V

Memory-Management Strategies: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table.

Virtual-Memory Management: Background, Demand Paging, Page Replacement Algorithms, allocation of frames, Thrashing.

UNIT – VI

File System: File concept, Access methods, File Mounting, Directory structure, Directory implementation, Allocation methods.

Secondary Storage Structure: Overview of mass storage structure, Disk structure, Disk scheduling Algorithms, Disk management.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Stallings, "**Operating Systems – Internals and Design Principles**", 5th Edition, 2005, Pearson Education.
2. Andrew S. Tanenbaum, "**Modern Operating Systems**", 2nd Edition, Pearson/PHI
3. Kernighan and Pike, "**UNIX Programming Environment**", PHI/ Pearson Education

II B.Tech.	OPERATING SYSTEMS & UNIX PROGRAMMING LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

Student will be able to,

1. Gain knowledge on basic UNIX commands.
2. Practice text processing utilities in UNIX.
3. Understand the basic shell commands and its functionalities.
4. Implement C programs using UNIX system calls.
5. Simulate and implement operating system concepts such as scheduling, deadlock management.
6. Understand File management and memory management system algorithms.

LIST OF EXPERIMENTS:

1. Getting hands-on basic UNIX commands
2. Practice on text processing utilities: tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, comm, cmp, diff.
3. Write a shell script to count lines, words & characters in its input. (do not use wc)
4. Write a shell script to find whether a given number is prime.
5. Write a shell script to compute GCD & LCM of two numbers
6. Write a shell script to compute Fibonacci series.
7. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
8. Simulate Bankers Algorithm for Dead Lock Avoidance
9. Simulate the following page replacement algorithms.
   a) FIFO b) LRU c) Optimal
10. Simulate the following Disk Scheduling Algorithms
    a) FCFS b)SSTF c) SCAN d) CSCAN

II B.Tech.	CASE TOOLS LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To Understand the basic symbols used in UML diagram
2. To represent the connectivity between symbols and different links.
3. To introduce systematic representation of application flow.
4. To implement UML diagrams for real time implementations.
5. To have knowledge on design patterns.

COURSE OUTCOMES

Student will be able to;

1. Understand and effectively explain the underlying concepts of UML design patterns.
2. Design and implement a UML for solving complex structures.
3. Generate skeleton of a program through forward engineering.
4. Understand how to model requirements with use cases.
5. Describe the dynamic behavior of the design pattern.
6. Understand the structure of design for real time environment.

List of Experiments:

1. To create a UML diagram of ATM APPLICATION.
2. To create a UML diagram of LIBRARY MANAGEMENT SYSTEM.
3. To create a UML diagram of ONLINE BOOK SHOP
4. To create a UML diagram of RAILWAY RESERVATION SYSTEM
5. To create a UML diagram for BANKING SYSTEM
6. To design a Document Editor
7. Using UML design Abstract factory design pattern
8. Using UML design Builder Design pattern
9. Using UML design Facade Design pattern
10. Using UML design Bridge Design pattern
11. Using UML design Decorator Design pattern
12. User gives a print command from a word document. Design to represent this chain of responsibility design pattern

II B.Tech.	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To give a good formal foundation on the relational model of data
2. To present SQL and procedural interfaces to SQL comprehensively
3. To introduce systematic database design approaches covering conceptual design, logical design and an overview of physical design

COURSE OUTCOMES

Student will be able to,

1. Understand and effectively explain the underlying concepts of database design.
2. Design and implement a database schema for a given problem-domain
3. Populate and query a database using SQL DML/DDL commands and applying enforce integrity constraints on a database.
4. Executing PL/SQL including stored procedures, stored functions, cursors, packages.
5. Join multiple tables using different types of joins.
6. Understand PL/SQL Architecture and write PL/SQL code for procedures, triggers, cursors.

LIST OF EXPERIMENTS

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Write the Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET.
3. Writ the Queries using aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation, dropping of Views.
4. Queries using Conversion functions, String functions. Date functions
5. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and print along with his/her Grade, and an exception can be raised if no records were found)
6. Develop Programs using Before Triggers, Statement Triggers
7. Write a PL/SQL block to check whether a given number is Even or Odd.
8. Write a PL/SQL program to calculate the sum of the integers between 1 and N.
9. Write a PL/SQL block to find Sum of Digits of a given Number.
10. Write a PL/SQL block to Generate Fibonacci Series
11. Write a PL/SQL block to Check the Given String is Palindrome or Not.
12. Display the name of the day on the screen based on the Date and the date is entered by the user.

II B.Tech.	SKILL ORIENTED COURSE-II FUNDAMENTALS ON ANDROID TECHNOLOGIES	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. To provide knowledge on database and content providers.
2. To teach Swift, Xcode, SQL queries, JSON and XML.
3. To provide knowledge on threading and tuning performance.
4. To create iOS applications and connect with database.
5. To learn iOS design principles and interface guidelines.

COURSE OUTCOMES

Student will be able to,

1. Design and implement Database Application and Content providers.
2. Design and implement Objective-C or Swift, XCode, SQLite database, Web services, JSON and XML
3. Design and implement offline storage, threading, and performance tuning.
4. Design and implement APIs to connect iOS applications to back-end services.
5. Design and implement other web technologies and UI/UX standards
6. Design and implement Apple's design principles and interface guidelines

LIST OF EXPERIMENTS

1. Overview of JAVA OBJECT ORIENTED PROGRAMMING.
2. Install Android Studio and Run Hello World!
3. Making your First Interactive UI using Layouts.
4. Working with TextView elements, Learning about Available Resources.
5. Create and Start Activities, Activity Life Cycle and State, Activities.
6. Using the Debugger and Implicit Intents, Testing your Application using Support Libraries.
7. Using Keyboards, input Controls, Alerts and Pickers.
8. Using an Options Menu and Radio Buttons, Using the App Bar and Tabs for Navigation,
9. Creating a Recycler View, Drawables Styles and Themes.
10. Material Design: Lists, Cards and Colors.
11. Using Espresso to test your UI, Create an Async Task, Connect to the Internet with Async Task and Async Task Loaders.
12. Broadcast Receivers, Notifications, Alarm Manager, Job Scheduler
13. Shared Preferences, Adding Settings to an App, SQLite Database, Searching a SQLite Database,
14. Implementing a minimal List Content Provider, Adding a content Provider to your Database, Sharing content with other Applications.
15. Publishing App on Google Play Store

II B.Tech.	SKILL ORIENTED COURSE-II FUNDAMENTALS OF SEVER SIDE CONCEPTS	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. To learn basics of Python programming language.
2. To understand Django architecture, MVC and MVT.
3. To create application using HTML.
4. To provide request and response in HTTP.
5. To understand the responsibilities of users, admin and superuser.
6. To connect database with dynamic web page using SQL

COURSE OUTCOMES

Student will be able to,

1. Use LAMP Stack for web applications
2. Use Tomcat Server for Servlets and JSPs
3. Develops programs to interact with the Data Base using Java Servlets
4. Write simple applications with Technologies like HTML, Javascript, AJAX, HP Servlets and JSPs
5. Connect to Database and get results
6. Parse XML files using Java (DOM and SAX parsers)

LIST OF EXPERIMENTS

1. Introduction to Python
    a. Python Packages and modules using oop's.
2. Django:
    a. Introduction to Django
    b. MVC, MVT, Architecture of Django
    c. Django Installation
3. Project Creation, APP creation and use of admin app
4. URL mapping (creation), Dynamic URL mapping, views
5. Interface between controller (urls.py & views.py) files
6. Http Request and Responses.
7. Django Templates
8. Providing an interface between controller and templates
9. Static file handling
10. Data rendering from HTML to views and then views to HTML with example.
11. Model creation
12. Migrations, ORM
13. Model Queries (Django shell)
14. Superuser Creation (admin part)
15. Roles of the superuser.
16. Crud operations, Messages generation
17. Form Validations
18. Database Connectivity and Database Migrations with MYSQL

19. Mail Sending
20. File Uploading
21. User Registration & User Authentication
22. Templates Blocks
23. User Profile Creation

II B.Tech.	SKILL ORIENTED COURSE-II FUNDAMENTALS OF DATA SCIENCE LIBRARIES IN PYTHON	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. To create simple applications using Python.
2. To understand the concepts of correlation and covariance.
3. To define regression models.
4. To provide information about classification model packages.
5. To create and access dataset for different regression models.
6. To visualize the result through plot.

COURSE OUTCOMES

Student will be able to,

1. Design a simple applications and represent the solution as visualization
2. Know the difference between correlation and covariance.
3. Understand multiple regression models.
4. Install relevant packages for classification models.
5. Apply regression Model techniques to predict the data on above dataset
6. Plot clustering algorithms for unsupervised classification

LIST OF EXPERIMENTS

1. Python basics for Data Science
    a. Loading, Cleaning, Visualization of different types of data.
2. Python libraries for Data Science
3. TensorFlow
4. NumPy
5. SciPy
6. Pandas
7. Matplotlib
8. Keras
9. SciKit-Learn
10. PyTorch
11. Scrapy
12. BeautifulSoup

II B.Tech.	SKILL ORIENTED COURSE-II FUNDAMENTALS OF ORGANIZATIONAL LOCAL AREA NETWORKS USING NS2	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. To understand basic computer technology.
2. To learn data communication systems and its protocols.
3. To elaborate on wireless LAN protocols and network performance.
4. To study stop and wait protocol.
5. To understand features of routing algorithms and its implementations.
6. To encrypt and decrypt the data to provide security during sending and receiving data among devices.

COURSE OUTCOMES

Student will be able to,

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network
6. Understand and building the skills of subnetting and routing mechanisms.

LIST OF EXPERIMENTS

1. Ethernet LAN protocol. To create Scenario and study the performance of CSMA/CD protocol through simulation
2. Token Bus and Token Ring protocols. To create scenario and study the performance of token bus and token ring protocols through simulation
3. Wireless LAN protocols. To create scenario and study the performance of network with CSMA/CA protocol and compare with CSMA/CD protocols
4. Implementation and study of Stop and Wait protocol
5. Implementation and study of Go back N and Selective Repeat protocols
6. Implementation of Distance Vector Routing algorithm
7. Implementation of Link state routing algorithm
8. Implementation of data encryption and decryption
9. Transfer of files from PC to PC using Windows/ UNIX socket processing

Hardware required: LAN Trainer Kit, Computers
Software required: Netsim, NS2

III B.Tech	COMPUTER NETWORKS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To understanding of the fundamental concepts of computer networking.
2. To familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Preparing a student for entering into advanced courses in computer networking.
4. To gain expertise in certain protocol communications and resource sharing.

COURSE OUTCOMES

Student will be able to

1. Enumerate the layers of the OSI model and TCP/IP Model and their function(s) of each layer.
2. Understand basic characteristics of Physical media data representation and communication.
3. Know how the data link layer prepares data for transmission and how it's Sub layers will work.
4. Know how packets are routed from a device on one network to a device on a different network.
5. Describe how TCP and UDP will function in data transmission.
6. List the functions and protocol performers in the top three layers in the OSI Model.

UNIT I: INTRODUCTION

Introduction to Computer Networks, uses of networks, Physical Structure: Data flow modes, types of connections, Transmission media, Network Topologies, Categories of networks, Protocols & Standards, Reference models: Design issues for the layer, OSI Reference model, TCP/IP Reference model, Address in TCP/IP.

UNIT II: PHYSICAL LAYER

Design issues of physical layer, Analog & Digital Data representation, encoding: Binary Stream, Manchester, NRZ, NRZ-I. Data transmission modes: Parallel, Serial, Multiplexing: FDM, WDM, TDM, switching: Circuit Switching and Packet Switching. Structure of a Switching.

UNIT III: DATA LINK LAYER

Design issues of DLL, services provided to the network layer, Framing, Error Control, Flow Control, Hamming Distance, Error Handling Methods, Elementary data link layer Protocols: Simplex, Stop-and-Wait, Stop-and-Wait ARQ, Sliding windows: Go-back-N and Selective Repeat, Data link layer in HDLC: configuration and transfer modes, frames, control field, point to point protocol (PPP): framing transition phase, multiplexing, multilink PPP.

UNIT IV: MULTIPLE ACCESS

Channel Allocation problems, Random Access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled Access: Reservation, POLLING, Token Passing. Channelization: FDMA, TDMA and CDMA.

UNIT V: NETWORK LAYER

Design Issues of Network Layer, Routing Algorithms: Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, IP Addresses, Subnetting.

UNIT VI: TRANSPORT LAYER

Services provided to Upper Layer, Elements of transport layer: Addressing, connection establishment, connection release, error control, flow control, crash recovery, and congestion control- Bandwidth allocation, TCP: TCP service, Segments, connection establishment, connection release, UDP: User datagram, checksum, use of UDP. Application Layer: Domain Name System: DNS name space, resource record. Email: Architecture, user agent, Message transfer agent: SMTP, Message access agent: POP & IMAP, file transfer (FTP), SNMP.

TEXT BOOKS

1. Behrouz A. Forouzan, **Data Communications and Networks,** 3rd Edition, McGraw Hill.
2. Andrew S Tanenbaum, **Computer Networks**, 4th Edition. Pearson Education PHI.

REFERENCE BOOKS

1. David Patterson, **Computer Networks**, 5th Edition, Elsevier.
2. Mayank Dave, **Computer Networks**, Cengage.
3. S. Keshav, **An Engineering Approach to Computer Networks,** 2nd Edition, Pearson Education
4. W.A. Shay, **Understanding communications and Networks**, 3rd Edition, Thomson.

WEB LINKS

1. https://en.wikipedia.org/wiki/Computer_network
2. http://web.cs.wpi.edu/~cs513/s07/week6-nl.pdf
3. https://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol
4. http://web.cs.wpi.edu/~cs4514/b98/week3-dllprot/week3-dllprot.html.

III B.Tech.	DESIGN & ANALYSIS OF ALGORITHMS	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To analyse performance of algorithms.
2. To choose the appropriate data structure and algorithm design method for a specified application.
3. To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
5. Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

COURSE OUTCOMES

Student will be able to

1. Analyze algorithms and improve the efficiency of algorithms.
2. Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc. Ability to understand and estimate the performance of algorithm.
3. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms and analyze them.
4. Explain the different ways to analyze randomized algorithms (expected running time, probability of error). Recite algorithms that employ randomization. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs.
5. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components and analyze them.
6. Compare between different data structures. Pick an appropriate data structure for a design situation.

UNIT I: INTRODUCTION

Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis.

UNIT II: DIVIDE AND CONQUER

General method, applications-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication.

UNIT III: **GREEDY METHOD**

General method, applications - Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT IV: DYNAMIC PROGRAMMING

General method, Applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT V: BACKTRACKING

General method, applications-n-queen problem, sum of subsets problem, graph colouring, Hamiltonian cycles.

UNIT VI: BRANCH AND BOUND

General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

TEXT BOOKS

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, **Fundamentals of Computer Algorithms**, Galgotia publications pvt. Ltd.
2. R. Neapolitan and K. Naimipour, **Foundations of Algorithm**, 4th Edition Jones and Bartlett Learning.
3. P. H. Dave, H. B. Dave, **Design and Analysis of Algorithms**, Pearson Education, 2008.

REFERENCE BOOKS

1. Sara Baase, Allen, Van, Gelder, **Computer Algorithms, Introduction to Design and Analysis,** 3rd Edition, Pearson Education.
2. M. T. Goodrich and R. Tomassia, **Algorithm Design: Foundations, Analysis and Internet examples**, John Wiley and sons.
3. K. A. Berman and J. L. Paul, **Fundamentals of Sequential and Parallel Algorithm**, Cengage Learning.
4. A. Levitin, **Introduction to the Design and Analysis of Algorithms**, Pearson Education.
5. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, **Introduction to Algorithms**, 3rd Edition, PHI.
6. Aho, Ullman and Hopcroft, **Design and Analysis of algorithm**, Pearson Education, 2004.

WEB LINKS

1. http://nptel.ac.in/courses/106101060/
2. http://cs.uef.fi/pages/franti/asa/notes.html

III B.Tech.	INTERNET PROGRAMMING	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES:

1. To understand different Internet Technologies.
2. To learn java-specific web services architecture

COURSE OUTCOMES:

1. Construct a basic website using HTML and Cascading Style Sheets.
2. Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
3. Develop server side programs using Servlets and JSP.
4. Construct simple web pages in PHP and to represent data in XML format.
5. Use AJAX and web services to develop interactive web applications.
6. Develop database driven web service application using SOAP.

UNIT I: WEBSITE BASICS, HTML 5, CSS 3, WEB

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls - CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.

UNIT II: CLIENT SIDE PROGRAMMING

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,- Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.

UNIT III: SERVER SIDE PROGRAMMING

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

UNIT IV: PHP and XML

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions- Form Validation- Regular Expressions - File handling – Cookies - Connecting to Database. XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT V: INTRODUCTION TO AJAX

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods;

UNIT VI: WEB SERVICES:

Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application – SOAP.

TEXT BOOK:

1. Deitel and Deitel and Nieto, "**Internet and World Wide Web - How to Program**", Prentice Hall, 5th Edition, 2011.

REFERENCE BOOKS:

1. Stephen Wynkoop and John Burke, "**Running a Perfect Website**", 2nd Edition, 1999.
2. Chris Bates, "**Web Programming – Building Intranet Applications**", 3rd Edition, Wiley Publications, 2009.
3. Jeffrey C and Jackson, "**Web Technologies A Computer Science Perspective**", Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J, "**Web Technology**", Prentice Hall of India, 2011.
5. Uttam K.Roy, "**Web Technologies**", Oxford University Press, 2011.

III B.Tech.	DATA WAREHOUSING AND DATA MINING (Professional Elective Course – I)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. Be familiar with the concepts of data warehouse and data mining,
2. Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

COURSE OUTCOMES

Student will be able to

1. Design a data mart or data warehouse for any organization
2. Asses Raw input data and preprocess it to provide suitable input for range of data mining algorithms
3. Extract association rules and classification model
4. Identify the similar objects using clustering techniques
5. Explore recent trends in data mining such as web mining, spatial-temporal mining
6. Apply data mining techniques to complex data objects like multimedia data.

UNIT I: DATA MINING

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues.

UNIT II: DATA PREPROCESSING

Introduction, Data Pre-processing Overview, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT III: DATA WAREHOUSE & OLAP

Introduction: What is OLAP? Characteristics of OLAP, Steps in the OLAP Creation Process, Advantageous of OLAP, What is Multidimensional Data, OLAP Architectures, MOLAP, ROLAP, HOLAP, Data Warehouse and OLAP, Hypercube & Multicubes.

Data Warehouse Fundamentals: Introduction to Data Warehouse, OLTP Systems, Differences between OLTP Systems and Data Warehouse, Characteristics of Data Warehouse; Functionality of Data Warehouse: Advantages and Applications of Data Warehouse; Advantages, Applications: Top- Down and Bottom-Up Development Methodology: Tools for Data warehouse development: Data Warehouse Types.

UNIT IV: ASSOCIATION ANALYSIS

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining.

UNIT V: CLASSIFICATION

Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation.

UNIT VI: CLUSTERING

Cluster Analysis – Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods – Density-Based Methods –Grid Based Methods.

TEXTBOOKS

1. Jiawei Han and Micheline Kamber, **Data Mining Concepts and Techniques**, 3rd Edition, Elsevier, 2012.
2. Alex Berson and Stephen J.Smith, **Data Warehousing, Data Mining and OLAP**, McGraw Hill Edition, Thirteenth Reprint 2008.

REFERENCE BOOKS

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, **Introduction to Data Mining**, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Aja, **Insight into Data Mining Theory and Practice**, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, **Introduction to Data Mining with Case Studies**, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T. Larose, **Data Mining Methods and Models**, Wiley-Interscience, 2006.

WEB LINKS

1. https://www.tutorialspoint.com/dwh/dwh_overview.htm
2. https://www.hinduwebsite.com/webresources/data_warehousing.asp

III B.Tech.	SCRIPTING LANGUAGES	L	T	P	C
I Semester	(Professional Elective Course – I)	3	0	0	3

COURSE OBJECTIVES

1. To be familiar with the concepts of Ruby basics.
2. Be acquainted with the tools and techniques used for Scripting, extending PERL.

COURSE OUTCOMES

Student will be able to

1. Comprehend the differences between typical scripting languages.
2. Learn typical system and application programming languages.
3. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby.
4. Select an appropriate language for solving a given problem.
5. Acquire programmingg skills in scripting language.
6. Implement the knowledge gained in real time environment.

UNIT 1: INTRODUCTION:

Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services
RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT 2: EXTENDING RUBY:

Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT 3: 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 4: ADVANCED PERL

Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT 5: TCL

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface

UNIT 6: TK

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS:

1. David Barron, "**The World of Scripting Languages**", Wiley Publications.
2. David Flanagan and Yukihiro Matsumoto, "Ruby Programming language" O'Reilly
3. Dave Thomas, "**Programming Ruby" The Pramatic Progammers guide**", 2nd edition

REFERENCE BOOKS:

1. J. Lee and B. Ware, **Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP**, (Addison Wesley) Pearson Education.
2. E. Quigley, "**Perl by Example**", Pearson Education.
3. Larry Wall, T. Christiansen and J. Orwant, "**Programming Perl**", O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. J. P. Flynt "**Perl Power**", Cengage Learning.

III B.Tech.	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
I Semester	(Professional Elective Course – I)	3	0	0	3

COURSE OBJECTIVES

1. The concepts of classical encryption techniques and concepts of finite fields and number theory.
2. Explore the working principles and utilities of various cryptographic algorithms including
3. secret key cryptography, hashes and message digests, and public key algorithms
4. Explore the design issues and working principles of various authentication protocols, PKI standards.
5. Explore various secure communication standards including Kerberos, IPsec, and SSL/TLS and email.
6. The ability to use existing cryptographic utilities to build programs for secure

COURSE OUTCOMES

Student will be able to

1. Identify information security goals, classical encryption techniques
2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes
4. Apply different digital signature algorithms to achieve authentication and create secure applications
5. Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.
6. Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications

UNIT I: CLASSICAL ENCRYPTION TECHNIQUES

Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques.

UNIT II: BLOCK CIPHERS & SYMMETRIC KEY CRYPTOGRAPHY

Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES Structure, Transformation functions, Key Expansion, Blowfish, CAST-128, IDEA, Block Cipher Modes of Operations.

UNIT III: NUMBER THEORY

Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms.

UNIT IV: PUBLIC KEY CRYPTOGRAPHY AND HASH FUNCTIONS

Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal encryption & decryption, Elliptic Curve Cryptography. Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication

Functions, Requirements & Security, HMAC & CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.

UNIT V: USER AUTHENTICATION, TRANSPORT LAYER SECURITY & EMAIL SECURITY

User Authentication: Remote user authentication principles, Kerberos. Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell (SSH). Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT VI: IP SECURITY & INTRUSION DETECTION SYSTEMS

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

TEXT BOOKS

1. William Stallings, **Cryptography & Network Security: Principles and Practices**, 6th Edition, PEA.
2. Chwan Hwa Wu, J. David Irwin, **Introduction to Computer Networks & Cyber Security**, CRC press.
3. Russell, Kaminsky, Forest Puppy, **Hack Proofing your Network**, Wiley Dream Tech.

REFERENCE BOOKS

1. Keith Martin, **Everyday Cryptography, Fundamental Principles & Applications**, Oxford.
2. Bernard Menezes, **Network Security & Cryptography**, Cengage, 2010.

WEB LINKS

1. https://www.mitel.com/articles/Web-Communication-Cryptography-and-Network-Security
2. https://www.ecpi.edu/blog/Crypotgraphy-and-Network-Security

III B.Tech.	ARTIFICIAL NEURAL NETWORKS	L	T	P	C
I Semester	(Professional Elective Course – I)	3	0	0	3

COURSE OBJECTIVES:

1. To understand the biological neural network and to model equivalent neuron models.
2. To understand the architecture, learning algorithm.
3. To know the issues of various feed forward and feedback neural networks.

COURSE OUTCOMES:

Student will be able to;

1. Create different neural networks of various architectures both feed forward and feed backward.
2. Perform the training of neural networks using various learning rules.
3. Perform the testing of neural networks.
4. Perform analysis of these networks for various pattern recognition applications.
5. Evaluate self-organization maps by using adaptive classifier.
6. Learn neuro dynamic models and Hopfield Models.

UNIT - I

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT - II

Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT - III

Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment
Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT - IV

Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT - V

Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT - VI

Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, Computer Experiment

TEXT BOOKS:

1. Simon Haykin, "**Neural Networks a Comprehensive Foundations**", PHI edition.

REFERENCE BOOKS:

1. B. Vegnanarayana, "**Artificial Neural Networks**", Prentice Hall of India P Ltd 2005
2. Li Min Fu, "**Neural Networks in Computer Intelligence**", McGraw Education, 2003.
3. James A Freeman David M S Kapura, "**Neural Networks**", Pearson Education 2004.
4. Jacek M. Zurada, "**Introduction to Artificial Neural Systems**", JAICO Publishing House, Ed. 2006.

III B.Tech.	WATER RESOURCE ENGINEERING	L	T	P	C
I Semester	(Open Elective Course – I)	3	0	0	3

COURSE OBJECTIVES

1. To build on the student's background in Hydrology and Hydraulics and understanding of Water Resources Systems.
2. To develop the skills in modeling of flood flows and flood routing.
3. To develop skills in the Ground Water Flow, type of Aquifer and Yield from the well.
4. To provide the knowledge of Design of Reservoir, Operation and Sedimentation.
5. To study the effect, Causes and Remedial Measures of Water –Logging.

COURSE OUTCOMES

Student will be able to

1. Design various channel systems.
2. Design Head and Cross Regulator Structures.
3. Identify various types of Reservoir and their Design Aspects.
4. Understand the Process of Cross Drainage Works and its Design.
5. Design Different types of Dams.
6. Design of different types of spillways.

UNIT I: IRRIGATION

Necessity and Importance, Principal Crops and Crop Seasons, Types, Methods of Application, Soil-Water-Plant Relationship, Soil Moisture Constants, Consumptive Use, Estimation of Consumptive Use, Crop Water Requirement, Duty and Delta, Factors Affecting Duty, Depth and Frequency of Irrigation, Irrigation Efficiencies, Water Logging and Drainage, Standards of Quality for Irrigation Water, Crop Rotation.

UNIT II: CANALS

Classification, Design of Non-Erodible Canals - Methods of Economic Section and Maximum Permissible Velocity, Economics of Canal Lining, Design of Erodible Canals -Kennedy's Silt Theory and Lacey's Regime Theory, Balancing Depth of Cutting.

UNIT III: CANAL STRUCTURES

Falls: types and location, design principles of Sardar type fall and straight glacis fall. Regulators: Head and Cross Regulators, Design Principles Cross Drainage Works: Types, Selection, and Design Principles of Aqueduct, Siphon Aqueduct and Super Passage. Outlets: Types, Proportionality, Sensitivity and Flexibility River Training: Objectives and Approaches

UNIT IV: DIVERSION HEAD WORKS

Types of Diversion Head Works, Weirs and Barrages, Layout of Diversion Head Works, Components. Causes and Failures of Weirs on Permeable Foundations, Bligh's Creep Theory, Khosla's Theory, Design of Impervious Floors for Subsurface Flow, Exit Gradient.

UNIT V: RESERVOIR PLANNING

Investigations, Site Selection, Zones of Storage, Yield and Storage Capacity of Reservoir, Reservoir Sedimentation. Dams: Types of Dams, Selection of type of Dam, Selection of Site for a Dam. Gravity Dams, Forces Acting on a Gravity Dam, Causes of Failure of a Gravity Dam, Elementary Profile and Practical Profile of a Gravity Dam, Limiting Height of a Dam, Stability Analysis, Drainage Galleries, Grouting.

UNIT VI: EARTH DAMS

Types, Causes of Failure, Criteria for Safe Design, Seepage, Measures for Control of Seepage-Filters, Stability Analysis-Stability of Downstream Slope During Steady Seepage and Upstream Slope During Sudden Drawdown Conditions. Spillways: Types, design principles of Ogee spillways, types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

TEXT BOOKS

1. Punmia BC, P.B.B Lal, A.K. Jain, "**Irrigation and Water Power Engineering**", Laxmi Publications Private Limited, New Delhi.
2. Asawa G L, "**Irrigation and Water Resources Engineering**", New Age International Publishers, 2013

REFERENCE BOOKS

1. Mays L.W, "**Water Resources Engineering**", Wiley India, Private Limited, New Delhi, 2013.
2. Sharma R.K and Sharma T.K, "**Irrigation Engineering**", S. Chand & Co Publishers, 2012

III B.Tech.	AUTOMATION AND ROBOTICS	L	T	P	C
I Semester	(Open Elective Course – I)	3	0	0	3

COURSE OBJECTIVES

1. To develop the student's knowledge in various robot structures and their workspace.
2. To develop student's skills in performing spatial transformations associated with rigid body motions.
3. To develop student's skills in perform kinematics analysis of robot systems.
4. To provide the student with knowledge of the singularity issues associated with the operation of robotic systems.
5. To provide the student with some knowledge and analysis skills associated with trajectory planning.
6. To provide the student with some knowledge and skills associated with robot control

COURSE OUTCOMES

Student will be able to

1. The goal of the Robotics course is to familiarize the students with the concepts and techniques in robot manipulator control
2. Enough to evaluate, chose, and incorporate robots in engineering systems
3. Develop a trajectory plan for a given application
4. Understand actuators and feedback devices used in robotic systems
5. Analyze robotics systems for dynamic performance using Lagrange-Euler and Newton-Euler formulations.
6. Write a program on robots

UNIT – I AUTOMATION

Definition of automation, Automation Production and Flow Lines – Methods of Work part Transport, General Terminology and Analysis. Production Economics – Costs in Manufacturing, Break-Even Analysis, Unit cost of production, Cost of Manufacturing Lead time and Work-in-process.

UNIT-II INTRODUCTION TO ROBOTICS

Introduction, Basic concepts -Laws of Robotics – Robot anatomy –Components of robots- Robot motions – Degrees of Freedom – Workspace and work envelope, Robot Configurations, Advantages, Limitations, and applications.

UNIT-III ROBOT END EFFECTORS

Introduction – Types of end effectors – Mechanical grippers – Vacuum cups, magnetic grippers, adhesive grippers, and others – Robot / End effectors interface – Considerations in gripper selection and design- Joint Motion-Pitch, yaw and roll.

.UNIT-IV MOTION OF ROBOTS

MANIPULATOR KINEMATICS: Introduction – Coordinate Frames, Description of Objects in space, Rotation Matrices, Homogeneous Transformation, Transformation of robotic arm for position and orientation, Numericals problems

UNIT-V ROBOT PROGRAMMING LANGUAGES

Robot Programming Languages. Methods of Robot Programming– Leadthrough Programming Methods- A Robot Program as a Path in Space- Motion Interpolation- Wait, Signal, and Delay Commands- Capabilities and Limitations of Leadthrough Methods.

UNIT-VI APPLICATION OF ROBOTS

APPLICATIONS OF ROBOTS: Robot applications in Material transfer and machine loading / unloading applications – Processing operations like(Material handling, Spot and Continuous Arc Welding, Spray Painting) – Assembly and inspection – Future applications- Hazardous and Inaccessible Non-Manufacturing.

TEXT BOOKS

1. Industrial Robotics / Groover M P / PersonEdu.
2. Nagrath and Mittal, “Robotics and Control”, Tata McGraw-Hill.

REFERENCES

1. Spong and Vidhyasagar, “Robot Dynamics and Control”, John Wiley and sons, 2008.
2. Fu. K.S, Gonzalez, R.C., Lee, C.S.G, Robotics, control, sensing, Vision and Intelligence, McGraw Hill International, 1987
3. Harry Asada & Slottine “Robot Analysis& Control”, Wiley Publications, 2014
4. S K Saha, “introduction to Robotics”, 2nd edition, TMH, 20131. Mikell P.Grover,.

III B.Tech.	RENEWABLE ENERGY SOURCES	L	T	P	C
I Semester	(Open Elective Course – I)	3	0	0	3

COURSE OBJECTIVES

1. It introduces solar energy its radiation, collection, storage and application.
2. It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy sources.

COURSE OUTCOMES

Students will be able to

1. Understand the Role and potential of new and renewable source
2. Know concept of solar energy storage.
3. Understand the different applications of solar energy.
4. Understand the fundamentals of horizontal and vertical axis windmills.
5. Know principles of ocean, wave energy and its application.
6. Lean to conversion of bio mass energy.

UNIT I: PRINCIPLES OF SOLAR RADIATION

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT II: SOLAR ENERGY COLLECTION

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT III: SOLAR ENERGY STORAGE AND APPLICATIONS

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications-solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT IV: WIND ENERGY

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Geothermal Energy**:** Resources, types of wells, methods of harnessing the energy, potential in India.

UNIT V: OCEAN ENERGY

Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and

Wave Energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT VI: BIO-MASS

Principles of Bio-Conversion, Anaerobic/aerobic digestion, Types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C Engine operation and economic aspects.

TEXT BOOKS

1. G.D. Rai, Non-Conventional Energy Sources, 4th Edition, *Khanna Publishers*, 2000.
2. Ramesh & Kumar, Renewable Energy Technologies, Narosa Publication,

REFERENCE BOOKS

1. Tiwari and Ghosal,**Renewable energy resources**, Narosa Publication
2. Ashok V Desai,**Non-Conventional Energy**, Wiley Eastern.
3. K Mittal,**Non-Conventional Energy Systems**, Wheeler
4. Sukhatme, **Solar Energy,** kindle Edition**.**

III B.Tech.	INTRODUCTION TO EMBEDDED SYSTEMS (Open Elective Course – I)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. Understand the building blocks of typical embedded system and different memory technology and memory types.
2. Learn the characteristics of an embedded system, quality attributes of embeddedsystems, Application specific and domain specific embedded system.
3. Learn about communication devices and basics about VLSI and integrated circuit design and learn concept of firmware design approaches, ISR concept. Interrupt sources, interrupt servicing mechanism, multiple interrupts.
4. Understand the concepts of c versus embedded c and compiler versus cross-compiler.
5. Learn about the integrated development environment, software utility tool.
6. Also learn about quality assurance and testing of the design, testing on host machine, simulators.

COURSE OUTCOMES

Student will be able to

1. Know basics of embedded system, classification, memories, different firmware.
2. Know its role in embedded system, different system components
3. Distinguish all communication devices in embedded system, other peripheral device.
4. Distinguish concepts of C versus embedded C and compiler versus cross-compiler.
5. Choose an operating system, and learn how to choose an RTOS ,Know the different Debugging models
6. Learn the different Debugging tools.

UNIT-I: BASICS OF EMBEDDED SYSTEMS

Embedded System-Definition, History, Classification, application areas and purpose of embedded systems, The typical embedded system-Core of the embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware. Characteristics, Quality attributes of an embedded systems, Application-specific and Domain-Specific examples of an embedded system.

UNIT-II: EMBEDDED HARDWARE DEVICES

Analog and digital electronic components, I/O types and examples, Serial communication devices, Parallel device ports, Wireless devices, Timer and counting devices, Watchdog timer, Real time clock.

UNIT-III: EMBEDDED FIRMWARE DESIGN

Embedded Firmware design approaches, Embedded Firmware development languages, ISR concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, DMA, Device driver programming, Concepts of C versus Embedded C and Compiler versus Cross-compiler.

UNIT-IV: REAL TIME OPERATING SYSTEM

Operating system basics, Types of operating systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Threads, Processes and Scheduling, Task Scheduling, Communication, Synchronization, How to choose an RTOS. **Hardware Software Co-Design:**

Fundamental Issues in Hardware Software Co-Design, Hardware software Trade-offs, Integration of Hardware and Firmware, ICE.

UNIT-V: EMBEDDED SYSTEM DEVELOPMENT

The integrated development environment, Types of files generated on cross-compilation, Disassembler/Decompiler, Simulators, Emulators and Debugging, Target hardware debugging, Boundary Scan, Embedded Software development process and tools.

UNIT-VI: EMBEDDED SYSTEM IMPLEMENTATION AND TESTING

The main software utility tool, CAD and the hardware, Translation tools-Pre-processors, Interpreters, Compilers and Linkers, Debugging tools, Quality assurance and testing of the design, Testing on host machine, Simulators, Laboratory Tools.

TEXT BOOKS:

1. Tammy Noergaard, "**Embedded Systems Architecture**", Elsevier Publications, 2005
2. Frank Vahid, Tony Givargis, "**Embedded System Design**", Wiley Publications.

REFERENCE BOOKS:

1. Raj Kamal, "**Embedded Systems**", McGraw Hill Education Private Limited, Second Edition, 2008
2. Labrosse, "**Embedding system building blocks**", CMP publishers.

III B.Tech.	COMPUTER NETWORKS LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES

1. Understanding of basic concepts related to networking.
2. Gain the knowledge with basic taxonomy and terminology in computer networks.
3. Analyze the performance of a network using various performance metrics.
4. Analyze the performance of routing protocols with various parameters.

COURSE OUTCOMES

Student will be able to

1. To know the fundamental concepts in computer networks.
2. To grasp the significance of basic taxonomy and terminology in computer networks.
3. To build a network with required values of performance metrics.
4. To compare the performance of various routing protocols.

LIST OF EXPERIMENTS (Using Network Simulator-2/3)

1. Write a program for TCP and UDP communication between Clients and Servers.
2. Write a program to establish Point-to-Point communication between client and server and analyze its performance using various parameters.
3. Write a program to create a network and analyze its performance by varying its parameters.
4. Write a program to create various network topologies with n-nodes.
5. Implementation of Distance Vector Routing Algorithm.
6. Implementation of Link State Routing Protocol.
7. Study and implement subnet masking.
8. Implementation of EIGRP.
9. Implement Open Shortest Path Routing Protocol.
10. Implement Routing Information Protocol.

III B.Tech.	INTERNET PROGRAMMING LAB	L	T	P	C
I Semester		0	0	3	1.5

COURSE OBJECTIVES:

1. To be familiar with Web page design using HTML/XML and style sheets
2. To be exposed to creation of user interfaces using Java frames and applets.
3. To learn to create dynamic web pages using server side scripting.
4. To learn to write Client Server applications.
5. To be familiar with the PHP programming.
6. To be exposed to creating applications with AJAX

COURSE OUTCOMES:

Students will be able to,

1. Construct Web pages using HTML/XML and style sheets.
2. Build dynamic web pages with validation using Java Script objects and by applying
3. Different event handling mechanisms.
4. Develop dynamic web pages using server side scripting.
5. Use PHP programming to develop web applications.
6. Construct web applications using AJAX and web services

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML
    a. To embed a map in a web page
    b. To fix the hot spots in that map
    c. Show all the related information when the hot spots are clicked.
2. Create a web page with the following.
    a. Cascading style sheets.
    b. Embedded style sheets.
    c. Inline style sheets. Use our college information for the web pages.
3. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
4. Write programs in Java using Servlets:
    i. To invoke servlets from HTML forms
    ii. Session tracking using hidden form fields and Session tracking for a hit count
5. Write programs in Java to create three-tier applications using servlets for conducting online examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
6. Install TOMCAT web server. Convert the static web pages of programs into dynamic web Pages using servlets (or JSP) and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

7. Redo the previous task using JSP by converting the static web pages into dynamic web Pages. Create a database with user information and books information. The books Catalogue should be dynamically loaded from the database.
8. Create and save an XML document at the server, which contains 10 users Information.
   (a) Write a Program, which takes user Id as an input and returns the User details by taking
   (b) The user information from the XML document
9. (a) Validate the form using PHP regular expression.
   (b) PHP stores a form data into database.
10. Write a web service for finding what people think by asking 500 people‘s opinion for any Consumer product.

III B.Tech.	CONSTITUTION OF INDIA	L	T	P	C
I Semester		2	0	0	0

COURSE OBJECTIVES

1. Students will have a broad understanding of State, Nation Polity and need for a constitution.
2. Students will have a knowledge of democratic and written constitution in India.

COURSE OUTCOMES

Student will be able to

1. Knowledge of basic need of constitution and its contents in India.
2. General knowledge regarding central government and its nature of rule in India.
3. Understanding the state government nature of rule.
4. Understanding the local bodies rule and its challenges.
5. Gains knowledge regarding vulnerable sections and their safe guarding acts
6. Students will have a knowledge on Union territories and its various law & order issues.

UNIT I: INTRODUCTION

Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNIT II: UNION GOVERNMENT AND ITS ADMINISTRATION

Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha , Rajya Sabha

UNIT III: STATE GOVERNMENT AND ITS ADMINISTRATION

Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

UNIT IV: LOCAL ADMINISTRATION

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT V: ELECTION COMMISSION

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women

UNIT VI: ADMINISTRATION OF UNION TERRITORIES

Genesis of union territories, Administrator, Provision for Legislative Assembly and Council of Ministers, Legislative power, President Power to make regulations as regards the Andaman & Nicobar Islands, Lakshadweep and other Islands, High courts for union territories, Acquired territories

TEXTBOOKS

1. M. Laxmikanth, **Indian Polity**, Mc Graw Hill Edition, 5th Edition, 2016.
2. Dr. Durga Das Basu, **Introduction to Constitution of India**, Lexis Nexis; 22nd Edition, 2015.

III B.Tech.	ADVANCED ANDROID TECHNOLOGIES (Skill Advanced Course-I)	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

1. To integrate multimedia, camera and Location based services in Android Application.

COURSE OUTCOMES

Student will be able to,

1. Design and develop android application using fragments, widgets.
2. Develop application which can be accessed with other peripheral devices.
3. Construct animated multimedia applications.
4. Represent the generated results in geospatial views.
5. Access camera and Location based services in Android App.

EXPERIMENTS

1. Develop an Android Application using Fragments.
2. Develop an Android Application that uses Widgets.
3. Develop an Android Application that works with sensors.
4. Develop an accessible Android Application
5. Develop an Android application with canvas
6. Develop an Android application with Video View.
7. Develop an animated android application
8. Develop an Android application with Surface View.
9. Develop an Android Application with Google Maps.

WEB LINK

1. https://codelabs.developers.google.com/advanced-android-training/

III B.Tech.	ADVANCED SERVER-SIDE CONCEPTS	L	T	P	C
I Semester	(Skill Advanced Course-I)	1	0	2	2

COURSE OBJECTIVES

1. Understand how server-side programming works on the web.
2. How to receive and process form submission data.

COURSE OUTCOMES

Student will be able to

1. Write PHP scripts to handle HTML forms.
2. Write regular expressions including modifiers, operators, and Meta characters.
3. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4. Analyze and solve common Web application tasks by writing PHP programs.

EXPERIMENTS

1. Explain the technologies involved in AJAX.
2. Explain about JQUERY events and selectors.
3. Write a PHP program to display a digital clock which displays the current time of the server
4. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings
5. Write the PHP programs to do the following:
   a. Implement simple calculator operations.
   b. Find the transpose of a matrix.
   c. Multiplication of two matrices
6. Write a PHP Program to implement file upload and download operations.
7. Write a PHP program to perform following operations in cookies
   a. Adding a cookie
   b. Deleting a cookie
8. Write a PHP program to implement php form handling.

TEXTBOOKS

1. The Joy of PHP Programming: A Beginner's Guide – by Alan Forbes.
2. PHP & MySQL Novice to Ninja – by Kevin Yank.
3. Headfirst PHP & MySQL – by Lynn Beighley & Michael Morrison.

III B.Tech.	ADVANCED CONCEPTS OF DATA SCIENCE LIBRARIES IN PYTHON (Skill Advanced Course-I)	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

1. To introduce the libraries in python for data science.
2. To study about tools and techniques for data visualization.

COURSE OUTCOMES

Student will be able to

1. Learn on using NumPy for numerical and exploring data with multi dimensional arrays.
2. Use NumPy, SciPy, Matplotlib, for data visualization.
3. Normalize and eliminate missing data using statistical analysis algorithms
4. Understand and code using the NumPy stack.
5. Access and manipulate data using Pandas.

EXPERIMENTS

1. Numerical Analysis and Data Exploration with NumPy
   a. The NumPy array
   b. Selecting data using slicing and logical indexing
   c. Efficient numerical processing with multi-dimensional arrays
   d. Expressive array operations and manipulations
   e. Access larger-than-RAM data using memory mapped arrays
2. Data Visualization with Matplotlib
   b. 2D plotting with Matplotlib: line plots, scatter plots, histograms, labeling
3. Accessing, Preparing, and Exploring Data with Pandas
   a. Loading from CSV and other structured text formats
   b. Accessing data stored in SQL databases
   c. 1D and 2D data structures: Series and Data Frame
   d. Stripping out extraneous information
   e. Normalizing data
   f. Dealing with missing data
   g. Data manipulation (alignment, aggregation, and summarization)
   h. Group-based operations: split-apply-combine
   i. Statistical analysis
   j. Date and time series analysis with Pandas
   k. Visualizing data

III B.Tech.	ADVANCED ORGANIZATIONAL LOCAL AREA NETWORKS USING NS3 (Skill Advanced Course-I)	L	T	P	C
I Semester		1	0	2	2

COURSE OBJECTIVES

This course will enable students

1. To familiarize with fundamental simulation tools and its usage.
2. To understand NS3 simulator and its advanced tool options.
3. To implement different topology in networks.
4. To install and configure NetAnim tools for network adaptors.
5. To understand the concept of designing hybrid topology.

COURSE OUTCOMES

Student will be able to;

1. Install NS3 simulator software in Linux operating system and to configure.
2. Design a small network with intermediate node as router.
3. Configure and use multiple routers and nodes for hybrid connectivity of network.
4. Learn NetAnim for file transferring.
5. Calculate network performance.
6. Analyze network traces using Wireshark software.

EXPERIMENTS

1. Introduction about discrete events simulation and its tools
2. Installation of NS3 in Linux
3. Program in NS3 to connect two nodes
4. Program in NS3 for connecting three nodes considering one node as a central node.
5. Program in NS3 to implement star topology
6. Program in NS3 to implement a bus topology.
7. Program in NS3 for connecting multiple routers and nodes and building a hybrid topology.
8. Installation and configuration of NetAnim
9. Program in NS3 to implement FTP using TCP bulk transfer.
10. Program in NS3 for connecting multiple routers and nodes and building a hybrid topology and then calculating network performance
11. To analyze network traces using Wireshark software.

LAB REQUIREMENTS

S/W Detail : Ubunto, Fedora Linux, NS3

III B.Tech.	MACHINE LEARNING	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To Understand Human learning aspects.
2. To introduce students to the basic concepts and techniques of Machine Learning.
3. To understand primitives in learning process by computer.
4. To understand nature of problems solved with Machine Learning.

COURSE OUTCOMES

Student will be able to

1. Model the learning primitives.
2. Understand a wide variety of learning algorithms.
3. Understand how to apply a variety of learning algorithms to data.
4. Understand how to perform evaluation of learning algorithms and model selection.
5. Capable of performing experiments in Machine Learning using real-world data
6. Capable of confidently applying common Machine Learning algorithms in practice and implementing their own to tackle real world problems in the domain of Data Mining, Information Retrieval, Computer vision, Linguistics and Bioinformatics.

UNIT I: INTRODUCTION TO MACHINE LEARNING

Introduction to machine learning: Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm, remarks on Version Spaces and Candidate-Elimination and inductive bias.

UNIT II: DECISION TREE LEARNING

Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

UNIT III: EVALUATING HYPOTHESES

Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing Learning algorithms.

UNIT IV: BAYESIAN LEARNING

Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classier, Gibbs algorithm, Naive Bayes classier, Bayesian belief networks and EM algorithm.

UNIT V: COMPUTATIONAL LEARNING THEORY

Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

UNIT VI: INSTANCE BASED LEARNING

Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning.

Genetic Algorithms: Introduction, hypothesis space search, Genetic programming and models of evolution and learning. Learning Resources:

TEXT BOOKS

1. Tom M. Mitchell, Machine Learning, Mc Graw Hill Publishing
2. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Prentice Hall of India, 3rd Edition 2014.

REFERENCE BOOKS

1. Charu C. Aggarwal, "Data Classification Algorithms and Applications", CRC Press, 2014.
2. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.
3. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012

WEB LINKS

1. http://searchenterpriseai.techtarget.com/definition/machine-learning-ML.
2. http://www.geeksforgeeks.org/machine-learning/.
3. http://www.tutorialspoint.com/mahout/mahout.machine-learning.htm.

III B.Tech.	ARTIFICIAL INTELLIGENCE	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To impart knowledge about the concepts of Artificial Intelligence.
2. To introduce the fundamental concepts of Search Techniques, knowledge representation and Predicate Logic.
3. To learn the fundamentals of AI, and solve different computational problems.
4. To focus on knowledge representation for expert systems.
5. To develop some simple applications form gained knowledge.

COURSE OUTCOMES

1. Define the concept of Artificial Intelligence.
2. Solve basic AI based problems.
3. Apply AI techniques to real-world problems to develop intelligent systems.
4. Select appropriately from a range of techniques when implementing intelligent systems.
5. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
6. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

UNIT-1

Introduction to Artificial Intelligence: AI Problems, The underlying Assumption, AI Techniques, Level of the Model Problems, Problem Spaces &Search: Defining the Problem as a state space search, Production System, Problem Characteristics, Production System Characteristics.

UNIT-2

Heuristic Search Techniques: Generate and Test, Hill Climbing, Best first Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT-3

Knowledge Representation Issues: Representation and Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem
Predicate Logic: Representing simple facts in logic, Computable Functions and Predicates, Resolution, Natural Deduction.

UNIT-4

Representing Knowledge using rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge

UNIT-5

Common Sense: Qualitative Physics, Common Sense Ontologies, Memory Organization
Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Knowledge Acquisition

UNIT-6

Fuzzy Logic System: Crisp Sets, Fuzzy Sets, Some Fuzzy Terminology, Fuzzy Logic Control, Sugeno Style of Fuzzy Inference Processing, Fuzzy Hedges, α Cut Threshold, Neuro Fuzzy System.

TEXT BOOK

1. Elaine Rich & Kevin Knight, "**Artificial Intelligence"**, 2nd Edition, McGraw Hill.

REFERENCE BOOK

1. Patrick Henry Winston, "**Artificial Intelligence"**, Pearson Education, 2003

III B.Tech.	COMPILER DESIGN	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the Phases of a Compiler and methods of Lexical analysis.
2. Identify different methods of Syntax analysis.
3. Design top-down and bottom-up parsers.
4. Understand the Semantic analysis and Intermediate Code.
5. The role of Symbol Table and its Organization, Code Generation.
6. Understand the code optimization and Scheduling.

COURSE OUTCOMES

Student will be able to

1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.
2. Parser and its types i.e. Top-down and Bottom-up parsers.
3. Construction of LL, SLR, CLR and LALR parse table.
4. Syntax directed translation, synthesized and inherited attributes.
5. Analyze the Code generation Techniques and Symbol Table.
6. Techniques for code optimization.

UNIT I: OVERVIEW OF LANGUAGE PROCESSING

Pre-processors – compiler – assembler – interpreters, pre-processors, – linkers & loaders - structure of a compiler – phases of a compiler. Lexical Analysis – Role of Lexical Analysis – Lexical Analysis Vs Parsing – Token, patterns and Lexemes – Lexical Errors – Regular Expressions – Regular definitions for the language constructs – Strings, Sequences, Comments – Transition diagram for recognition of tokens, Reserved words and identifiers, Examples.

UNIT II: SYNTAX ANALYSIS

Discussion on CFG, LMD, RMD, parse trees, Role of a parser – classification of parsing techniques – Brute force approach, left recursion, left factoring, Top down parsing – First and Follow- LL (1) Grammars, Non-Recursive predictive parsing – Error recovery in predictive parsing.

UNIT III: PARSERS

What is bottom up parsing approach, Types of Bottom up approaches; Introduction to simple LR – Why LR Parsers – Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables.

UNIT IV: SEMANTIC ANALYSIS

More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing. Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples, abstract syntax trees. Types and declarations, type Checking.

UNIT V: SYMBOL TABLES

Use and Need of Symbol Tables. Runtime Environment: Storage Organization, Stack Allocation, Access to Non-Local Data, Heap Management, Parameter Passing Mechanisms, Introduction to Garbage Collection. Reference Counting Garbage Collectors. Code Generation: Issues, Target Language, Basic Blocks & Flow Graphs, Simple Code Generator, Peephole Optimization, Register Allocation and Assignment.

UNIT VI: CODE OPTIMIZATION

Machine independent code optimization – semantic preserving transformations, global common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling inter procedural optimization.

TEXT BOOKS

1. Alfred V Aho, Monical S. Lam, Ravi Sethi Jeffery D. Ullman Compilers, **Principles Techniques and Tools**, 2nd Edition, Pearson, 2007.
2. K. Maheswaran, **Compiler Design**, OXFORD.

REFERENCE BOOKS

1. Nandini Prasad, **Principles of compiler design**, 2nd Edition, Elsevier.
2. Kenneth C Louden, **Compiler Construction, Principles and practice**, Cengage.
3. Yunlinsu, **Implementations of Compiler, A New approach to Compilers including the algebraic methods**, Springer.

WEB LINKS

1. http://www.tutorialspoint.com/compiler_design/
2. http://www.slideshare.net/Tech_MX/symbol-table-design-compiler-construction
3. https://staff.fnwi.uva.nl/a.d.pimentel/compiler/compiler.pdf

III B.Tech.	BIG DATA ANALYTICS (Professional Elective Course – II)	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To provide an overview of Apache Hadoop.
2. To provide HDFS Concepts and Interfacing with HDFS.
3. To understand Map Reduce Jobs.
4. To provide hands on Hadoop Eco System.
5. To apply analytics on Structured, Unstructured Data.
6. To Expose on Data Analytics with R.

COURSE OUTCOMES

Student will be able to

1. Overview of Big Data and Related Technologies.
2. Analyse Technologies for Handling Big Data and Hadoop Ecosystem.
3. Acquire clear understanding of MapReduce Fundamentals and HBase.
4. Acquire clear understanding of NoSQL Data Management.
5. Acquire a clear understanding of Analytics and Big Data.
6. Analyse the various Approaches Tools to Analyse Data and Exploring R.

UNIT I: GETTING AN OVERVIEW OF BIG DATA

What is Big Data? History of Data Management – Evolution of Big Data, Structuring Big Data, Types of Data, Elements of Big Data, Volume, Velocity, Variety, Veracity, Big Data Analytics, Advantages of Big Data Analytics, Careers in Big Data, Skills Required, Future of Big Data. SLE: Business Intelligence, Preventing Fraud Using Big Data Analytics

UNIT II: INTRODUCING TECHNOLOGIES FOR HANDLING BIG DATA AND HADOOP ECOSYSTEM

Distributed and Parallel Computing for Big Data, Introducing Hadoop, How does Hadoop Function, Cloud Computing and Big 98 Data, Features of Cloud Computing, Cloud Deployment Models, Cloud Delivery Models, Cloud Services for Big Data, Cloud Providers in Big Data Market, In-Memory Computing Technology for Big Data, Hadoop Ecosystem, Hadoop Distributed File System, HDFS Architecture, Features of HDFS, MapReduce, Features of MapReduce, Hadoop YARN. SLE: HBase, Hive, Pig, Sqoop, Flume

UNIT III: UNDERSTANDING MAPREDUCE FUNDAMENTALS AND HBASE

The MapReduce Framework, Exploring the Features of Map Reduce, Working of MapReduce, Exploring Map and Reduce Functions, Techniques to Optimize MapReduce Jobs, Hardware/Network Topology, Synchronization, File System, Uses of MapReduce, Role of HBase in Big Data Processing, Characteristics of HBase SLE: Installation of HBase

UNIT IV: NOSQL DATA MANAGEMENT

Introduction to NoSQL, Characteristics of NoSQL, Evolution of Databases, Aggregate Data Models, Key Value Data Model, Document Databases, Relationships, Graph Databases, Schema Less Databases, Materialized Views, Distribution Models, Sharding, MapReduce Partitioning and Combining, Composing MapReduce Calculations SLE: CAP Theorem

UNIT V: UNDERSTANDING ANALYTICS AND BIG DATA

Comparing Reporting and Analysis, Reporting, Analysis, The Analytic Process, Types of Analytics, Basic Analytics, Advanced Analytics, Operationalized Analytics, Monetized Analytics, Characteristics of Big Data Analysis, Points to Consider during Analysis, Frame the Problem Correctly, Statistical Significance or Business Importance? , Making Inferences versus Computing Statistics, Developing an Analytic Team, Convergence of IT and Analytics, Understanding Text Analytics SLE: Skills required for an Analyst

UNIT VI: ANALYTICAL APPROACHES: TOOLS TO ANALYZE DATA

Analytical Approaches, Ensemble Methods, Text Data Analysis, History of Analytical Tools, Graphical User Interfaces, Point Solutions, Data Visualization Tools, Introducing Popular Analytical Tools, The R Project for Statistical Computing, IBM SPSS, SAS, Comparing Various Analytical Tools.

TEXTBOOKS

1. DT Editorial Services, **Big Data: Black Book**, Wiley India Private Limited, 2015 Edition

REFERENCE BOOKS

1. Arvind Sathi, **Big Data Analytics: Disruptive Technologies for Changing the Game**, 1st Edition, IBM Corporation, 2012.
2. Vignesh Prajapati, **Big Data Analytics with R and Hadoop**, Packt Publishing 2013
3. Michael Minelli, Michehe Chambers, **Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business**, 1st Edition, Ambiga Dhiraj, Wiely CIO Series, 2013.
4. Bill Franks, **Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics**, 1st Edition, Wiley and SAS Business Series, 2012.

III B.Tech.	SOFTWARE DESIGN WITH UML	L	T	P	C
II Semester	(Professional Elective Course – II)	3	0	0	3

COURSE OBJECTIVES

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches
3. To design with static UML diagrams
4. To design with the UML dynamic and implementation diagrams
5. To improve the software design with design patterns
6. To test the software against its requirements specification

COURSE OUTCOMES

Student will be able to

1. Illustrate software design with UML diagrams
2. Design software applications using OO concepts
3. Identify various scenarios based on software requirements
4. Apply UML based software design into pattern based design using design patterns
5. Learn on improving software design with design patterns.
6. Illustrate the various testing methodologies for OO software

UNIT I: INTRODUCTION TO UML

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle. Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced classes, advanced relationships, Object diagrams: common modeling techniques.

UNIT II: BEHAVIORAL MODELING

Behavioral Modeling: Interactions, Interaction diagrams. Use cases, Usecase Diagrams, Activity Diagrams, Events and signals, state machines, state chart diagrams.

UNIT III: ADVANCED BEHAVIORAL MODELING

Advanced Behavioral Modeling: Architectural Modeling: Components, Deployment, Component diagrams and Deployment diagrams, Common modeling techniques for component and deployment diagrams

UNIT IV: DESIGN PATTERN

Introduction, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, Using a Design Pattern.

UNIT V: CREATIONAL PATTERN

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

UNIT VI: SOFTWARE QUALITY

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, What to Expect from Design Patterns

TEXTBOOKS

1. The unified Modeling language user guide by Grady Booch, JamesRumbaugh, Ivar Jacobson, Pearson.

REFERENCE BOOK

1. Object Oriented Analysis and Design, Satzinger, CENGAGE.

WEB LINKS

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. https://www.tutorialspoint.com/sdlc/sdlc_quick_guide.htm
3. https://www.castsoftware.com/research-labs/risk-management-in-software-development-and-software-engineering-projects

III B.Tech.	BLOCK CHAIN TECHNOLOGY (Professional Elective Course – II)	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them.
2. Design, build, and deploy smart contracts and distributed applications.
3. Integrate ideas from block chain technology into their own projects.

COURSE OUTCOMES

Student will be able to

1. Demonstrate the foundation of the Block chain technology.
2. Understand the processes in payment and funding.
3. Identify the risks involved in building Block chain applications
4. Review of legal implications using smart contracts.
5. Choose the present landscape of Blockchain implementations and understand Crypto currency markets.
6. Examine how to profit from trading crypto currencies.

UNIT 1: INTRODUCTION

Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain.

Evolution of Blockchain : Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT 2: BLOCKCHAIN CONCEPTS

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT 3: ARCHITECTING BLOCKCHAIN SOLUTIONS

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications.

Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.

UNIT 4: ETHEREUM BLOCKCHAIN IMPLEMENTATION

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart

Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelin Contracts

UNIT 5: HYPERLEDGER BLOCKCHAIN IMPLEMENTATION

Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application. Advanced Concepts in Blockchain: Introduction, InterPlanetary File System (IPFS),

UNIT 6: QUANTUM COMPUTING

Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Blockchain with IoT and AI/ML Quantum Computing and Blockchain, Initial Coin Offering, Blockchain Cloud Offerings, Blockchain and its Future Potential.

TEXTBOOKS

1. Ambadas, Arshad Sarfarz Ariff, Sham "**Blockchain for Enterprise Application Developers**", Wiley
2. Andreas M. Antonpoulos, "**Mastering Bitcoin: Programming the Open Blockchain**", O'Reilly.

REFERENCE BOOK

1. Joseph Bambara, Paul R. Allen**, "Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions"**, Mc Graw Hill.

III B.Tech.	NATURAL LANGUAGE PROCESSING	L	T	P	C
II Semester	(Professional Elective Course – II)	3	0	0	3

COURSE OBJECTIVES

1. To learn the fundamentals of natural language processing.
2. To understand the use of CFG and PCFG in NLP.
3. To understand the role of semantics of sentences and pragmatics.
4. To apply the NLP techniques to IR applications

COURSE OUTCOMES

Student will be able to

1. Tag a given text with basic Language features.
2. Design an innovative application using NLP components.
3. Implement a rule based system to tackle morphology/syntax of a language.
4. Design a tag set to be used for statistical processing for real-time applications.
5. Use lexical resources for evaluating the problems and rectifying it through various techniques.
6. Compare and contrast the use of different statistical approaches for different types of NLP applications.

UNIT I : INTRODUCTION

Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II : WORLD LEVEL ANALYSIS

Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III : SYNTACTIC ANALYSIS

Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

UNIT IV : SEMANTICS

Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles.

UNIT V : PRAGMATICS

Selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT VI: DISCOURSE ANALYSIS AND LEXICAL RESOURCES

Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer,

Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

TEXTBOOKS

1. Daniel Jurafsky, James H. Martin, "**Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech**", Pearson Publication, 2014.
2. Steven Bird, Ewan Klein and Edward Loper, "**Natural Language Processing with Python**, First Edition, O'Reilly Media, 2009.

REFERENCE BOOK

1. Breck Baldwin, "**Language Processing with Java and LingPipe Cookbook**", Atlantic Publisher, 2015.
2. Richard M Reese, "**Natural Language Processing with Java**", O'Reilly Media, 2015.

III B.Tech.	CIVIL ENGINEERING MATERIALS	L	T	P	C
II Semester	(Open Elective Course - II)	3	0	0	3

COURSE OBJECTIVES

1. To understand the principles of planning and by-laws.
2. To draw plan, elevation and section of framed structures.
3. To draw plan, elevation and section of public and industrial structures.
4. To prepare detailed drawings for doors, windows, etc.

COURSE OUTCOMES

Student will be able to

1. Understand fundamental concepts of stones, bricks & tiles.
2. Understand the concept of building planning and the building Bye Laws and the regulations.
3. Understand the stages involved in building planning.
4. Understand different techniques of construction viz., brick masonry and stone masonry.
5. Understand the different types of floors, roofs, doors, staircases its use, know about thesupporting structures and building amenities.
6. Draw plan, section and elevation for given line plan of buildings using Auto CAD.

UNIT I: STONES, BRICKS AND TILES

Properties of building stones – relation to their structural requirements, classification of stones –stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminum, Gypsum, Glass and Bituminous materials – their quality.

UNIT II MASONRY

Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

WOOD: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiver – Reinforced Plastics, Steel, Aluminum.

UNIT III: LIME AND CEMENT

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime.

Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

UNIT IV: BUILDING BYELAWS AND REGULATIONS

Introduction- terminology- objectives of building byelaws- floor area ratio-floor space index-principles under laying building bye laws- classification of buildings-

Residential Buildings-Minimum standards for various parts of buildings- Public Buildings-Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT V: SIGN CONVENTIONS AND BONDS

Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT VI: CEMENTS & ADMIXTURES

Portland cement – Chemical composition –setting of cement, Fineness of cement,– Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption& moisture content of aggregate – Bulking of sand –Deleterious substance in aggregate — Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates –Maximum aggregate size, Quality of mixing water

TEXT BOOKS:

1. Building Materials by S.S. Bhavikatti, Vices publications House private ltd.
2. Building Materials by B.C. Punmia, Laxmi Publications private ltd.
3. Building materials by Rangwala
4. Building palinng and drawing by kumaraswamy and kameswaran
5. Planning, designing and Scheduling by Gurucharan Singh and Jagadish Singh
6. Building planning and drawing by M. Chakravarthi

REFERENCE BOOKS:

1. Building Materials by S.K.Duggal, New Age International Publications.
2. Building Materials by P.C.Verghese, PHI learning (P)ltd.

III B.Tech.	ELECTRICAL ESTIMATION AND COSTING (Open Elective Course - II)	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. Introduce the electrical symbols and simple electrical circuits
2. Able to learn the design of electrical installations.
3. Able to learn the design of electrical installation for different types of buildings and small industries.
4. Learn the basic components of electrical substations.
5. Familiarize with the motor control circuits.

COURSE OUTCOMES

Student will be able to

1. Identify the various electrical apparatus and their interconnections.
2. Select suitable electrical supply system and design earthing systems of various electric loads.
3. Estimate the cost for installation of wiring for different types of building and small industries.
4. Identify the components of electrical substations.
5. Design suitable control circuit for starting of three phase induction motor and synchronous motor.
6. Prepare the schedule of materials with specifications for transmission lines and substations.

UNIT I : **ELECTRICAL SYMBOLS AND SIMPLE ELECTRICAL CIRCUITS**

Need of electrical symbols, list of symbols, Electrical Diagrams, Methods of representation for wiring diagrams, introduction to simple light and fan circuits, system of connection of appliances and accessories, simple examples on light and fan circuits.

UNIT II : DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS

Electric supply system, Three-phase four wire distribution system, protection of electric installation against overload, short circuit and earth fault, earthing, neutral and earth wire, types of loads, systems of wiring, permissible of voltage drops and sizes of wires , estimating and costing of electrical installations

UNIT III : ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES

Electrical installations for electrical buildings, estimating and costing of material, simple examples on electrical installation for residential buildings, electrical installations for commercial buildings, electrical installation for small industries.

UNIT IV : SUBSTATIONS

Introduction, types of substations, outdoor substations-pole mounted type, indoor substations-floor mounted type, simple examples on quantity estimation.

UNIT V : MOTOR CONTROL CIRCUITS

Introduction to AC motors, starting of three phase squirrel cage induction motors, starting of wound rotor motors, starting of synchronous motors, contractor control circuit components, basic control circuits, motor protection.

UNIT VI: SERVICE MAINS

Meaning of service mains, code of Practice for service mains, types of service mains- Over Head Service Mains -materials and specifications, UG Service Mains -materials and specifications, Standard wire size table, current ratings for Aluminium, copper conductors and selection of size of conduit pipe as per the size and number of wires. Load calculation, selection of size and type of conductor/UG cable, discrimination of size of protective devices, Quantity calculation, schedules of materials and estimates for single phase OH service connection, three phase OH service connection, single phase UG service connection and three phase UG service connection.

TEXTBOOKS

1. K. B. Raina and S.K.Bhattacharya, "**Electrical Design and Estimation Costing**" , New Age International Publishers.

REFERENCE BOOK

1. S.L.Uppal and G.C.Garg, "**Electrical wiring estimating and costing**", Khanna publishers, sixth edition, 1987.
2. J.B.Gupta Kataria, "**A course in electrical installation estimating and costing**", SK & Sons.

III B.Tech.	MATERIAL PROPERTIES & IT'S APPLICATIONS (Open Elective Course - II)	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the basic fundamentals of Material science and Physical metallurgy.
2. To know the basic concepts to be taught will help for the improvement, proper selection and effective utilization of materials.
3. To satisfy the ever increasing demands of the society.

COURSE OUTCOMES

Student will be able to

1. Analyse the structure of materials at different levels and necessity of alloying
2. Evaluate the various types of Mechanical properties and Testing.
3. Analyse the Microstructural Exam.
4. Demonstrate the Magnetic and Electric properties.
5. Understand the fundamentals of Ferrous& Non-Ferrous metals
6. Understand the fundamentals of Ceramics**,** Plastics & Other materials.

UNIT I: INTRODUCTION TO ELEMENTS AND CRYSTALLOGRAPHY

Introduction: Historical perspective-importance of materials-Chemical bonding Crystallography and Imperfections: Concept of unit cell space lattice-Bravais lattices-common crystal structures-Atomic packing factor and density-Miller indices-calulations

UNIT II: MECHANICAL PROPERTIES AND TESTING

Mechanical properties and Testing: Stress strain diagram, Ductile & brittle material, Stress VS strength. Toughness, Hardness, Fracture, Fatigue and Creep. Testing such as Strength testing, Hardness testing, Impact testing, Fatigue testing Creep testing, Non-destructive testing (NDT)

UNIT III: MICROSTRUCTURAL EXAM

Microstructural Exam: Microscope principle and methods. Preparation of samples and Microstructure exam and grain size determination. Comparative study of microstructure of various metals & alloys such as Mild steel, CI, Brass-SEM, TEM, XRD principals and working

UNIT IV: MAGNETIC& ELECTRIC PROPERTIES

Magnetic properties: Concept of magnetism - Dia, Para, Ferro Hysteresis. Soft and hard magnetic materials, Magnetic storages.

Electric properties: Energy band concept of conductor, insulator and semi-conductor. Intrinsic & extrinsic semi-conductors. p-n junction and transistors. Basic devices and its application. Diffusion of Solid.

UNIT V: FERROUS& NON-FERROUS METALS

Ferrous materials: Iron and steel manufacture, furnaces. Various types of carbon steels, alloy steels and cast irons, its properties and uses.

Non-Ferrous metals and alloys: Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. and its applications. Various type Brass, Bronze, bearing materials, its properties and uses. Aluminum alloys such as Duralumin. Other advanced materials/alloys.

UNIT VI: CERAMICS, PLASTICS & OTHER MATERIALS

Ceramics: Structure types and properties and applications of ceramics. Mechanical/Electrical behavior and processing of Ceramics.

Plastics: Various types of polymers/plastics and its applications. Mechanical behaviors and processing of plastics. Future of plastics.

Other materials: Brief description of other material such as optical and thermal materials concrete, Composite Materials and its uses.

TEXT BOOKS

1. Sidney H. Avener, Introduction to Physical Metallurgy, Mc Graw Hill, 2nd Edition.
2. V.D.Kodgire, Material Science and Metallurgy, Everest Publication House, 42nd Edition
3. O. P. Khanna, Material Science and Metallurgy, Khanna Publishers. 4th Edition.
4. William d callister, Materials science and Engineering, John Wiley & Sons, 9th Edition.

REFERENCE BOOKS

1. V. Rahghavan, Material science and Engineering, 10th Edition
2. A V K Suryanarayana, Material Science and Metallurgy, B S Publications.
3. U. C. Jindal, Material Science and Metallurgy, Pearson Publications, 1st Edition.

III B.Tech.	COMMUNICATION ENGINEERING (Open Elective Course - II)	L	T	P	C
II Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the concepts of signals and its characteristics in communication systems.
2. To understand the concept of modulation .
3. To Apply the concept of modulation on various characteristics of analog signals.
4. To Apply the concept of modulation on various characteristics of discrete signals.
5. To Analyze the digital modulation schemes.
6. To Apply the concept of coding technique for digital data transmission.

COURSE OUTCOMES

Student will be able to

1. Interpret the various types of signals and their representation.
2. Analyze the various modulating signals using different modulation techniques.
3. Analyze and design of various continues wave and angle modulation and demodulation techniques.
4. Analyze and design various pulse modulation techniques.
5. Understand the concepts of digital modulation techniques.
6. Design and implement Source coding theorem.

UNIT I : BASICS OF SIGNALS

Types of signals, classifications of signals, elementary signals-step, impulse, exponential, introduction on Transform techniques- Fourier Transform

UNIT II : ANALOG MODULATION-I

Introduction to Communication Systems – Modulation – Types – Need for Modulation**,** Amplitude Modulation – AM, DSBSC, SSB, Modulators and Demodulators.

UNIT III : ANALOG MODULATION-II

Angle modulation – PM, FM, Modulators and Demodulators.

UNIT IV : PULSE MODULATION

Low pass sampling theorem – Quantization – PAM –Line coding – PCM, Time Division Multiplexing, Frequency Division Multiplexing

UNIT V : DIGITAL MODULATION AND TRANSMISSION

Phase shift keying – BPSK, DPSK, QPSK – Principles of M-Array signaling, QAM – Comparison.

UNIT VI : INFORMATION THEORY & CODING

Measure of information – Entropy – Source coding theorem – Shannon–Fanon coding, Huffman Coding.

TEXTBOOKS

1. Simon haykin, barry van veen, "signals & systems", wiley Publisher, second edition, 2004.
2. H Taub, D L Schilling, G Saha, "**Principles of Communication Systems**" third edition, McGraw Hill, 2007.
3. S. Haykin "**Digital Communications**" John Wiley 2005**.**

REFERENCE BOOKS

1. B.P.Lathi, "**Modern Digital and Analog Communication Systems**", 3rd edition, Oxford University Press, 2007.
2. B.Sklar, "**Digital Communications Fundamentals and Applications**" 2/e Pearson Education 2007.

WEBLINKS

1. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SECA1303.pdf
2. https://www.geektonight.com/analog-communication-pdf/
3. https://www.iare.ac.in/sites/default/files/iaredc%20lecture%20notes%20final.pdf
4. https://archive.nptel.ac.in/content/storage2/courses/106108098//Learning%20Materia

III B.Tech.	MACHINE LEARNING LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES:

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
5. Experiment with a machine learning model for simulation and analysis.
6. Explore the current scope, potential, limitations, and implications of intelligent systems.

COURSE OUTCOMES:

Student will be able to;

1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
5. Demonstrate proficiency in applying scientific method to models of machine learning.
6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

LIST OF EXPERIMENTS

1. Write a python program to compute
   a) Central Tendency Measures: Mean, Median, Mode.
   b) Measure of Dispersion: Variance, Standard Deviation.
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
3. Study of Python Libraries for ML application such as Pandas and Matplotlib
4. Write a Python program to implement Simple Linear Regression
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn
6. Implementation of Decision tree using sklearn and its parameter tuning
7. Implementation of KNN using sklearn
8. Implementation of Logistic Regression using sklearn
9. Implementation of K-Means Clustering
10. Performance analysis of Classification Algorithms on a specific dataset

III B.Tech.	ARTIFICIAL INTELLIGENCE LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES:

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
5. Experiment with a machine learning model for simulation and analysis.
6. Explore the current scope, potential, limitations, and implications of intelligent systems.

COURSE OBJECTIVES:

Student will be able to;

1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
5. Demonstrate proficiency in applying scientific method to models of machine learning.
6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

LIST OF EXPERIMENTS

1. (a) Write a python program to print the multiplication table for the given number?
   (b) Write a python program to check whether the given number is prime or not?
   (c) Write a python program to find factorial of the given number?
2. Write a python program to implement simple Chatbot?
3. (a) Write a python program to implement List operations (Nested List, Length, Concatenation, Membership, Iteration, Indexing and Slicing)?
   (b) Write a python program to implement List methods (Add, Append, and Extend & Delete).
4. (a) Write a python program to Illustrate Different Set Operations?
   (b) Write a python program to generate Calendar for the given month and year?
   (c) Write a python program to implement Simple Calculator program?
5. (a) Write a python program to Add Two Matrices.
   (b) Write a python program to Transpose a Matrix.
6. Write a python program to implement Breadth First Search Traversal?
7. Write a python program to implement Water Jug Problem?

8. (a) Write a python program to remove punctuations from the given string?
   (b) Write a python program to sort the sentence in alphabetical order?
9. Write a program to implement Hangman game using python.
10. Write a program to implement Tic-Tac-Toe game using python.

III B.Tech.	COMPILER DESIGN LAB	L	T	P	C
II Semester		0	0	3	1.5

COURSE OBJECTIVES

1. To understand the Phases of a Compiler and methods of Lexical analysis.
2. Identify different methods of Syntax analysis.
3. Design top-down and bottom-up parsers.
4. Understand the Semantic analysis and Intermediate Code.
5. The role of Symbol Table and its Organization, Code Generation.
6. Understand the code optimization and Scheduling.

COURSE OUTCOMES

Student will be able to

1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.
2. Parser and its types i.e. Top-down and Bottom-up parsers.
3. Construction of LL, SLR, CLR and LALR parse table.
4. Syntax directed translation, synthesized and inherited attributes.
5. Analyze the Code generation Techniques and Symbol Table.
6. Techniques for code optimization.

LIST OF EXPERIMENTS

1. Write a C Program for dividing the input program into lexemes.
2. Write a C Program to Simulate FIRST and FOLLOW of grammar.
3. Write a C program for implementing the operator precedence.
4. Design a lexical analyzer for the given language. The lexical analyzer should ignore redundant spaces, tabs and new lines, comments etc.
5. Write a C Program to Implement a Recursive Descent Parser.
6. Write a C program to construct LL (1) parser.
7. Write a C Program to Implement a Predictive Parser
8. Write a C Program to construct shift- reduce parser.
9. Write a C program to generate three address code.
10. Design a LALR bottom up parser for the given language.
11. Convert the BNF rules into YACC form and write code to generate abstract syntax tree.
12. A program to generate machine code from the abstract syntax tree generated by the parser.

III B.Tech.	SQLITE	L	T	P	C
II Semester	(Skill Advanced Course - II)	1	0	2	2

COURSE OBJECTIVES

1. To work with SQLite Database and content providers.
2. To learn different DDL and DML commands.
3. To use appropriate operators.
4. To understand about SQL tools and techniques.

COURSE OUTCOMES

Student will be able to,

1. Learn DDL and DML commands for doing different operations.
2. Use joins (inner, outter, etc) for accessing data from the database.
3. Understand different views and triggers used over data.
4. Use tools for performing different set operations.
5. Implement Database Application and Content providers.

EXPERIMENTS

1. SQLite Data Types
2. SQLite Data Definition Commands
3. SQLite Data Manipulation Commands
4. SQLite Select statement
5. SQLite clauses
6. SQLite Joins
7. SQLite Grouping data
8. SQLite Set Operators
9. SQLite Transactions
10. Views
11. Indexes
12. Triggers
13. SQLite Tools
14. SQLite Functions

REFERENCES:

1. http://www.sqlitetutorial.net/

III B.Tech.	DATABASES FOR WEB APPLICATIONS (Skill Advanced Course - II)	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL.
2. Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.

COURSE OUTCOMES

Student will be able to,

1. Write a PHP program for any problem statement.
2. Connect the database with PHP program and access the required data.
3. Connect to databases to fetch, store, and update persistent information.
4. Learn for connecting MYSQL database with the application using MVC architecture.
5. Avoid SQL injection attacks using parameter binding and input sanitization.

EXPERIMENTS

1. Write a PHP program to implement database connection between PHP and MYSQL database.
2. Implement different functions used to connect web form to the MYSQL database.
3. Implement a program for displaying data from MySQL Data Base in Web Form.
4. Implement a program for Insert data into MYSQL using web form.
5. Implement a program for Updating data present in MYSQL using web form.
6. Implement a program for Deleting data from MYSQL using web form.
7. Implement a Sample Web application with MYSQL database using MVC Architecture.
8. Implement AJAX based PHP web Application with database.

TEXT BOOKS

1. The Joy of PHP Programming: A Beginner's Guide – by Alan Forbes.
2. PHP & MySQL Novice to Ninja – by Kevin Yank. ...
3. Headfirst PHP & MySQL – by Lynn Beighley & Michael Morrison.

III B.Tech.	MACHINE LEARNING USING PYTHON (Skill Advanced Course - II)	L	T	P	C
II Semester		1	0	2	2

COURSE OBJECTIVES

1. To introduce students to state-of-the-art methods and modern programming tools for data analysis.

COURSE OUTCOMES

Student will be able to,

1. Understand complexity of Machine Learning algorithms and their limitations;
2. Understand modern notions in data analysis-oriented computing;
3. Apply common Machine Learning algorithms in practice and implementing their own.
4. Perform distributed computations.
5. Perform experiments in Machine Learning using real-world data.

EXPERIMENTS

1. Introduction to Machine Learning
   a. Linear and nonlinear models
   b. Constant and variable learning-rates
   c. Cost functions, regularization methods, and other constraints
   d. Fitting, transforming, and predicting
2. Machine Learning: Numeric Data
   a. Logarithmic and curvilinear transforms
   b. Data scaling
   c. Outliers
   d. Linear regressors
   e. l1 and l2 normalization
   f. Support vector machines (SVM)
3. Machine Learning: Categorical Data
   a. Contrast encoding
   b. Missing values
   c. Linear classifiers
   d. Tree-based classifiers
   e. Ensemble methods
   f. Boosting methods
4. Machine Learning: Image Data
   a. Image storage formats
   b. Smoothing and denoising
   c. Edge detection
   d. Feature-based segmentation
   e. K-means clustering.

III B.Tech.	PROTOCOL SIMULATION USING NS2	L	T	P	C
II Semester	(Skill Advanced Course - II)	1	0	2	2

COURSE OBJECTIVES

1. To familiarize with the basic and advanced protocols for computer networks

COURSE OUTCOMES

Student will be able to,

1. Design communication protocols while getting a good exposure to the TCP/IP protocol suite.
2. Experience in managing the communication protocols over TCP/IP protocol suite
3. Test simple protocols in a laboratory scenario
4. Configure Point to point protocol in a serial connection networks.
5. Configure and simulate AODV protocol.

EXPERIMENTS

1. Simulation of ARP / RARP
2. Configuring Enhanced Interior Gateway Routing Protocol (EIGRP)
3. Simulation of BGP / OSPF routing protocol.
4. STP and Ether Channel
5. Configuring PPP on a Serial Line (Mandatory Commands)
6. Configuring Frame Relay
7. Configuration of DHCP
8. Simulation of AODV Routing Protocol

III B.Tech.	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (Mandatory Course)	L	T	P	C
II Semester		2	0	0	0

COURSE OBJECTIVES

1. Understand the concept of Traditional knowledge and its importance.
2. Know the need and importance of protecting traditional knowledge.
3. Know the various enactments related to the protection of traditional knowledge.
4. Understand the concepts of Intellectual property to protect the traditional knowledge

COURSE OUTCOMES

1. Understand and elucidate the basic knowledge of traditional knowledge to develop the physical and social changes on traditional knowledge system.
2. Discuss different characteristics of Indigenous Knowledge (IK) to differentiate it with formal, western and traditional knowledge.
3. Describe the significance of traditional knowledge protection to communicate the traditional knowledge information.
4. Recognize the role of government on traditional knowledge to measure its impact on global economy.
5. Explain the acts related to schedule tribes, traditional forest dwellers, plants protection and farmers to inculcate the legal protection information.
6. Illustrate the rules of biological diversity and geographical indicators for the protection of traditional knowledge bill.

UNIT 1: INTRODUCTION TO TRADITIONAL KNOWLEDGE

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT 2: PROTECTION OF TRADITIONAL KNOWLEDGE

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK

UNIT 3: LEGAL FRAMEWORK AND TK

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT 4: TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT 5: TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

TEXT BOOKS:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

REFERENCE BOOKS:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.

IV B.Tech.	DEEP LEARNING (Professional Elective Course - III)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To cover the fundamentals of deep learning, but also give a grasp of contemporary research.
2. To focus on using GPUs for general purpose computing, rather than for graphics.

COURSE OUTCOMES

Student will be able to

1. Independently solve business problems using deep learning techniques.
2. Know the main techniques in deep learning and the main research in this field.
3. Design and implement deep neural network systems.
4. Identify new application requirements in the field of computer vision
5. Analyze GPU architecture, assess their advantages and identify potential software optimizations based on knowledge of the GPU architecture,
6. Design and implement a program for a GPU for applications in scientific computing, machine learning, image and video processing, computer graphics or for a mobile phone.

UNIT I: INTRODUCTION

Overview of machine learning, linear classifiers, loss functions. Optimization-Stochastic gradient descent and contemporary variants, back-propagation. Feed forward networks and training-Activation functions, initialization, regularization, batch normalization, model selection, ensembles.

UNIT II: CONVOLUTIONAL NEURAL NETWORKS

Fundamentals, architectures, pooling, visualization. Deep learning for spatial localization-Transposed convolution, efficient pooling, object detection, semantic segmentation Recurrent neural networks-Recurrent neural networks (RNN), long-short term memory (LSTM), language models, machine translation, image captioning, visual question answering, video processing, learning from descriptions, attention.

UNIT III: DEEP GENERATIVE MODELS

Auto-encoders, variational auto-encoders, generative adversarial networks, auto-regressive models, generative image models, unsupervised and self-supervised representation learning. Deep reinforcement learning-Policy gradient methods, Q-Learning.

UNIT IV: GPU PROGRAMMING

Introduction to GPU- Introduction to CUDA-. Introduction to CUDA C3- CUDA Parallelism Model- CUDA Memory Model- DRAM, GMAC.

UNIT V: GPU CONCEPTS

Convolution, Constant Memory, and Constant Cache- Tiled Convolution- Tiled Convolution Analysis- Reduction Tree- Parallel Prefix- Floating Point Considerations.

UNIT VI: ATOMIC OPERATIONS AND HISTOGRAMMING

GPU as Part of the PC Architecture-Data Transfer and CUDA Streams**.** Case Study: Advanced MRI Reconstruction- Molecular Visualization and Analysis- Performance Analysis- Joint CUDA-MPI Programming- Introduction to Open CL- Introduction to Open ACC

TEXTBOOKS

1. Goodfellow, Y. Bengio, A. Courville, **Deep Learning**, MIT Press, 2016. http://www.deeplearningbook.org.

REFERENCE BOOKS

1. K. P. Murphy, **Machine Learning: A Probabilistic Perspective**, MIT Press, 2012.
2. C. M. Bishop, **Pattern Recognition and Machine Learning**, Springer, 2006.

IV B.Tech.	HUMAN COMPUTER INTERACTION	L	T	P	C
I Semester	(Professional Elective Course - III)	3	0	0	3

COURSE OBJECTIVES

1. Learn the foundations of Human Computer Interaction
2. Be familiar with the design technologies for individuals and persons with disabilities
3. Be aware of mobile HCI
4. Learn the guidelines for user interface
5. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction
6. Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.

COURSE OUTCOMES

Student will be able to

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
3. Apply an interactive design process and universal design principles to designing HCI systems.
4. Describe and use HCI design principles, standards and guidelines
5. Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
6. Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

UNIT I: INTRODUCTION

Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability. Managing Design Processes: Introduction, Organizational design to support usability, four pillars of design, development methodologies, Ethnographic observation, Participatory design, Social impact statement for early design review, legal issues.

UNIT II: MENU SELECTION, FORM FILL-IN AND DIALOG BOXES

Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays.

UNIT III: COMMAND AND NATURAL LANGUAGES

Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing. Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large.

UNIT IV: QUALITY OF SERVICE

Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences. Balancing Function and

Fashion: Introduction, Error Messages, No anthropomorphic Design, Display Design, Web Page Design, Window Design, Color.

UNIT V: USER DOCUMENTATION AND ONLINE HELP

Introduction, Online Vs Paper Documentation, reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, online communities for User Assistance, The Development Process.

UNIT VI: INFORMATION SEARCH

Introduction, Searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Searching Interfaces Information Visualization: Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization.

TEXTBOOKS

1. Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, **Designing the User Interface, Strategies for Effective Human Computer Interaction**, 5th Edition, Pearson.
2. Wilbert O Galitz, **The Essential guide to user interface design**, 2nd Edition, Wiley DreamTech.

REFERENCE BOOKS

1. Dan R. Olsan, **Human Computer Interaction**, Cengage, 2010.
2. Ben Shneidermann, **Designing the user interface**, 4th Edition, PEA.

WEB LINKS

1. http://yosualeonardo.wordpress.com/2013/10/26/Human-Computer-Interface-3-managing-design-process/
2. http://studylib.net/doc/15217350/chapter-6-menu-selection--form-fill-in--and-dialog-boxes

IV B.Tech.	APPLICATIONS OF AI	L	T	P	C
I Semester	(Professional Elective Course - III)	3	0	0	3

COURSE OBJECTIVES

1. To impart knowledge about the concepts of Artificial Intelligence.
2. To introduce the fundamental concepts of Search Techniques, knowledge representation and Predicate Logic.
3. To learn the fundamentals of AI, and solve different computational problems.
4. To focus on knowledge representation for expert systems.
5. To develop some simple applications form gained knowledge.

COURSE OUTCOMES

1. Define the concept of Artificial Intelligence.
2. Solve basic AI based problems.
3. Apply AI techniques to real-world problems to develop intelligent systems.
4. Select appropriately from a range of techniques when implementing intelligent systems.
5. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
6. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

UNIT-1

Introduction to Artificial Intelligence: AI Problems, The underlying Assumption, AI Techniques, Level of the Model Problems, Problem Spaces &Search: Defining the Problem as a state space search, Production System, Problem Characteristics, Production System Characteristics.

UNIT-2

Heuristic Search Techniques: Generate and Test, Hill Climbing, Best first Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT-3

Knowledge Representation Issues: Representation and Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem
Predicate Logic: Representing simple facts in logic, Computable Functions and Predicates, Resolution, Natural Deduction.

UNIT-4

Representing Knowledge using rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge

UNIT-5

Common Sense: Qualitative Physics, Common Sense Ontologies, Memory Organization
Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Knowledge Acquisition

UNIT-6

Fuzzy Logic System: Crisp Sets, Fuzzy Sets, Some Fuzzy Terminology, Fuzzy Logic Control, Sugeno Style of Fuzzy Inference Processing, Fuzzy Hedges, α Cut Threshold, Neuro Fuzzy System.

TEXT BOOK

1. Elaine Rich & Kevin Knight, "**Artificial Intelligence"**, 2nd Edition, McGraw Hill.

REFERENCE BOOK

1. Patrick Henry Winston, "**Artificial Intelligence"**, Pearson Education, 2003

IV B.Tech.	BIOINFORMATICS AND COMPUTATIONAL GENOMICS (Professional Elective Course - III)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To give a bird's eye view of life sciences and to introduce basics of Bioinformatics.

COURSE OUTCOMES

Student will be able to,

1. Learn the nature and scope of life sciences
2. Give an overview about basic molecular Biology concept
3. Understand the basic Bioinformatics terminologies.
4. Review on algorithms used in Computational Biology.
5. Analyze the genetic chromosome components and its functionality in Bioinformatics.

UNIT-1 : NATURE AND SCOPE OF LIFE SCIENCE

Branches of life sciences, Characteristics of life, Levels of Organization, Origin of life, Biochemical evolution- evolution of Proteins and Nucleotide.

UNIT-2 : CELL BIOLOGY

The cell as basic unit of life- Prokaryotic cell and Eukaryotic cell, Cell Structure and Function-cell membrane, cell organelles, Cell Division; Mitosis & Meiosis.

UNIT-3 : CELL ENERGETICS

Laws of Thermodynamics, Photosynthesis, Anaerobic & aerobic respiration, Structure and function of mitochondria, respiratory pathways: Glycolysis, Kreb's Cycle, Electron transport chain.

UNIT-4 : CHROMOSOME-GENOME-GENES-DATABASES

Bio-molecules- DNA, RNA, Protein and amino acids, Chargaff's Rules, Codon bias, GC content. Central Dogma: Replication, Transcription, Translation, Post transcriptional & post translational modifications, RNA processing, RNA splicing and RNA editing. Sense/coding and anti-sense/template strands, Genetic code, wobble hypothesis. Introduction to DNA and Protein sequencing, Human Genome Project, Bioinformatics databases, Type of databases, Nucleotide sequence databases, Primary nucleotide sequence databases-EMBL, Gene Bank, DDBJ; Secondary nucleotide sequence databases.

UNIT-5 : PROTEINS AND DATABASES

Protein structure and function, Protein Primary structure, Amino acid residues, Secondary, Tertiary, Quaternary Structure of Protein, Protein sequence databases- SwissProt/ TrEMBL, PIR, Sequence motif databases -Pfam, PROSITE, Protein structure databases, Protein Data Bank-SCOP, CATH, KEGG, Chembank, Sequence, structure and function relationship

UNIT-6 : INTRODUCTION TO COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

Nature and scope of Computational Biology and Bioinformatics, Basic algorithms in Computational Biology, Introduction to sequence alignment (only general ideas, not algorithm) - Local and global, pair wise and multiple, BLAST.

TEXT BOOK

1. Devasena, T, "**Cell Biology**", Published by Oxford University Press, 2012.
2. Fall, C.P., Marland, E.S., Wagner, J.M., Tyson, J.J.(2002), "**Computational Cell Biology**", Springer.

REFERENCE BOOK

1. Misener, S., Krawetz, S.A.(1999). Bioinformatics Methods and Protocols. Humana Press.
2. Moody, G. (2004). Digital code of life: how bioinformatics is revolutionizing science, medicine, and business. John Wiley & Sons.
3. Nelson, D. L., Lehninger, A. L., & Cox, M. M. (2008). Lehninger principles of biochemistry. Macmillan.

WEBLINKS

1. https://www.edx.org/course/mitx/mitx-7-00x-introduction-biology-secret-1768
2. https: //www.coursera.org/course/introbiology
3. https://www.coursera.org/course/emergenceoflife

IV B.Tech.	CLOUD COMPUTING	L	T	P	C
I Semester	(Professional Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES

After completing this course, students will be able to

1. Discuss, with confidence, what is cloud computing and what are key security and control considerations within cloud computing environments.
2. Assess cloud characteristics and service attributes, for compliance with enterprise objectives
3. Recognize steps and processes used to perform an audit assessment of a cloud computing environment
4. Summarize specific environments that would benefit from implementing cloud computing, contrasted against those environments that might not benefit.
5. Weight the impact of improperly controlled cloud computing environments on organizational sustainability.

COURSE OUTCOMES

Student will be able to

1. Presents fundamental concepts of cloud computing, charting their evolution, Delivery models, and Deployment models, can present models for migrating applications to cloud environments.
2. Cover IaaS, from enabling technologies such as virtual machines and virtualized storage, to sophisticated mechanisms for securely storing data in the cloud and managing virtual clusters.
3. Describe PaaS/IaaS, detailing the delivery of cloud hosted software and applications. The design and operation of sophisticated, auto-scaling applications and environments
4. Presents monitoring and management mechanisms for Cloud Computing Architectures for federating cloud computing resources are explored, as well as service level agreement (SLA) management and performance prediction.
5. Develop some novel applications that have been made possible by the rapid emergence of cloud computing resources.
6. Experience Best practices for architecting cloud applications, describing how to harness the power of loosely coupled cloud resources.

UNIT I: SYSTEMS MODELING, CLUSTERING AND VIRTUALIZATION

Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security and Energy Efficiency

UNIT II: VIRTUAL MACHINES AND VIRTUALIZATION OF CLUSTERS AND DATA CENTERS

Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT III: CLOUD PLATFORM ARCHITECTURE

Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT IV: CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENTS

Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT V: CLOUD RESOURCE MANAGEMENT AND SCHEDULING

Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two-Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling Map Reduce Applications Subject to Deadlines.

UNIT VI: STORAGE SYSTEMS

Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system, Apache Hadoop, Big Table, Megastore, and Amazon Simple Storage Service (S3).

TEXT BOOKS

1. Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK, **Distributed and Cloud Computing**, Elsevier.

REFERNCE BOOKS

1. Dan C Marinescu, MK, **Cloud Computing, Theory and Practice,** Elsevier.
2. Arshadeep Bahga, Vijay Madisetti, **Cloud Computing, A Hands-on approach**, University Press

WEB LINKS

1. http://www.thoughtsoncloud.com/2014/02/cloud-computing-basics/

IV B.Tech.	COMPUTER ANIMATION	L	T	P	C
I Semester	(Professional Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES

1. Understand the fundamental concepts and theory of computer graphics.
2. Understand modelling, and interactive control of 3D computer graphics applications.
3. The underlying parametric surface concepts be understood.
4. Learn multimedia authoring tools.
5. To develop, design and implement two- and three-dimensional graphical structures
6. To learn Creation, Management and Transmission of Multimedia objects.

COURSE OUTCOMES

Student will be able to

1. Explain the various output primitives and graphics systems.
2. Understand the various output primitives of computer graphics
3. Discuss various 2D transformations, viewing and clipping techniques.
4. Explain the 3D objects and projections.
5. Explain basic illumination and Colour models.
6. Discuss various animation sequences and graphics realism.

UNIT I: INTRODUCTION

Application areas of computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

UNIT II: PRIMITIVES AND 2D TRANSFORMATIONS

Output Primitives: Points and Lines, Line Drawing Algorithms (Bradenham's And DDA Line Derivations and Algorithms), Midpoint Circle Algorithm.
Filled Area Primitives: Scan-Line Polygon Fill Algorithm, Boundary-Fill and Flood-Fill Algorithm.
2-Dgeometrical Transformations: Translation, Scaling, Rotation, Reflection and Shear Transformation Matrix Representations and Homogeneous Co-Ordinates, Composite Transformations, Transformations Between Coordinates.

UNIT III: 2-D VIEWING

The viewing pipeline, viewing coordinat4 reference frame, window to view-port co-ordinate transformations, viewing function, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

UNIT IV: 3-D OBJECT REPRESENTATION

Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces.

UNIT V: 3-D GEOMETRIC TRANSFORMATIONS:

Translation, rotation, scaling, reflection, shear transformation, composite transformations. Visible surface detection methods: Classification, back-face detection, Depth-buffer, scan-line, depth sorting.

UNIT VI: COMPUTER ANIMATION

Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification.

TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, **Computer Graphics C version**, Pearson/ PHI.
2. Foley, Van Dam, Feiner and Hughes, **Computer Graphics Principles & practice**, 2nd Edition in C, Pearson Education.

REFERENCE BOOKS

1. Zhigand xiang, Roy Plastock, **Computer Graphics,** 2nd Edition, Schaum's outlines, Tata Mc-Graw hill edition.
2. David F Rogers, **Procedural elements for Computer Graphics**, 2nd Edition, Tata Mc Graw hill.
3. Neuman and Sproul, **Principles of Interactive Computer Graphics**, TMH.
4. Steven Harrington, **Computer Graphics**, TMH.

WEB LINKS

1. https://online.stanford.edu/courses/cs148-introduction-computer-graphics-and-imaging
2. https://ocw.mit.edu/courses/Electrical-Engineering-and-Computer-Science/6-837-Computer-Graphics-fall-2012/

IV B.Tech.	EMBEDDED SYSTEMS (Professional Elective Course - IV)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. Understand the building blocks of typical embedded system and different memory technology and memory types.
2. Learn the characteristics of an embedded system, quality attributes of embeddedsystems, Application specific and domain specific embedded system.
3. Learn about communication devices and basics about VLSI and integrated circuit design and learn concept of firmware design approaches, ISR concept. Interruptsources, interrupt servicing mechanism, multiple interrupts.
4. Understand the concepts of c versus embedded c and compiler versus cross-compiler.
5. Learn about the integrated development environment, software utility tool.
6. Also learn about quality assurance and testing of the design, testing on host machine, simulators.

COURSE OUTCOMES

Student will be able to

1. Know basics of embedded system, classification, memories, different firmware.
2. Know its role in embedded system, different system components
3. Distinguish all communication devices in embedded system, other peripheral device.
4. Distinguish concepts of C versus embedded C and compiler versus cross-compiler.
5. Choose an operating system, and learn how to choose an RTOS ,Know the different Debugging models
6. Learn the different Debugging tools.

UNIT-I: BASICS OF EMBEDDED SYSTEMS

Embedded System-Definition, History, Classification, application areas and purpose of embedded systems, The typical embedded system-Core of the embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware. Characteristics, Quality attributes of an embedded systems, Application-specific and Domain-Specific examples of an embedded system.

UNIT-II: EMBEDDED HARDWARE DEVICES

Analog and digital electronic components, I/O types and examples, Serial communication devices, Parallel device ports, Wireless devices, Timer and counting devices, Watchdog timer, Real time clock.

UNIT-III: EMBEDDED FIRMWARE DESIGN

Embedded Firmware design approaches, Embedded Firmware development languages, ISR concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, DMA, Device driver programming, Concepts of C versus Embedded C and Compiler versus Cross-compiler.

UNIT-IV: REAL TIME OPERATING SYSTEM

Operating system basics, Types of operating systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Threads, Processes and Scheduling, Task Scheduling, Communication, Synchronization, How to choose an RTOS. **Hardware Software Co-Design:** Fundamental Issues in Hardware Software Co-Design, Hardware software Trade-offs, Integration of Hardware and Firmware, ICE.

UNIT-V: EMBEDDED SYSTEM DEVELOPMENT

The integrated development environment, Types of files generated on cross-compilation, Disassembler/Decompiler, Simulators, Emulators and Debugging, Target hardware debugging, Boundary Scan, Embedded Software development process and tools.

UNIT-VI: EMBEDDED SYSTEM IMPLEMENTATION AND TESTING

The main software utility tool, CAD and the hardware, Translation tools-Pre-processors, Interpreters, Compilers and Linkers, Debugging tools, Quality assurance and testing of the design, Testing on host machine, Simulators, Laboratory Tools.

TEXT BOOKS:

1. Tammy Noergaard, "**Embedded Systems Architecture**", Elsevier Publications, 2005
2. Frank Vahid, Tony Givargis, "**Embedded System Design**", Wiley Publications.

REFERENCE BOOKS:

1. Raj Kamal, "**Embedded Systems**", McGraw Hill Education Private Limited, Second Edition, 2008
2. Labrosse, "**Embedding system building blocks**", CMP publishers.

IV B.Tech.	ADVANCED COMPUTER NETWORKS	L	T	P	C
I Semester	(Professional Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES

1. Gain core knowledge of Network layer routing protocols and IP addressing.
2. Study Session layer design issues, Transport layer services, and protocols.
3. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
4. Provide the mathematical background of routing protocols.
5. To develop some familiarity with current research problems and research methods in advance computer networks.

COURSE OUTCOMES

Student will be able to

1. Illustrate reference models with layers, protocols and interfaces
2. Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6
3. Describe and Analysis of basic protocols of computer networks
4. Assist in network design and implementation
5. Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks

UNIT-I:

Network layer: Network Layer Services, Packet Switching, Performance, provided transport layers, implementation connectionless services, implementation connection oriented services, comparison of virtual –circuit and datagram subnets.IPV4 Address, Forwarding of IP Packets, Internet Protocol, ICMP v4, Mobile IP.

UNIT-II:

Routing Algorithms–Distance Vector routing, Link State Routing, Path Vector Routing, Unicast Routing Protocol-Internet Structure, Routing Information Protocol, Open Source Path First, Border Gateway Protocol V4, Broadcast routing, Multicasting routing, Multicasting Basics, Intra-domain Muticast Protocols, IGMP.

UNIT-III:

IPv6 Addressing, IPv6 Protocol, Transition from IPv4 to IPv6.Transport Layer Services, connectionless versus connection oriented protocols. Transport Layer Protocols: Simple Protocol, Stop and Wait, Go-Back-N, Selective repeat, Piggy Backing.

UNIT-IV:

UDP: User datagram, Services, Applications. TCP: TCP services, TCP features, segment, A TCP connection, Flow control, error control, congestion control.

UNIT-V:

SCTP: SCTP services SCTP features, packet format, An SCTP association, flow control, error control. QUALITY OF SERVICE: flow characteristics, flow control to improve QOS: scheduling, traffic shaping, resource reservation, admission control.

UNIT-VI:

WWW and HTTP, FTP, Telnet, Domain name system, SNMP, Multimedia data, Multimedia in the Internet.

TEXT BOOKS:

1. Behrouz A. Forouzan, "**Data Communication and Networking**", McGraw Hill, 5th Edition, 2012.
2. Andrew S. Tanenbaum, David J. Wetherall, "**Computer Networks**", Pearson Education India; 5th edition, 2013.

REFERENCE BOOKS:

1. Mayank Dave, "**Computer networks**", CENGAGE.
2. BS Davie, Morgan-Kauffman, "**Computer Networks: A Systems Approach**", LL Peterson, 5th Edition, 2011.
3. KW Ross, Addison, JF Kurose "**Computer Networking: A Top-Down Approach**", Wesley, 5th Edition, 2009.

IV B.Tech.	INTERNET OF THINGS	L	T	P	C
I Semester	(Professional Elective Course - V)	3	0	0	3

COURSE OBJECTIVES

1. Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.
2. Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, RF and sensing modules.
3. Market forecast for IoT devices with a focus on sensors.
4. Analyze and use interfacing Devices in IoT.
5. To study practical examples of IoT.
6. Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi.

COURSE OUTCOMES

Student will be able to,

1. Understand the concepts of Internet of Things
2. Learn the concepts of Seven Generations of IoT Sensors
3. Analyze Energy Storage in Wireless Sensor.
4. Interface hardware in IoT.
5. Implement projects using Raspberry Pi.
6. Create the projects on IoT.

UNIT I: INTRODUCTION

Internet of Things Promises–Definition– Scope–Sensors for IoT Applications–Structure of IoT– IoT Map Device

UNIT II: SEVEN GENERATIONS OF IOT SENSORS TO APPEAR

Industrial sensors – Description & Characteristics–First Generation – Description & Characteristics–Advanced Generation – Description & Characteristics–Integrated IoT Sensors – Description & Characteristics–Polytronics Systems – Description & Characteristics–Sensors' Swarm – Description & Characteristics–Printed Electronics – Description & Characteristics–IoT Generation Roadmap.

UNIT III: TECHNOLOGICAL ANALYSIS

Wireless Sensor Structure–Energy Storage Module–Power Management Module–RF Module–Sensing Module.

UNIT IV: IOT DEVELOPMENT EXAMPLES

ACOEM Eagle – En Ocean Push Button – NEST Sensor – Ninja Blocks -Focus on Wearable Electronics.

UNIT V: PREPARING IOT PROJECTS-I

Creating the sensor project - Preparing Raspberry Pi - Clayster libraries - Hardware- Interacting with the hardware - Interfacing the hardware- Internal representation of sensor values - Persisting data - External representation of sensor values - Exporting sensor data.

UNIT VI: PREPARING IOT PROJECTS-II

Creating the actuator project- Hardware - Interfacing the hardware - Creating a controller - Representing sensor values - Parsing sensor data - Calculating control states - Creating a camera - Hardware -Accessing the serial port on Raspberry Pi - Interfacing the hardware - Creating persistent default settings - Adding configurable properties - Persisting the settings - Working with the current settings -Initializing the camera.

TEXT BOOKS

1. Ovidiu Vermesan Peter Friess, **Internet of Things** – From Research and Innovation to Market Deployment, River Publishers, 2014.
2. Peter Waher, **Learning Internet of Things,** Packet Publishing, 2015 Editors.

REFERENCE BOOKS

1. Dr. Guillaume Girardin, Antoine Bonnabel, Dr. Eric Mounier, **Technologies & Sensors for the Internet of Things Businesses & Market Trends,** 2014 - 2024, Yole Development Copyrights ,2014
2. Peter Waher, **Learning Internet of Things,** Packet Publishing, 2015 Editors.
3. Ovidiu Vermesan Peter Friess, **Internet of Things** – From Research and Innovation to Market Deployment, River Publishers, 2014
4. N. Ida, Sensors, **Actuators and Their Interfaces**, Scitech Publishers, 2014.

IV B.Tech.	SOFT COMPUTING	L	T	P	C
I Semester	(Professional Elective Course - V)	3	0	0	3

COURSE OBJECTIVES

1. To learn the various soft computing fuzzy models.
2. To be familiar with design of optimal solutions.
3. To be exposed to artificial intelligence and machine learning process.
4. To learn genetic programming and fuzzy modeling.
5. To learn to know real time applications of Fuzzy techniques in AI.

COURSE OUTCOMES

Student will be able to,

1. Apply various soft computing frame works in fuzzy logic models.
2. Design of various neural networks with simple search for solution.
3. Understand the membership functions and rules of Fuzzy logic.
4. Use fuzzy logic in AI with heuristic classifications.
5. Apply genetic programming in hybrid learning algorithms.
6. Create own real-time applications using AI.

UNIT I : NEURAL NETWORKS (INTRODUCTION & ARCHITECTURE)

Neuron, Nerve structure and synaCSEe, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto associative and hetro-associative memory

UNIT II : NEURAL NETWORKS II (BACK PROPAGATION NETWORKS)

Architecture: perceptron model, solution, single layer artificial neural network, multilayer Perception model; back propagation learning methods, effect of learning rule coefficient ;back Propagation algorithm, factors affecting back propagation training, applications.

UNIT III : FUZZY LOGIC-I (INTRODUCTION)

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV : FUZZY LOGIC–II (FUZZY MEMBERSHIP, RULES)

Membership functions, interference in fuzzy logic, fuzzy if then rules, Fuzzy implicationsand Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V : GENETIC ALGORITHM (GA)

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, Application

UNIT VI : MULTI-OBJECTIVE OPTIMIZATION PROBLEM SOLVING

Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi-Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs, Some applications with MOEAs.

TEXT BOOKS:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "**Neural Networks, Fuzzy Logic and Genetic Algorithm : Synthesis and Applications**" Prentice Hall of India.
2. N. P. Padhy, "**Artificial Intelligence and Intelligent Systems**" Oxford UniversityPress.

REFERENCE BOOKS:

1. Siman Haykin,"**Neural Networks**", Prentice Hall of India.
2. Timothy J. Ross, "**Fuzzy Logic with Engineering Applications**" Wiley India.
3. Kumar Satish, "**Neural Networks**" McGraw Hill

IV B.Tech.	VIRTUAL REALITY: INTERFACE APPLICATION AND DESIGN	L	T	P	C
I Semester	(Professional Elective Course - V)	3	0	0	3

COURSE OBJECTIVES

1. To establish and cultivate a broad and comprehensive understanding of this rapidly evolving and commercially viable field of Computer Science.
2. Prepare the student for participating in the production of highly integrative immersive applications, immersive social platforms, cross disciplinary academic research projects.
3. To design leading developments in Medical, Industrial and Manufacturing R&D.

COURSE OUTCOMES

A student will be able to;

1. Work in collaborative group projects and develop working prototypes.
2. Design demo experiences, immersive platforms, unique controllers.
3. Develop multimedia tacking devices and controllers.
4. Innovate new technologies that can be used in the development and production.
5. Immersive environments in the fields of entertainment, education, training, medical and industrial innovation.

UNIT 1: INTRODUCTION

Introduction to Immersive Technologies: A Brief History of Virtual Reality, The five Classic Components of a VR System, Early Commercial VR Technology, VR Becomes an Industry, Reality, Virtuality and Immersion, VR, AR, MR, xR: similarities and differences, Current trends and state of the art in immersive technologies, developing platforms and consumer devices, The future of human experience

UNIT 2: MOTION TRACKING, NAVIGATION AND CONTROLLERS

Position and Motion Trackers, Inside Out/Outside In, Tracker Performance Parameters, Optical - Active and Passive Trackers, Inertial and Hybrid Trackers - HMD Trackers, Magnetic Trackers, Mechanical Trackers, Ultrasonic Trackers, Navigation and Manipulation Interfaces, Tracker-Based Navigation/Manipulation Interfaces, Three-Dimensional Probes and Controllers, Data Gloves and Gesture Interfaces.

UNIT 3: CAMERA TRACKING AND 3D RENDERING FOR IMMERSIVE ENVIRONMENTS

Inside-Out Camera tracking, Depth Sensing, Microsoft HoloLens, Vrvana Totem, Low cost AR and MR systems, Mobile Platforms, Full-Body tracking: Inverse & Forward Kinematics, Kinect, Intel Realsense, Full body inertial tracking, Holographic Video.

Rendering Architecture: Graphics Accelerators, 3D Rendering API's, OpenGL, DirectX, Vulcan, Metal, Best practices and Optimization techniques.

UNIT 4: MODELING THE PHYSICAL WORLD

Geometric Modeling: Virtual Architecture, Virtual Object Shape, Virtual Object Appearance, Procedural Textures, Advanced Material Properties, Procedural Objects, Photogrammetry.

Kinematics Modeling: Homogeneous Transformation Matrices, Object Position, Transformation Invariants, Object Hierarchies, Scale, Perspective and Perception.

Physical Modeling: Collision Detection, Surface Deformation, Force computation, Force Smoothing and Mapping, Haptic Texturing.

UNIT 5: SOUND IN IMMERSIVE ENVIRONMENTS

Evolution of Sound Systems: From mono to stereo to surround, Object Based Sound, Ambisonics, HRTF.

Sound Design Basics: Sound as Information, Earcons, Impact of Sound in Objects and Actions, Natural vs Real Sound.

UNIT 6: VR APPLICATIONS IN MANUFACTURING

Productivity Enhancement Platforms: Virtual Prototyping spaces, Virtual collaborative working spaces, Augmented and Virtual Assistance, Telepresence.

Applications of VR in Robotics: Robot Programming, Robot Teleoperation. Information Visualization: Oil Exploration and Well Management, Big Data Visualization, Volumetric Data Visualization.

Product Liability and Social responsibility: Innovation as continuity vs disruption, Entrepreneurial Design for Societal Progress, Legal Responsibilities.

TEXTBOOK

1. Kelly S. Hale (Editor), Kay M. Stanney (Editor), "**Handbook of Virtual Environments: Design, Implementation, and Applications**", Second Edition, 2014.

IV B.Tech.	IT SUPPORT TECHNOLOGIES	L	T	P	C
I Semester	(Professional Elective Course - V)	3	0	0	3

COURSE OBJECTIVES

1. To study how to plan and manage projects at each stage of the software development life cycle (SDLC).
2. To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3. To understand successful software projects that support organization's strategic goals.
4. Understanding of software evolution and related issues such as version management.
5. Understanding on quality control and how to ensure good quality software.
6. Understanding of some ethical and professional issues that are important for software engineers.

COURSE OUTCOMES

Student will be able to

1. To match organizational needs to the most effective software development model
2. To understand the basic concepts and issues of software project management and effectively Planning the software projects
3. To implement the project plans through managing people, communications and change
4. To select and employ mechanisms for tracking the software projects
5. To conduct activities necessary to successfully complete and close the Software projects
6. To develop the skills for tracking and controlling software deliverables

UNIT I: INTRODUCTION

Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

UNIT II: PROJECT APPROACH

Lifecycle models, Choosing Technology, Prototyping Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

UNIT III: EFFORT ESTIMATION & ACTIVITY PLANNING

Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation, Activity Identification Approaches, Network planning models, Critical path analysis.

UNIT IV: RISK MANAGEMENT

Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach.

UNIT V: PROJECT MONITORING & RESOURCE ALLOCATION

Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

UNIT VI: SOFTWARE QUALITY

Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)

TEXTBOOKS

1. Bob Hughes & Mike Cotterell, **Software Project Management**, TMGH
2. Walker Royce, **Software Project Management**, Pearson Education, 2005.
3. Pankaj Jalote, **Software Project Management in practice**, Pearson.

REFERENCE BOOK

1. Joel Henry, **Software Project Management**, Pearson Education.

WEB LINKS

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. https://www.tutorialspoint.com/sdlc/sdlc_quick_guide.htm
3. https://www.castsoftware.com/research-labs/risk-management-in-software-development-and-software-engineering-projects

IV B.Tech.	DISASTER MANAGEMENT	L	T	P	C
I Semester	(Open Elective Course - III)	3	0	0	3

COURSE OBJECTIVES

1. Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
2. Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.
3. Understand the 'relief system' and the 'disaster victim.'
4. Describe the three planning strategies useful in mitigation.
5. Identify the regulatory controls used in hazard management.
6. Describe public awareness and economic incentive possibilities.

COURSE OUTCOMES

A student will be able to;

1. Affirm the usefulness of integrating management principles in disaster mitigation work.
2. Distinguish between the different approaches needed to manage preduring and post-disaster periods
3. Explain the process of risk management.
4. Relate to risk transfer.

UNIT 1: NATURAL HAZARDS AND DISASTER MANAGEMENT

Introduction of DM – Inter disciplinary -nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides..

UNIT 2: MAN MADE DISASTAR AND THEIR MANAGEMENT ALONG WITH CASE STUDY

Methods of The Following: Fire hazards – transport hazard dynamics –solid waste management – post disaster – bio terrotirism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

UNIT 3: RISK AND VULNERABILITY

Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

UNIT 4: ROLE OF TECHNOLOGY IN DISASTER MANAGEMENTS

Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and trainingtransformable indigenous knowledge in disaster reduction.

UNIT 5: EDUCATION AND COMMUNITY PREPAREDNESS

Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.

UNIT 6: MULTI-SECTIONAL ISSUES

Impact of disaster on poverty and deprivation- Climate change adaptation and human health - Exposure , health hazards and environmental risk-Forest management and disaster risk reduction.- Institutional capacity in disaster management -The Red cross and red crescent movement-Corporate sector and disaster risk reduction-A community focused approach.

TEXT BOOKS

1. 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy(2009),Universities press.
2. 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

REFERENCE BOOK

1. 'Disaster Management' edited by H K Gupta (2003),University press.

IV B.Tech.	UTILIZATION OF ELECTRICAL ENERGY (Open Elective Course - III)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To understand the operating principles and characteristics of traction motors withrespect to speed, temperature, loading conditions.
2. To acquaint with the different types of heating and welding techniques.
3. To study the basic principles of illumination and its measurement.
4. To understand different types of lightning system including design.
5. To understand the basic principle of electric traction including speed–time curves of different traction services.
6. To understand the method of calculation of various traction system for braking, acceleration and other related parameters, including demand side management of energy.

COURSE OUTCOMES

A student will be able to;

1. Identify most appropriate heating or welding techniques for suitable applications.
2. Understand various level of luminosity produced by different illuminating sources.
3. Estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.
4. Determine the speed/time characteristics of different types of traction motors.
5. Estimate energy consumption levels at various modes of operation.
6. Estimate the type of lighting require for a particular application

UNIT I: SELECTION OF MOTORS

Choice of motor, type of electric drives, starting and running characteristics–Speed control–Temperature rise–Applications of electric drives–Types of industrial loads– continuous–Intermittent and variable loads–Load equalization.

UNIT II: ELECTRIC HEATING & ELECTRIC WELDING

Methods of electric heating: Resistance heating, induction heating and dielectric heatingArc furnaces Direct and indirect arc furnaces Electric welding: Resistance and arc welding Electric welding equipment Comparison between AC and DC Welding.

UNIT III: ILLUMINATION FUNDAMENTALS

Introduction, terms used in illumination–Laws of illumination Polar curves Integratingsphere Lux meter principle and operation of tungsten filament lamp, fluorescent tube, Discharge lamps, MV, SV lamps and LED lamps Lumen or flux method of calculation.

UNIT IV: VARIOUS ILLUMINATION METHODS

Basic principles of light control Types and design of lighting: flood, factory, street anddomestic lighting Conservation of energy (fundamentals).

UNIT V: ELECTRIC TRACTION – I

System of electric traction and track electrification Review of existing electric traction systems in India Special features of traction motor Mechanics of train movement Speedtime curves for different services: Trapezoidal and quadrilateral speed time curves-Highspeed transportation trains.

UNIT VI: ELECTRIC TRACTION – II

Calculations of tractive effort power Specific energy consumption for given run– Effectof varying acceleration and braking retardation Adhesive weight and braking, retardation adhesive weight and coefficient of adhesion Principles of energy efficient motors-Modern traction motors.

TEXTBOOKS

1. E. Openshaw Taylor, **Utilization of Electric Energy**, Orient Longman.
2. Partab, Art & Science of **Utilization of Electrical Energy**, Dhanpat Rai & Sons.

REFERENCE BOOKS

1. N.V. Suryanarayana, **Utilization of Electrical Power** including Electric drivesand Electric traction, New Age International (P) Limited, Publishers, 1996.
2. C.L. Wadhwa, Generation, Distribution and **Utilization of Electrical Energy**, NewAge International (P) Limited, Publishers, 1997..

WEBLINKS

1. https://www.livewebtutors.com/assignment-help/electrical-engineering/electrical- energy-utilization
2. https://nptel.ac.in/courses/108105060

IV B.Tech.	MANUFACTURING TECHNOLOGIES	L	T	P	C
I Semester	(Open Elective Course - III)	3	0	0	3

COURSE OBJECTIVES

1. To impart basic knowledge and understanding about the primary manufacturing processes such as casting, joining, forming, blanking, piercing, bending, coining, spinning, presses and its applications.
2. In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, Shaper, slotter, and drilling machines.

COURSE OUTCOMES

Student will be able to,

1. Design of different types of patterns, metal casting process and its applications
2. Evaluate the various types of welding operations
3. Analyse the forging, rolling, extrusion and drawing.
4. Apply the various types of fabrication process like forming, blanking, piercing, bending, coining, and spinning.
5. Demonstrate the operations performed on lathe and drilling classify
6. Demonstrate the operations performed on shaping, slotting, milling and planning machines.

UNIT I: CASTING

Steps involved in making a casting – Advantage of casting and its applications. – Types of patterns – Materials used for patterns, pattern allowances,

UNIT II: WELDING

Classification of welding processes, types of welded joints and their characteristics, Gas welding-Arc welding, Manual metal arc welding-Sub merged arc welding-Inert Gas welding-TIG & MIG welding- Thermit welding, Laser welding, Soldering & Brazing.

UNIT III: METAL FORMING PROCESS

Bulk-forming processes: Forging - Types Forging, Smith forging, Drop Forging, forging-Rolling – fundamentals, types of rolling mills and products, Extrusion and its characteristics-Wire drawing and Tube drawing.

UNIT IV: SHEET METAL OPERATION

Blanking and Piercing-Deep Drawing-Stretch Forming-Bending-Coining-Spinning, Types of presses and press tools.

UNIT V: LATHE& DRILLING

Engine lathe – principle of working, specification of lathe – types of lathe – work holders, tool holders-lathe operations, Drilling: Principles of working, specifications

UNIT VI: SHAPING, SLOTTING, MILLING AND PLANNING MACHINES

Shaping, slotter, Planning& milling Types, Principles of working – principal parts – specifications, slotter, Cross and open belt drive quick return mechanism- work holding devices, operations performed.

TEXT BOOKS

1. R.K. Jain, **Production Technology**, Khanna Publishers.
2. B.S. Raghu Vamshi, Danpath Rai, **A Course in Workshop Technology, Vol.- II**, Dhanpat Rai Delhi , 2012, 9th Edition.
3. P.N. Rao, **Manufacturing Technology -Volume I** – TMH.
4. Mikell P Groover, **Fundamentals of Modern Manufacturing**, Wiley publication, 3rd Edition.

REFERENCE BOOKS

1. Ghosh & A.K. Malik, **Manufacturing Science,** East West Press Private Limited.
2. Lindberg- **Process and materials of manufacture,** PHI, 2nd Edition.
3. Milton C. Shaw, **Metal Cutting Principles**, Oxford University Press, 2012, 2nd Edition.
4. S.K Hazaraj Chowdary, A.K Hazaraj Chowdary**,** Nirjhar Roy**, Elements of Workshop Technology** Vol. II, Machine Tools, Media Promotors and Publishing Pvt. Ltd, Mumbai, 2003, 11th Edition.

IV B.Tech.	SEMICONDUCTOR OPTO-ELECTRONICS (Open Elective Course - III)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES

1. To know the basics of semiconductor devices and their characteristics.
2. To know the basics of solid state physics and understand the nature and characteristics of light.
3. To understand different methods of luminescence, display devices and laser types and their applications.
4. To learn the principle of optical detection mechanism in different detection devices.
5. To understand different light modulation techniques and the concepts and applications of optical switching.
6. To study the integration process and application of opto electronic integrated circuits in transmitters and receivers.

COURSE OUTCOMES

Student will be able to,

1. Model the basic semiconductor circuit for the given requirements.
2. Analyse the characterises of the light.
3. Analyse the methods of luminescence, display devices and laser types and their applications.
4. Differentiate between optical detection mechanisms in different detection devices.
5. Apply various modulation techniques based on the applications.
6. Analyse the integration process and application of opto electronic integrated circuits in transmitters and receivers.

UNIT I: INTRODUCTION TO SEMICONDUCTORS

Semiconductor microelectronics and the latest industrial revolution Introduction to energy-band diagrams, density-of-states and semiconductor statistics Semiconductors in equilibrium, charge carriers and doping Carrier transport and excess carriers, drift and diffusion, carrier recombination Structure and properties of the Schottky barrier Structure and properties of the p/n junction, photo detectors and solar cells Bipolar Junction Transistors (BJT): basic principles and models of operation Basic properties of metal-oxide-semiconductor (MOS) structures Field-effect Transistors: MOS FETs and memory devices Introduction to CMOS technology Light emitting diodes and semiconductor lasers.

UNIT II: ELEMENTS OF LIGHT AND SOLID STATE PHYSICS

Wave nature of light, Polarization, Interference, Diffraction, Light Source, review of Quantum Mechanical concept, Review of Solid State Physics, Review of Semiconductor Physics and Semiconductor Junction Device.

UNIT III: DISPLAY DEVICES AND LASERS

Introduction, Photo Luminescence, Cathode Luminescence, Electro Luminescence, Injection Luminescence, Injection Luminescence, LED, Plasma Display, Liquid Crystal Displays, Numeric Displays, Laser Emission, Absorption, Radiation, Population Inversion, Optical Feedback, Threshold condition, Laser Modes, Classes of Lasers, Mode Locking, laser applications.

UNIT IV: OPTICAL DETECTION DEVICES

Introduction, Analog and Digital Modulation, Electro-optic modulators, Magneto Optic Devices, Acoustoptic devices, Optical, Switching and Logic Devices.

UNIT V: OPTOELECTRONIC MODULATOR

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling, Optical receiver operation Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of Error, Quantum limit, Analog receivers.

UNIT VI: OPTOELECTRONIC INTEGRATED CIRCUITS

Introduction, hybrid and Monolithic Integration, Application of Opto Electronic Integrated Circuits, Integrated transmitters and Receivers, Guided wave devices.

TEXT BOOKS

1. Jasprit Singh, **Semiconductor Devices**, ISBN 0-471-36245-X
2. S. O. Kasap, **Principles of electronic materials and devices**, ISBN 0-07-295791-3
3. J. Wilson and J.Haukes, "**Opto Electronics – An Introduction**", Prentice Hall of India Pvt. Ltd., New Delhi, 1995.

RERFERENCE BOOKS

1. Bhattacharya "**Semiconductor Opto Electronic Devices**", Prentice Hall of India Pvt., Ltd., New Delhi, 1995.
2. Jasprit Singh, "**Opto Electronics – As Introduction to materials and devices**", McGraw-Hill International Edition, 1998.

WEBLINKS

1. https://creol.ucf.edu/ose5414-fundamentals-of-optoelectronic devices/#:~:text=Semiconductor%20optoelectronic%20devices%20such%20as,beam%20using%20an%20electrical%20input.
2. https://www.elprocus.com/optoelectronics-devices-with-their-applications/
3. https://en.wikipedia.org/wiki/Optoelectronics

IV B.Tech.	AIR POLLUTION AND CONTROL	L	T	P	C
I Semester	(Open Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES

1. To know the analysis of air pollutants
2. To know the Threshold Limit Values (TLV) of various air pollutants
3. To acquire the design principles of particulate and gaseous control
4. To learn plume behavior in different environmental conditions
5. To learn carbon credits for various day to day activities

COURSE OUTCOMES

Student will be able to,

1. Decide the ambient air quality based the analysis of air pollutants.
2. The design principles of particulate and gaseous control measures for an industry.
3. Judge the plume behavior in a prevailing environmental condition
4. Estimate carbon credits for various day to day activities.
5. Assess the various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.
6. Explain the natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources.

UNIT I: AIR POLLUTION

Air Pollution: Sampling and analysis of air pollutants, conversion of ppm into $\mu g/m^3$. Definition of terms related to air pollution and control - secondary pollutants - Indoor air pollution - Climate Change and its impact - Carbon Trade.

UNIT-II: THERMODYNAMICS AND KINETICS OF AIR-POLLUTION

Thermodynamics and Kinetics of Air-pollution: Applications in the removal of gases like SOx, NOx, CO and HC - Air-fuel ratio- Computation and Control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT – III: METEOROLOGY AND AIR POLLUTION

Meteorology and Air Pollution: Properties of atmosphere: Heat, Pressure, Wind forces, Moisture and relative Humidity, Lapse Rates - Influence of
Terrain and Meteorological phenomena on plume behaviour and Air Quality - Wind rose diagrams, Plume Rise Models.

UNIT-IV: AMBIENT AIR QUALITY MANAGEMENT

Ambient Air Quality Management: Monitoring of SPM, SO2; NOx and CO - Stack Monitoring for flue gases - Micro-meteorological monitoring - Weather Station. Emission Standards-Gaussian Model for Plume Dispersion.

UNIT-V: AIR POLLUTION CONTROL

Air Pollution Control: Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipments – Settling Chambers, Cyclone separators –Fabric filters– scrubbers, Electrostatic precipitators

UNIT – VI: AIR POLLUTION CONTROL METHODS

Air Pollution Control Methods: Control of NOx and SOx emissions – Environmental friendly fuels - In-plant Control Measures, process changes, methods of removal and recycling. Environmental criteria for setting industries and green belts.

TEXT BOOKS:

1. Air Pollution by M.N. Rao and H.V.N. Rao –McGraw Hill Company.
2. Air Pollution and Control by KVSG Murali Krishna, Laxmi Publications, New Delhi.

REFERENCE BOOKS:

1. An Introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.
2. Air pollution by Wark and Warner - Harper & Row, New York

IV B.Tech.	ENERGY CONSERVATION AND AUDIT	L	T	P	C
I Semester	(Open Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES

1. To understand energy efficiency, scope, conservation and technologies.
2. To design energy efficient lighting systems.
3. To estimate/calculate power factor of systems and propose suitable compensation techniques.
4. To understand energy conservation in HVAC systems.
5. To calculate life cycle costing analysis and return on investment on energy efficient technologies.

COURSE OUTCOMES

1. Identify the demand supply gap of energy in Indian scenario.
2. Carry out energy audit of an industry/Organization.
3. Draw the energy flow diagram of an industry and identify the energy wasted or a waste stream.
4. Select appropriate energy conservation method to reduce the wastage of energy
5. Evaluate the techno economic feasibility of the energy conservation technique adopted.
6. To study about the Energy audit and its benefits

UNIT I

General energy problem, Sector wise Energy consumption, demand supply gap, Scope for energy conservation and its benefits Energy conservation Principle – Maximum energy efficiency, Maximum cost effectiveness, Mandatory provisions of EC act, Features of EC act-Standards and labeling, designated consumers, Energy Conservation Building Codes (ECBC), Energy management concept and objectives, Initializing Planning, Leading, Controlling, Promoting, Monitoring and Reporting. energy management programmes

UNIT II

Energy saving opportunities in electric motors, Benefits of Power factor improvement and its techniques-Shunt capacitor, Synchronous Condenser etc., Effects of harmonics on – Motors, and remedies leading to energy conservation

UNIT III

Energy conservation by VSD, Methods and techniques of energy conservation in ventilation and air conditioners,compressors pumps, fans and blowers,Area Sealing, Insulating the Heating / cooling fluid pipes , automatic door closing- Air curtain, Thermostat / Control., Energy conservation in electric furnaces, ovens and boilers., lighting techniques – Natural , CFL, LED lighting sources and fittings

UNIT IV

New equipment, technology, staffing, training,Calculation and costing of energy conservation project., Depreciation cost, sinking fund method., Cost evaluation by Return On Investment(ROI) and pay back method etc., Risk analysis., Case study

UNIT V

Performance improvement of existing power plant: co-generation , small hydro ,DG Set, Demand side management, Load response programmes, Types of tariff and restructuring of electric tariff, Technical measures to optimize T and D losses

UNIT VI

Energy audit and its benefits, Energy flow diagram, Preliminary, Detailed energy audit., Methodology of preliminary energy audit and Detailed energy audit – Phase I, Pre audit, Phase II- Audit and Phase III- Post audit, Energy audit report., Electrical Measuring Instruments - Power Analyser, Combustion analyzer, fuel efficiency monitor, thermometer-contact, infrared, pitot tube and manometer, water flowmeter, leak detector, tachometer and luxmeter, IE rules and regulations for energy audit, Electricity act(Numerical)

TEXT BOOKS:

1. Energy Management Handbook W.C. Turner Publisher John Wiley and Sons

REFERENCE BOOKS:

1. Energy Efficient Electric Motors and Applications H.E. Jordan Plenum Pub. Corp
2. Energy Management Author Publisher W. R. Murphy, G. Mckay Butterworths

IV B.Tech.	COMPUTER AIDED DESIGN AND MANUFACTURING (Open Elective Course - IV)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES:

1. To familiarize the components of computer aided manufacturing, introduce CNC machines, and computer aided process planning

COURSE OUTCOMES:

Student will be able to,

1. Knowledge of Computer-Aided Programming
2. Analyse the Tooling For CNC Machines.
3. Understand the Knowledge of Post processors for CNC
4. Understand the design process, visualize models through graphics standards and apply principles of computer graphics like geometric transformations.
5. Recognize various wireframe entities and model them.
6. Apply surface modelling techniques for generating various parts

UNIT I: COMPUTER-AIDED PROGRAMMING

Computer-Aided Programming: General information, APT programming, Examples Apt programming problems (2D machining only). NC programming on CAD/CAM systems, the design and implementation of post processors .Introduction to CAD/CAM software, Automatic Tool Path generation.

UNIT II: TOOLING FOR CNC MACHINES

Principles of Numerical control, Types of CNC Machine Tools, Features of CNC Systems, Direct numerical control (DNC), Elements of CNC viz. Ball screws, rolling guide ways, structure, drives and controls, standard controllers, Manual part programming with APT.

UNIT III: POST PROCESSORS FOR CNC

Post processors for CNC: Introduction to Post Processors: The necessity of a Post Processor, the general structure of a Post Processor, the functions of a Post Processor, DAPP — based-Post Processor: Communication channels and major variables in the DAPP — based Post Processor, th creation of a DAPP — Based Post Processor

UNIT III: CAD

Introduction: Criteria for selection of CAD workstations, Shigley's design process, Design criteria, Geometric modelling, Entities, 2d and 3d primitives, Computer Aided Design, Iterative Design, CAD process Geometric Transformations: 2d Translation, Scaling, Rotation, Reflection and shearing, Homogeneous Coordinates, Rotation and Scaling about arbitrary points

UNIT V: MODELING OF CURVES

Modeling of Curves: Curve representation, Analytic curves- Lines, and Circles, Ellipse, and Conics, Synthetic curves – Cubic, Bezier, B-Splines

UNIT VI: SURFACE MODELING

Surface Modeling: Surface representation, Analytic Surfaces: Plane Surface, Ruled Surface, Surface of Revolution, Tabulated Cylinder. Synthetic Surface: Cubic, Bezier, B-spline

TEXT BOOKS

1. Koren **Computer Control of Manufacturing Systems** -, McGraw Hill,3rd edtion
2. Zimmer's & P. Grover, **CAD/CAM**, Pearson Education.
3. Ibrahim Zaid, **CAD / CAM Theory and Practice**, Tata McGraw Hill Publications

REFERENCE BOOKS

1. Grover, **Automation, Production Systems & Computer Integrated Manufacturing**, Pearson Education Publications.
2. Radhakrishnan and Subramanian, **CAD/CAM/CIM**, New Age International Publications.
3. Farid Amirouche, **Principles of Computer Aided Design and Manufacturing**, Pearson Education Publications.
4. Alavala, **CAD/CAM: Concepts and Applications**, PHI.
5. Warren S Seames, **Computer Numerical Control Concepts and programming**, 4th Edition, Thomson Learning Inc.

IV B.Tech.	DATA COMMUNICATION AND NETWORKING	L	T	P	C
I Semester	(Open Elective Course - IV)	3	0	0	3

COURSE OBJECTIVES:

1. To have a detailed study of various analog and digital modulation and demodulation techniques
2. To have a thorough knowledge of various multiplexing schemes and Data communication protocols
3. To know about the standards and mechanisms of television systems

COURSE OUTCOMES:

1. Evaluate the time and space parameters of a switched signal
2. Establish the digital signal path in time and space, between two terminals
3. Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions.
4. Investigate the traffic capacity of the system.
5. Evaluate methods of collecting traffic data.
6. Evaluate the method of interconnecting two separate digital switches.

UNIT -I: INTRODUCTION

INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING :Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Networks, Alternate Protocol Suites.

SIGNALS, NOISE, MODULATION, AND DEMODULATION: Signal Analysis, Electrical Noise and Signal-to- Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

UNIT -II: TRANSMISSION MEDIA

METALLIC CABLE TRANSMISSION MEDIA: Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves

OPTICAL FIBER TRANSMISSION MEDIA**:** Advantages of Optical Fiber cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

UNIT -III: TRANSMISSION TECHNIQUES

DIGITAL TRANSMISSION :Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to- Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

MULTIPLEXING AND T CARRIERS**:** Time- Division Multiplexing, T1 Digital Carrier System, Digital Line Encoding, T Carrier systems, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network.

UNIT -IV: WIRELESS COMMUNICATIONS SYSTEMS

Electromagnetic Polarization, Electromagnetic Radiation, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

UNIT -V: TELEPHONE INSTRUMENTS AND SYSTEMS

TELEPHONE INSTRUMENTS AND SIGNALS**:** The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

CELLULAR TELEPHONE SYSTEMS**:** First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, Global system for Mobile Communications.

UNIT -VI: ERROR CONTROL CODING AND EQUIPMENT

DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS: Data Communications Character Codes, Bar Codes, Error Control, Error Detection and Correction, Character Synchronization.

DATA COMMUNICATIONS EQUIPMENT: Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asyn chronous Voice-Band Modems, Synchronous Voice-Band Modems,

Modem Synchronization, 56K Modems, Modem Control: The AT Command Set, Cable Modems.

TEXT BOOK:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education

REFERENCE BOOKS:

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition,Mc Graw Hill.
2. Data and Computer communications, 8/e, William Stallings, PHI.
3. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
4. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

IV B.Tech.	FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS	L	T	P	C
I Semester	(Humanities and Social Science Elective)	3	0	0	3

COURSE OBJECTIVE:

1. To understand the Concepts of Management
2. To know about human resource design and organization culture
3. To understand the concepts of Operations Management
4. To know about functions of marketing management
5. To get knowledge on distribution channels
6. To understand about network analysis and project management

COURSE OUTCOME:

Student will be able to,

1. Significance of Management in their Profession.
2. Manage Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
3. Explore the Management Practices in their domain area.
4. Apply concepts in Practical aspects of business and development of Managerial Skills for Engineers.
5. Process of marketing functions and mix.
6. Learn about network analysis

UNIT - I INTRODUCTION TO MANAGEMENT:

Evolution of Management, Nature & Scope-Functions of Management Role of Manager-levels of Management-Managerial Skills - Challenges-Planning-Planning Process Types of Plans-MBO

UNIT - II ORGANIZATION STRUCTURE & HRM

Organization Design-Organizational Structure-Departmentation– Delegation-Centralization - Decentralization-Recentralization-Organizational Culture- Organizational climate-Organizational change

Human Resource Management-HR Planning - Recruitment & Selection - Training & Development Performance appraisal - Job satisfaction-Stress Management Practices

UNIT - III OPERATION MANAGEMENT

Introduction to t-Principles and Types of Plant Layout-Methods of production (Job Batch and Mass production) - Method study and Work Measurement-Quality Management - TQM-Six sigma - Deming's Contribution to Quality - Inventory Management – EOQ - ABC Analysis - JIT System-Business Process Re-engineering (BPR)

UNIT - IV MARKETING MANAGEMENT- 1

Introduction to Marketing-Functions of Marketing-Marketing vs. SellingMarketing Mix - Marketing Strategies - Product Life Cycle

UNIT – V MARKETING MANAGEMENT- 2

Market Segmentation -Types of Marketing - Direct Marketing-Network Marketing - Digital Marketing-Channels of Distribution - Supply Chain Management (SCM)

UNIT - VI PROJECT MANAGEMENT

Introduction to Project Management-steps in Project Management - Project Planning - Project Life Cycle-Network Analysis-Program Evaluation & Review Technique (PERT)- Critical Path Method (CPM) - Project Cost Analysis - Project Crashing - Project Information Systems

TEXT BOOKS:

1. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
2. Fundamentals of Management, Stephen P.Robbins, Pearson Education, 2009.

REFERENCE BOOKS:

1. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
2. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
3. Industrial Engineering and Management: Including Production Management, T.R.Banga, S.C Sharma , Khanna Publishers.

IV B.Tech.	BASICS OF FINANCIAL INSTITUTIONS, MARKETS & SERVICES	L	T	P	C
I Semester	(Humanities and Social Science Elective)	3	0	0	3

COURSE OBJECTIVES:

1. To give an understanding about Indian Financial system with respect to Markets
2. To know about the Banking Institutions and Services.
3. To understand about non-banking financial institutions
4. To know about depositary securities markets
5. To get knowledge on fund based financial services and regulatory framework
6. To get information on Lead Managers& underwriting

COURSE OUTCOMES:

Student will be able to,

1. Introduction to Indian Financial system
2. Banking and Non-Banking Institutions
3. Financial and Securities markets
4. Fund and Fee based services.
5. Classification and financial leasing
6. Challenges faced by investment bankers

UNIT – I: INTRODUCTION:

The structure of Indian financial system; Equilibrium in financial markets; Indicators of Financial Development, Structure of Financial Institutions, and Recent Developments of Indian Financial System.The role and functions of SEBI.

UNIT - II: BANKING INSTITUTIONS:

Commercial banks – Growth and structure of commercial Banks- competition, interest rates, spreads, and NPAs. Bank capital – adequacy norms and capital market support. Banking Innovations- e-banking- Risk Management in Banking. Cooperative banks- Features, Structure and Growth, Government initiatives to strengthen the cooperative banks.

UNIT - III: NON-BANKING FINANCIAL INSTITUTIONS:

Structure and functioning of Unit Trust of India and Mutual Funds. Growth of Indian Mutual funds and its Regulation. The Role of AMFI. Insurance Companies – Structure and Investment Pattern of Public and Private Sector insurance companies, Competition, innovation, Role of IRDA, Challenges of Insurance Sector in India.

UNIT - IV: FINANCIAL AND SECURITIES MARKETS:

Structure and functions of Call Money Market, Government Securities Market – T-bills market, Commercial Bills market, Commercial paper and certificate of deposits- Securities markets – Organization and structure, Listing trading and settlement. SEBI and Regulation of Primary and Secondary Markets. Role and functions of Clearing Corporation of India Ltd

UNIT - V: ASSET /FUND BASED FINANCIAL SERVICES

Lease Finance- Conceptual and Regulatory Framework, Classification and Financial leasing, Hire Purchase and Consumer Credit, Factoring and Forfeiting, Housing finance, Venture capital financing.

UNIT - VI: FEE-BASED / ADVISORY SERVICES:

Investment Banking – Introduction, Functions and activities of Merchant bankers, Lead Managers, underwriting, bankers to an issue, debenture trustees, and portfolio managers. Challenges faced by investment bankers. Stock broking, Custodial Services, Depository system, Credit rating – Role of agencies, Process, regulations. CIBIL

TEXT BOOKS:

1. M.Y. Khan: Financial Services, Mc Graw Hill, 2012.
2. S. Gurusamy: Financial Services and System, Cengage,2012

REFERENCE BOOKS:

1. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson, 2012.
2. Frank. J. Fabozzi & Franco Modigliani: Foundations of Financial Markets and Institutions, Pearson, 2012.
3. L.M. Bhole: Financial Institutions and Markets, Mc Graw Hill, 2012.

IV B.Tech.	ESSENTIALS OF LEADERSHIP & CHANGE MANAGEMENT (Humanities and Social Science Elective)	L	T	P	C
I Semester		3	0	0	3

COURSE OBJECTIVES:

1. Gain knowledge and leadership skills to help organizations chart a successful course through change.
2. Describe the role leadership plays in anticipating organizational change
3. Identify the motivation of business leaders in achieving organizational advancement.
4. Planning readiness and navigating organizational change.
5. Recognize the significant drivers of organizational change.
6. Demonstrate the importance of effective change management.

COURSE OUTCOMES:

1. Acquire concepts of the basic variations found in leadership/management philosophies, styles.
2. Examine the basic business leadership competency model as it relates to health care and health promotion programming.
3. Increase business acumen by learning essential business terms, concepts and functions.
4. Create a leadership philosophy based on your understanding of characteristics of effective leaders aligned with the business leadership competency model.
5. Understand the basic concepts of change Management.
6. Identify effective strategies for implementing change in an organization.

UNIT I: ORGANISATIONAL LEADERSHIP:

Definition, Components and evaluation of leadership, factors of leadership, Situational Leadership Behaviour: Meaning, Fiedler Contingency Model, Path Goal and Normative Models - Emerging Leadership Behaviour: Transformational, Transactional and Visionary Leadership –

UNIT-II: LEADERSHIP FOR THE NEW MILLENNIUM ORGANISATIONS

Leadership in Indian Organisations. Leadership Effectiveness: Meaning, Reddins '3-D Model, Hersey and Blanchard Situational Model, Driving LeadershipEffectiveness, Leadership for Organisational Building.

UNIT III: LEADERSHIP MOTIVATION, CULTURE:

Motivation Theories for Leadership- Emerging Challenges in Motivating Employees. Motivation, Satisfaction, Performance.Organisational Culture: Meaning, Definitions, Significance, Dimensions, Managing Organisational Culture, Changing organisational Cultural.Leadership Development: Leadership development: Significance – Continuous Learning: Principles of learning to develop effective leadership – Vision and Goals for organisation: significance of goals for leaders.

UNIT IV: STRATEGIC LEADERSHIP:

Leader Self-management: significance - Developing self-esteem and balancing emotions – Interpersonal Leadership Skills: Praise – Criticize – Communicate – Leadership Assertiveness: Circle of influence and circle of concern – Leadership and creativity: Developing creative

thinking – Leadership and Team Building: Principles of team building, individual versus Group versus Teams – Leadership and Integrity: Developing character and values.

UNIT V: BASICS OF CHANGE MANAGEMENT:

Meaning, nature and Types of Change – change programmes – change levers – change as transformation – change as turnaround – value-based change.

UNIT VI: MAPPING CHANGE:

The role of diagramming in system investigation – A review of basic flow diagramming techniques –systems relationships – systems diagramming and mapping, influence charts, multiple cause diagrams- a multidisciplinary approach -Systems approach to change: systems autonomy and behavior – the intervention strategy model – total project management model (TPMM).

TEXT BOOKS:

1. Peter G. Northouse, Leadership, 2010, Sage. Publication.
2. Richard L. Daft ―Leadership‖ Cengage Learning 2005.

REFERENCE BOOKS:

1. Uday Kumar Haldar ―Leadership and Team Building, Oxford Higher Education 2010
2. Richard L Hughes, Robert C Ginnett, Gordon J Curphy ―Leadrship‖ Tata Mc Graw Hill Education Private Limited 2012.
3. Peter Lornge, ThoughtLeadership Meets Business, 1st edition, 2009, Cambridge.
4. 6.Cummings: ―Theory of Organisation Development and Change, Cengage Learning, New Delhi, 2013.
5. Robert A Paton: Change Management, Sage Publications, New Delhi, 2011.

IV B.Tech.	CUSTOMER RELATIONSHIP MANAGEMENT FOR ENGINEERS	L	T	P	C
I Semester	(Humanities and Social Science Elective)	3	0	0	3

COURSE OBJECTIVES:

1. To understand how customer relations is related to other business functions and its importance to the success of the business entity.
2. To understand the importance of CRM process as it relates to marketing
3. To identify, understand, and apply basic marketing concepts to service quality
4. To know about CRM implementation and choosing the right CRM Solution for customization process.
5. To understand about salesforce automation and establishment of relations among contacts.
6. To understand the concepts about E-Commerce and Customer Relationships on the Internet Supplier and online sales etc.

COURSE OUTCOMES:

Students will be able to,

1. How customer relations is related to other business functions and its importance to the success of the business entity.
2. Find the importance of CRM process as it relates to marketing
3. Identify, understand, and apply basic marketing concepts to service quality
4. Implementation of CRM and choosing the right CRM Solution for customization process.
5. Salesforce automation and establishment of relations among contacts.
6. The concepts about E-Commerce and Customer Relationships on the Internet Supplier and online sales.

UNIT-I: INTRODUCTION TO CRM:

Definition and concepts of CRM, Components of CRM, Understanding the goal of CRM and Customer Touch Points.

UNIT-II: CRM PROCESS:

Introduction and Objectives of a CRM Process; an Insight into CRM and e-CRTA/online CRM, The CRM cycle i.e. Assessment Phase; Planning Phase; The Executive Phase; Modules in CRM, 4C's (Elements) of CRM Process, CRM Process for Marketing Organization, CRM Affiliation in Retailing Sector.

UNIT-III: DEVELOPING CRM STRATEGY:

Role of CRM in business strategy, Understanding Service Quality: Technical, Functional and dimensions of service quality, Managing Customer communications.

UNIT:-IV: CRM IMPLEMENTATION:

Choosing the right CRM Solution; Framework for Implementing CRM: a Step-by-Step Process: Five Phases of CRM Projects: Development Customizations; Beta Test and Data Import; Train and Retain; Rollout and System Hand-off; Support.

UNIT-V: SALES FORCE AUTOMATION

Sales Process, Activity, Contact, Lead and Knowledge Management. Field Force Automation.

UNIT-VI: CRM LINKS IN E-BUSINESS:

E-Commerce and Customer Relationships on the Internet, Supplier.

TEXT BOOK:

1. Alok Kumar Rai, Customer Relationship Management (Concepts and Cases), PHI Learning Pvt. Ltd., Second edition.

REFERENCE BOOKS:

1. The CRM Handbook – A Business Guide to Customer Relationship Management, Pearson Education, New Delhi.
2. Kaushik Mukherjee, Customer Relationship Management, Prentice Hall of India, New Delhi.