Open Department of CSE

The R.V.R. & J.C. College of Engineering is among the first few engineering colleges in Andhra Pradesh to introduce the undergraduate program in Computer Science & Engineering (CSE). The department came into being in 1994 with the introduction of the B.Tech programme. Since its inception, the department has grown exponentially in the areas of student intake, quality of academic work and student achievements. The initial student enrollment was limited to 30 B.Tech students. Since then, the B.Tech programme has seen a gradual increase in the student enrollments and current annual intake stands at 180. Taking the needs of the academic institutions and the industry into cognizance, the department of CSE has started the M.Tech programme in the year 2003. The current annual intake for the M.Tech programme is 25 students. The M.Tech programme helps enhance the quality of the academic atmosphere in the department.

The mission of the Computer Science & Engineering program is *"to educate students in the theoretical foundation of the discipline and its creative application to the solution of complex problems, and to prepare students to learn independently in a discipline that is constantly changing. The program seeks to develop students, who are, sensitive to the wide range of social concerns impacted by the discipline and are articulate in expression of their ideas and actions".* All the staff members of the department of CSE work with dedication to achieve the objectives listed in the mission statement.

The department has excellent infrastructure facilities to support the teaching-learning process. More than half of the class rooms of the department have the integrated computer-assisted teaching systems. The faculty of the department utilizes these systems to deliver effective lectures. A new training facility named E-learning centre was developed in the year 2009 at a cost of Rs.40 Lakhs. The E-learning centre is one of a kind training facility capable of hosting 75 participants at a time and has one dedicated computer terminal for each participant. The latest equipment required for video conferencing, remote lecture delivery and collaborative lecture delivery are available in the E-learning centre. The department of CSE also maintains the MOODLE course management system for electronic distribution of lecture material, online references and question papers. The MOODLE course management system is also being used by the faculty members to conduct online examinations.

The department has modern laboratories to serve the teaching and research needs of the students and faculty members. The laboratories of the department have substantial computing resources that include the latest hardware and software. The laboratories are equipped with the computers of latest configuration procured from MNCs. All the laboratory computers are connected to the campus network using hi-speed Fibre Optic Local Area Network. A dedicated leased line provides round-the-clock Internet access to all the laboratory computers. The department also maintains a dedicated lab for improving the communication skills of the students.

The college and the department are well served by the central library. The central library has more than 5000 books related to computer science and engineering subjects. The central library has online subscription to INDEST (Indian National Digital Library in Engineering Science and Technology) consortium. The subscription to INDEST provides online access to reputed engineering journals from professional societies like IEEE and ACM. The central library also procures physical copies of the popular periodicals, national and international journals. There is also a dedicated department library to serve the needs of the department.

The faculty members of the department actively pursue research in their respective areas and publish research papers in renowned journals. The students are strongly encouraged to participate in the national and international conferences, workshops, student symposiums and to publish papers in national / international journals.

The department strives towards delivering quality education to the students. This fact is attested to by the National Board of Accreditation (NBA). The department of CSE received accreditation from NBA for a period of 3 years during 2002 and the accreditation was renewed again for a period of 3 years during 2007. The All India Council for Technical Education (AICTE) has recognized the strengths of the department and awarded two different projects to the department. The first project was sanctioned under the MODROBS scheme for a total of Rs.10 lakhs during the 2009-2010 year. The project money was used to establish a dedicated Wireless Networks lab. The department has also successfully conducted an AICTE-sanctioned Staff Development Programme (SDP)

during the 2008-2009 academic year. The department also invites experts from premiere educational institutions and the industry to conduct seminars / workshops on the advanced topics in Computer Science.

The department of CSE is justly proud of its high performing students. The students successfully secured Top Ranks in the university examinations for the past several years. The students secured admissions in the IITs, NITs and other higher education institutions of India. A significant number of students also pursue their higher studies in renowned foreign universities. Students of this department are placed in Top MNC's like TCS, CTS, Infosys, Oracle, Accenture, IBM, Wipro, CISCO etc,. One of the alumni was awarded the Best New Performer during the year 2006 in the Asia Pacific Region by M/s.Infosys Technologies. The alumni of the department are well represented in all walks of life.

R.V.R. & J.C. COLLEGE OF ENGINEERING(AUTONOMOUS)
CHOWDAVARAM:: GUNTUR-522 019.
REGULATIONS (R12) FORFOUR - YEAR B.TECH DEGREE COURSE

(Effective for the batch of students admitted into first year B.Tech. from the academic year 2012-2013)

1.0. MINIMUM QUALIFICATIONS FOR ADMISSION

A candidate seeking admission into First Year of B.Tech. Degree Course should have passed either Intermediate examination conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics, and Chemistry as optional subjects (or any equivalent examination recognized by the Acharya Nagarjuna University) or Diploma in Engineering in the relevant branch conducted by the State Board of Technical Education & Training of Andhra Pradesh (or equivalent Diploma recognized by Acharya Nagarjuna University).

The selection is based on the rank secured by the candidate at the EAMCET / ECET (FDH) examination conducted by A.P. State Council of Higher Education.

The candidate shall also satisfy any other eligibility requirements stipulated by the University and / or the Government of Andhra Pradesh from time to time.

2.0. BRANCHES OF STUDY

2.1. The B.Tech. Course is offered in the following branches of study:

1 Biotechnology
2 Chemical Engineering
3 Civil Engineering
4 Computer Science & Engineering
5 Electrical & Electronics Engineering
6 Electronics & Communication Engineering
7 Information Technology
8 Mechanical Engineering

2.2 In addition to the core electives, an open elective (non Departmental elective) is to be offered in the first semester of fourth year by all branches of B.Tech. courses.

3.0. DURATION OF THE COURSE AND MEDIUM OF INSTRUCTION

3.1 The duration of the course is four academic years consisting of two semesters in each academic year. The medium of instruction and examination is English.

3.2 The duration of the course for the students (Diploma Holders) admitted under lateral entry into II/IV B.Tech. is three academic years consisting of two semesters in each academic year. The medium of instruction and the Examination is English.

4.0. MINIMUM INSTRUCTION DAYS

Each semester shall consist of a minimum number of 90 days of instruction excluding the days allotted for tests, examinations and preparation holidays.

5.0 EVALUATION

The performance of the students in each semester shall be evaluated subject wise

5.1. The distribution of marks between sessionals (based on internal assessment) and Semester end Examination is as follows:

Nature of the subject	**Sessional Marks**	**End Semester Exam. Marks**
Theory subjects/Design and/ or	40	60

Drawing/Practicals Project work	80	120 (Viva voce)

5.2. Ineach of the Semesters, there shall be two Mid Term examinations and two Assignment Tests in every theory subject. The Sessional marks for the midterm examinations shall be awarded giving a weightage of 15 marks out of 18 marks (80% approx) to that midterm examination in which the student scores more marks and the remaining 3 marks (20% approx.) for other midterm examination in which the student scores less marks. Similarly a weightage of 10 marks (80% approx) out of 12 marks earmarked for assignment tests shall be given for the assignment in which the student scores more marks and remaining 2 marks (20% approx) shall be given for the assignment test in which the student scores less marks.

Five marks are allotted for attendance in the respective theory subjects in a graded manner as indicated in ***clause7.2.***The remaining 5 marks out of the 40 marks earmarked for the internal sessional marks are awarded (quiz/online examination) by the concerned teacher in the respective theory subjects.

5.3. The evaluation for Laboratory class work consists of a weightage of 25 marks for day to day laboratory work including record work and 15 marks for internal laboratory examination including Viva-voce examination.

In case of Project work, the sessional marks shall be awarded based on the weekly progress, the performance in two Seminars and the Project Report submitted at the end of the semester. The allotment of sessional marks for Seminars and day-to-day class work shall be30 and 50 respectively.

NOTE : A student who is absent for any Assignment / Mid Term Exam, for any reason whatsoever, shall be deemed to have scored zero marks in that Test / Exam and no make-up test / Exam shall be conducted.

5.4. A student who could not secure a minimum of 50% aggregate sessional marks is not eligible to appear for the semester-end examination and shall have to repeat that semester.

6.0. LABORATORY / PRACTICAL CLASSES

In any semester, a student and get the record certified by the concerned Head of the Department, to be eligible to face the Semester end Examination in that Practical subject.

7.0. ATTENDANCE REGULATIONS

7.1 Regular course of study means a minimum average attendance of 75% in all the subjects computed by totaling the number of hours / periods of lectures, design and / or drawing, practicals and project work as the case may be, held in every subject as the denominator and the total number of hours / periods actually attended by the student in all the subjects, as the numerator.

7.2 A weightage in sessional marks up to a maximum of 5 marks out of 40 marks in each theory subject shall be given for those students who put in a minimum of 75% attendance in the respective theory in a graded manner as indicated below:

Attendance of 75% and above but less than 80% - 1 mark
Attendance of 80% and above but less than 85% - 2 marks
Attendance of 85% and above but less than 90% - 4 marks
Attendance of 90% and above - 5 marks

7.3 Condonation of shortage in attendance may be recommended on genuine medical grounds, up to a maximum of 10% provided the student puts in at least 65% attendance as calculated in ***clause 7.1*** above, provided the Principal is satisfied with the genuineness of the reasons and the conduct of the student.

7.4 A student who could not satisfy the minimum attendance requirements as given above, in any semester, is not eligible to appear for the semester end examinations and shall have to repeat that semester.

8.0 DETENTION

A student, who fails to satisfy either the minimum attendance requirements as stipulated in *Clause-7*, or the requirement of minimum aggregate sessional marks as stipulated in *Clause 5*, shall be detained. Such

a student shall have to repeat the same semester subsequently and satisfy the above requirements afresh to become eligible to appear for the semester-end examination.

9.0. SEMESTER END EXAMINATION

9.1. For each theory subject, there shall be a comprehensive semester end Examination of three hours duration at the end of each Semester, unless stated otherwise in the detailed Scheme of Instruction.

Question paper setting shall be entrusted to external examiners from the panels approved by the respective Boards of Studies.

9.2. For each Practical subject, the semester end examination shall be conducted by one internal and one external examiner appointed by the Principal of the College, the duration being that approved in the detailed Schemes of Instruction & Examination.

9.3 Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner appointed by the Principal.

10.0 CONDITIONS FOR PASS

A candidate shall be declared to have passed the Semester end Examination in individual subjects if he / she secures a minimum of 35% marks in theory and 50% marks in Practical subjects and drawing subjects (including Project Viva-voce).

11.0 AWARD OF CREDITS

Credits are awarded for each Theory/Practical Subjects. Each theory subject is awarded four credits and each practical subject is awarded two credits. Project work is awarded ten credits. However for some specific subjects more/less than four credits may be awarded by individual boards. The total number of credits for all the four years put together should be in the range of 218-224 for any branch.

11.1 AWARD OF GRADES

S.No.	Range of Marks	Grade	Grade Points
1	≥85%	S	10.0
2	75%-84%	A	9.0
3	65%-74%	B	8.0
4	55%-64%	C	7.0
5	45%-54%	D	6.0
6	40%-44%	E	5.0
7	≤39%	F (Fail)	0.0
8	The grade "W" represents withdrawal/absent (subsequently changed into pass or E to S or F grade in the same semester)	W	0.0

11.2 A Student securing 'F' grade in any subject there by securing zero grade points has to reappear and secure at least 'E' grade in the subsequent examinations for that subject.

11.3 After each semester, Grade sheet will be issued which will contain the following details:

- The list of subjects for each semester and corresponding credits and Grades obtained
- The Grade Point Average(GPA) for each semester and
- The Cumulative Grade Point Average(CGPA) of all subjects put together up to that semester from first semester onwards

GPA is calculated based on the following formula:

$$\frac{\sum [\text{No. of Credits X Grade Points}]}{\sum \text{Credits}}$$

CGPA will be calculated in a similar manner, considering all the subjects enrolled from first semester onwards.

12.0 CONDITIONS FOR PROMOTION

12.1 A student shall be eligible for promotion to II/IV B.Tech. Course if he / she satisfies the minimum requirements of attendance and sessional marks as stipulated in Clauses 5 and 7, irrespective of the number of backlog subjects in I/IV B.Tech.

12.2 A student shall be eligible for promotion to III/IV B.Tech. Course if he / she secures a minimum of 70% of the total number of credits from two regular and one supplementary examinations of first semester and one regular and one supplementary examinations of second semester of I/IV B.Tech.(including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in II/IV B.Tech.

12.3 A student shall be eligible for promotion to IV/IV B.Tech. course if he/she secures a minimum of 70% of the total number of credits from three regular and two supplementary examinations of first semester and two regular and two supplementary examinations of second semester of I/IV B.Tech. and two regular and one supplementary examinations of II/IV B.Tech. first semester and one regular and one supplementary examinations of II/IV B.Tech. second semester (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III/IV B.Tech.

12.4 A student (Diploma Holder) admitted under lateral entry into II/IV B.Tech. shall be eligible for promotion to IV/IV B.Tech. course if he/she secures a minimum of 70% of the total number of credits from two regular & one supplementary examinations of II/IV B.Tech. first semester and one regular and one supplementary examinations of II/IV B.Tech. second semester (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III/IV B.Tech.

13.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE

The B.Tech. Degree shall be conferred on a candidate who has satisfied the following requirements:

13.1 The candidate must have satisfied the conditions for pass in all the subjects of all the years as stipulated in *clause 10.*

13.2 Maximum Time Limit for completion of B.Tech Degree

A Student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the year of admission, shall forfeit his/her seat in B.Tech. course.

13.3 A student (Diploma Holder) admitted under lateral entry into II/IV B.Tech., who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of admission, shall forfeit his/her seat in B.Tech. course.

14.0 AWARD OF CLASS

A candidate who becomes eligible for the award of B.Tech. Degree as stipulated in *Clause 12* shall be placed in one of the following Classes.

S.No.	Class	CGPA
1	First Class With Distinction	8.0 or more
2	First Class	6.5 or more but less than 8.0
3	Second Class	5.0 or more but less than 6.5

15.0 IMPROVEMENT OF CLASS

15.1 A candidate, after becoming eligible for the award of the Degree, may reappear for the semester end Examination in any of the theory subjects as and when conducted, for the purpose of improving the aggregate and the class. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree.

Candidates shall not be permitted to reappear either for Sessional Examinations or for Semester end Examinations in Practical subjects (including Project Viva-voce) for the purpose of improvement. However, this facility cannot be availed by a candidate who has taken the Original Degree Certificate.

15.2 A single Grade sheet shall be issued to the candidate after incorporating the Credits and Grades secured in subsequent improvements.

15.3 A consolidated Grade Sheet shall be issued to the candidate indicating the CGPA of all the four years put together along with the Provisional Certificate.

16 AWARD OF RANK

The rank shall be awarded based on the following:

16.1 Ranks shall be awarded in each branch of study for the top ten percent of the students appearing for the Regular semester end Examinations or the top ten students whichever is lower.

16.2 Only such candidates who pass the Final year examination at the end of the fourth academic year after admission as regular final year student along with others in their batch and become eligible for the award of the Degree shall be eligible for the award of rank. The Rank will be awarded only to those candidates who complete their degree within four academic years.

16.3 For the purpose of awarding rank in each branch, the CGPA calculated based on the Grades secured at the first attempt only shall be considered.

16.4 Award of prizes, scholarships, or any other Honors shall be based on the rank secured by a candidate, consistent with the desire of the Donor, wherever applicable.

17.0 SUPPLEMENTARY EXAMINATIONS

In addition to the Regular semester end Examinations held at the end of each semester, Supplementary Examinations will be conducted during the academic year. Such candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one semester end Examination per day.

18.0 TRANSITORY REGULATIONS

A Candidate, who is detained or discontinued in the semester, on readmission shall be required to do all the courses in the curriculum prescribed for such batch of students in which the students joins subsequently. However, exemption will be given to those candidates who have already passed in such courses, which he / she had passed in the earlier semester(s).

18.1 A student, following the Acharya Nagarjuna University (ANU), Guntur curriculum, detained due to lack of academics/attendance at the end of the first semester of second year, shall join the autonomous batch of third semester. Such students will study all the courses prescribed for that batch, in which the student joins. The first year marks shall not be converted into course credits. However, the student has to clear all the first year backlog subjects by appearing the supplementary examinations, conducted by ANU, Guntur and courses prescribed by Autonomous stream for the award of Degree. The class will be awarded based on the academic performance of a student. Such candidates will be considered on par with lateral entry candidates of autonomous stream and will be governed by regulations applicable to lateral entry candidates' category.

18.2 A student, following ANU, Guntur curriculum, detained due to lack of academics / attendance at the end of the second semester of second year and also at the subsequent semesters, shall join with the

autonomous batch at the appropriate semester. Such candidates shall be required to pass in all the courses in the programme prescribed by concerned BOS for such batch of students, to be eligible for the award of degree. However, exemption will be given in all those courses of the semester(s) of the batch, which he / she had passed earlier. The student has to clear all his/her backlog subjects by appearing the supplementary examinations, conducted by ANU, Guntur and College (Autonomous stream) for the award of degree. The class will be awarded based on the academic performance of a student in the autonomous pattern.

19.0 CONDUCT AND DISCIPLINE

(a) Students shall conduct themselves within and outside the premises of the institute in a manner befitting the students of our institution.
(b) As per the order of Honourable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.
(c) The following acts of omission and / or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.
    (i) Lack of courtesy and decorum, indecent behaviour anywhere within or outside the campus.
    (ii) Wilful damage of college / individual property
    (iii) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.
    (iv) Mutilation or unauthorized possession of library books.
    (v) Noisy and unseemly behaviour, disturbing studies of fellow students.
    (vi) Hacking of computer systems (such as entering into other person's areas without prior permission, manipulation and / or damage of computer hardware and software or any other cyber-crime etc.)
    (vii) Usage of camera / cell phone in the campus
    (viii) Plagiarism of any nature
    (ix) Any other acts of gross indiscipline as decided by the academic council from time to time.
(d) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debar from examination, disallowing the use of certain facilities of the institute, rustication for a specified period or even outright expulsion from the institute or even handing over the case to appropriate law enforcement or the judiciary, as required by the circumstances.
(e) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief warden, the head of the department and the principal respectively, shall have the authority to reprimand or impose fine.
(f) Cases of adoption of unfair means and / or any malpractice in an examination shall be reported to the principal for taking appropriate action.
(g) All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the academic council.
(h) The institute level standing disciplinary action committee constituted by the academic council, shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
(i) The principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the programmes committee in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved by the appropriate authority, shall be reported to the academic council for ratification.
(j) "Grievance and Redressal Committee" (General) constituted by the Principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters.

20.0 MALPRACTICES

20.1 The Principal shall refer the cases of malpractices in internal assessment tests and semester-end examinations to a malpractice enquiry committee constituted by him / her for the purpose. Such committee shall follow the approved scales of punishment. The principal shall take necessary action, against the erring students basing on the recommendations of the committee.

20.2 Any action on the part of a candidate during an examination trying to get undue advantage or trying to help another, or drive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the staff, who are in-charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned in the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

21.0 AMENDMENTS TO REGULATIONS

The College may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabus.

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R.V.R. & J.C. COLLEGE OF ENGINEERING, CHOWDAVARAM, GUNTUR-522 019
(Autonomous)

COMPUTER SCIENCE & ENGINEERING

***Proposed*SCHEME OF INSTRUCTION AND EXAMINATION**
w.e.f.2012-2013

I/IV B.Tech. FIRST SEMESTER

S.No.	Course Details		Scheme of Instruction		Scheme of Examination			Credits
	Subject Code	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Drawing/ Practical	Internal	Semester End		
1	BT/CE/CHE/CS/ EC/EE/IT/ME 111	Engineering Mathematics-I	4+1	-	40	60	100	4
2	BT/CE/CHE/CS/ EC/EE/IT/ME 112	Engineering Physics - I	3+1	-	40	60	100	3
3	CE/CS//IT 113	Engineering Chemistry – I	3+1	-	40	60	100	3
4	BT/CHE/CE/ CS/IT 114	Technical English & Communication Skills	4+1	-	40	60	100	4
5	CS/IT 115	Environmental Studies	4	-	40	60	100	4
6	BT/CHE/CE/ CS/IT 151	Physics Lab.	-	3	40	60	100	2
7	BT/CHE/CE/ CS/IT 152	English Language Lab	-	3	40	60	100	2
8	BT/CHE/ CS/IT 153	Engineering Graphics Lab.	2	4	40	60	100	4
TOTAL			**20+4**	**10**	**320**	**480**	**800**	**26**
I/IV B.Tech.SECOND SEMESTER								
1.	BT/CE/CHE/CS/ EC/EE/IT/ME 121	Engineering Mathematics-II	4+1	-	40	60	100	4
2.	BT/CE/CHE/CS/ EC/EE/IT/ME 122	Engineering Physics - II	3+1	-	40	60	100	3
3.	CE/CS/IT 123	Engineering Chemistry - II	3+1	-	40	60	100	3
4.	BT/CHE/CE/ CS/IT 124	C-Programming	4+1	-	40	60	100	4
5.	CS/IT 125	Mechanics for Engineers	4+1	-	40	60	100	4
6.	BT/CHE/CE/ CS/IT 161	Chemistry Lab.	-	3	40	60	100	2
7.	BT/ChE/CE/ CS/IT 162	Workshop	-	3	40	60	100	2
8.	BT/CHE/CE/ CS/IT 163	C-Programming Lab.	-	3	40	60	100	2
TOTAL			**18+5**	**9**	**320**	**480**	**800**	**24**

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***Proposed* SCHEME OF INSTRUCTION AND EXAMINATION**
w.e.f. 2012-2013

II / IV B.Tech. THIRD SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT211	Mathematics-III	4			40	60	100	4
2.	CS/IT 212	Basic Electrical & Electronics Engineering	3	1		40	60	100	3
3.	CS/IT 213	Digital Logic Design	4			40	60	100	4
4.	CS/IT 214	Discrete Mathematical Structures	4	1		40	60	100	4
5.	CS/IT 215	Data Structures	4	1		40	60	100	4
6.	CS/IT 216	Object Oriented Programming	4			40	60	100	4
7.	CS/IT 251	Basic Electrical & Electronics Engineering Lab			3	40	60	100	2
8.	CS/IT 252	Data Structures Lab			3	40	60	100	2
9.	CS/IT 253	Object Oriented Programming Lab			3	40	60	100	2
		TOTAL	23	3	9	360	540	900	29

II / IV B.Tech. FOURTH SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT 221	Probability & Statistics	4			40	60	100	4
2.	CS/IT 222	Computer Organization	4			40	60	100	4
3.	CS/IT 223	JAVA Programming	4	1		40	60	100	4
4.	CS/IT 224	Database Management Systems	4	1		40	60	100	4
5.	CS/IT 225	Operating Systems	4			40	60	100	4
6.	CS/IT 226	Design & Analysis of Algorithms	4	1		40	60	100	4
7.	CS/IT 261	JAVA Programming Lab			3	40	60	100	2
8.	CS/IT 262	DBMS Lab			3	40	60	100	2
9.	CS/IT 263	Communication Skills Lab			3	40	60	100	2
		TOTAL	24	3	9	360	540	900	30

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COMPUTER SCIENCE & ENGINEERING

***Proposed* SCHEME OF INSTRUCTION AND EXAMINATION**
w.e.f 2012-2013

III / IV B.Tech. FIFTH SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT 311	Professional Ethics & Human Values	3	1		40	60	100	3
2.	CS/IT 312	Computer Networks	4			40	60	100	4
3.	CS/IT 313	UNIX Programming	4	1		40	60	100	4
4.	CS/IT 314	Automata Theory & Formal Languages	4	1		40	60	100	4
5.	CS/IT 315	Web Technologies	4	1		40	60	100	4
6.	CS/IT 316	Software Engineering	4			40	60	100	4
7.	CS/IT 351	UNIX Programming Lab			3	40	60	100	2
8.	CS/IT 352	Web Technologies Lab			3	40	60	100	2
9.	CS/IT 353	Advanced Communication Skills Lab			3	40	60	100	2
		TOTAL	23	4	9	360	540	900	29

III / IV B.Tech. SIXTH SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT 321	Network Programming	4	1		40	60	100	4
2.	CS/IT 322	Object Oriented Analysis & Design	4	1		40	60	100	4
3.	CS/IT 323	Interactive Computer Graphics	4			40	60	100	4
4.	CS/IT 324	Microprocessors & Interfacing	4	1		40	60	100	4
5.	CS/IT 325	Compiler Design	4			40	60	100	4
6.	CS/IT 326	**Elective-I**	4			40	60	100	4
7.	CS/IT 361	Network Programming Lab			3	40	60	100	2
8.	CS/IT 362	Object Oriented Analysis & Design Lab			3	40	60	100	2
9.	CS/IT 363	Microprocessors & Interfacing Lab			3	40	60	100	2
		TOTAL	24	3	9	360	540	900	30

Elective-I	
CS/IT 326 (A)	Artificial Intelligence
CS/IT 326 (B)	Multi-media Systems
CS/IT 326 (C)	Advanced Database Management Systems
CS/IT 326 (D)	Digital Image Processing

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COMPUTER SCIENCE & ENGINEERING

***Proposed* SCHEME OF INSTRUCTION AND EXAMINATION**
w.e.f 2012-2013

IV / IV B.Tech. SEVENTH SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT 411	Cryptography & Network Security	4	1		40	60	100	4
2.	CS/IT 412	Distributed Systems	4			40	60	100	4
3.	CS/IT 413	Data Engineering	4	1		40	60	100	4
4.	CS414	Advanced Computer Architecture	4			40	60	100	4
5.	CS 415	**Elective-II (Open)**	3	1		40	60	100	3
6.	CS/IT 416	**Elective-III**	3	1		40	60	100	3
7.	CS/IT 451	Term Paper			4	100	--	100	2
8.	CS/IT 452	Data Engineering Lab			3	40	60	100	2
9.	CS/IT 453	**Elective-III Lab**			3	40	60	100	2
		TOTAL	22	4	10	420	480	900	28

Elective-II (open) (Offered to other branches)		**Elective-III**	
CS 415(A)	Java Programming	CS/IT 416(A)	.NET Technologies
CS 415(B)	Database Management Systems	CS/IT 416(B)	Open Source Systems
CS 415(C)	Design Thinking	CS/IT 416(C)	Mobile Computing
		CS/IT 416(D)	Software Testing Methodologies
		CS/IT 416(E)	Security Analyst
		CS/IT 416(F)	Data Analytics
		CS/IT 416(G)	Cyber Security

IV / IV B.Tech. EIGHTH SEMESTER

S.No.	Sub. Code	Subject Name	L	T	P	I	E	T	C
1.	CS/IT 421	Industrial Engineering & Management	4			40	60	100	4
2.	CS422	Cloud Computing	4			40	60	100	4
3.	CS/IT 423	J2EE Web Services	4	1		40	60	100	4
4.	CS/IT 424	**Elective-IV (Industry Related Subject)**	4			40	60	100	4
5.	CS/IT 461	J2EE Web Services Lab			3	40	60	100	2
6.	CS/IT 462	Project Work			9	80	120	200	10
		TOTAL	16	1	12	280	420	700	28

I/IV Year B.Tech. - First Semester

BT/CE/ChE/CS/IT/ECE/EEE/ME – 111
ENGINEERING MATHEMATICS – I

Lectures : 4 periods / week	Sessional Marks : 40
Tutorials : 1 period / week	Semester End Exam Marks : 60
Sem End Exam Duration: 3 hrs	Credits : **4**

Course Objectives:

- To provide knowledge on solving ordinary differential equations and applications of first order ordinary differential equations.
- To give basic knowledge on evaluation of double, triple integrals, area and volume.
- To provide knowledge and skills in writing a periodic function in its Fourier series form and on their applications.
- To develop skills for applying them in future on various engineering applications

Course Outcomes:

- Understand methods of solving First order and Higher order ordinary differential equations along with some physical applications.
- Understand the relation between two variables by Curve fitting.
- Able to evaluate double, triple integrals and the area, volume by double & triple integrals respectively.
- Understand the concept of Fourier-series representation of periodic functions and their applications.

UNIT – I **(15)**

Ordinary Differential Equations: Introduction, Linear equation, Bernoulli's equation, Exact differential equations, Equations reducible to exact equations, Orthogonal trajectories, Newton's law of cooling. Linear differential equations with constant coefficients: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, working procedure to solve the equation.

UNIT – II **(15)**

Method of variation of parameters, Equations reducible to linear equations with constant coefficients: Cauchy's homogeneous linear equation, Legendre's linear equation, Simultaneous linear equations with constant coefficients.

Statistics: Method of least squares, Correlation, Co-efficient of correlation (direct method), Lines of regression.

UNIT - III **(15)**

Fourier series: Introduction, Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, half range series. Parseval's formula, Practical harmonic analysis.

UNIT – IV **(15)**

Multiple Integrals: Double integrals**,** Change of order of integration, Double integrals in polar coordinates, Area enclosed by plane curves, Triple integrals, Volume by triple integral, Change of variables in a double integral.

Beta, Gamma functions, Error function.

TEXT BOOK:

Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna Publishers, 40th Edition, 2007.

REFERENCE BOOK:

Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition, 2007.

I/IV Year B.Tech. - First Semester

BT/CE/CHE/CS/IT/ECE/EEE/ME – 112
ENGINEERING PHYSICS - I

Lectures : 3 periods / week — Sessional Marks : 40
Tutorials : 1 period / week — Semester End Exam Marks : 60
SemEnd Exam Duration: 3 hrs — Credits : **3**

Course Objectives: Physics subject plays an important role in the curriculum of any branch of Engineering.

- The production & detection of ultrasonics and its applications are presented to emphasize in understanding the medical ultrasound techniques. Superposition principle of light waves and its applications in thin films (wedge, convex shaped) are used to find the various parameters.
- For the identification of various vibrational modes of atoms of molecules in materials by laser Raman spectroscopy and in the study of mechanical strains and in the studies of crystals, polarized light and diffraction phenomena can effectively be used.
- The basics of laser light, its properties with applications in various fields and its important role played in the preparation of holograms, in analysing the optical spectra and in optical communication are presented.
- An overview of Maxwell's E-M equations to understand all the problems encountered in Electromagnetism and the connection to the Optics. The free electron theory and its significance to characterize the electrical and thermal properties of solids and the concept of the Fermi-Dirac distribution function to explain the Fermi energy level in metals.

Learnig Out Comes: The student will understand:

- The ultrasonics in various fields of science, engineering & medicine, to recognize the experimental evidence for the wave nature of light and interference in thin films and its technological applications.
- Diffraction spectra due to single slit on changing of wavelength and slit width. Concept and various types of polarization can be signified. Nicol prism as polarizer and analyser & its limitations.
- Importance of the stimulated emission in producing the lasing beam and its dependence on resonating cavity and active medium. 3D image production & construction and its application using highly monochromatic lasing beam. Guiding light through thin strands of dielectric material and classification.
- Propagation of electromagnetic waves through Maxwell’s equations, Distinguishing the properties of electrons and Photons.

UNIT –I **(16periods)**

Ultrasonics: production of ultrasonics by magnetostriction, piezo electric oscillator methods, detection by acoustic grating method, applications in engineering and medicine, ultrasonic testing methods (pulse echo technique, ultrasonic imaging).

Interference: superposition principle, young’s double slit experiment (qualitative treatment),stoke’s principle (change of phase on reflection), interference in thin films due to reflected light (Cosine law), theory of air wedge (fringes produced by a wedge shaped thin film) and theory of newton’s rings(reflected system), non-reflecting films.

UNIT-II **(15 Periods)**

Diffraction: Fraunhofer diffraction due to a single slit(quantitative), theory of plane transmission diffraction grating, Rayleigh’s criterion, resolving power & dispersive power of a grating.

Polarization: introduction, double refraction, construction and working of a nicol prism, nicol prism as a polarizer and analyser, quarter wave plate, production and detection of circular and elliptical polarizations(qualitative), optical activity, specific rotation, kerr and faraday effects.

UNIT-III **(15 Periods)**

Lasers: Laser characteristics, spontaneous and stimulated emissions, population inversion, pumping, active system, gas (He-Ne) laser, Nd: YAG laser and semiconductor (GaAs) laser, applications of lasers.

Holography: basic principle, recording, reproduction and applications.

Fiber optics: structure of optical fiber, light propagation through optical fiber-numerical aperture, acceptance angle and acceptance cone, types of optical fibers, fiber optics in communication system and applications of optical fibres.

UNIT-IV **(14 Periods)**

Electromagnetism: induced electric fields, displacement current and conduction current, Maxwell's equation – qualitative (differential & integral forms)-significance, LC oscillations (quantitative), velocity of electromagnetic wave equation in free space , poynting vector.

Statistical Physics : phase space, Maxwell-Boltzmann, Fermi-Dirac & Bose-Einstein's distribution functions(qualitative), photon gas & electron gas.

LEARNING RESOURCES:

TEXT BOOKS:

1. Engineering Physics – R .K. Gaur & S. L. Gupta Danpati Rai Publications, Delhi.
2. Engineering Physics – Hitendra K. Malik & A.K.Singh, Tata MacGraw Hill, New Delhi

REFERENCE BOOKS:

1. Fundamentals of Physics – Resnick & Halliday, John Wiley sons.
2. Engineering Physics – M.N. Avadhanulu & P.G. Kshirasagar, S.Chand & Co.Ltd.
3. Engineering Physics – M.Arumugam, Anuradha Publications, Chennai.
4. Engineering Physics – B. K. Pandey & S. Chaturvedi, Cengage Learning India Pvt. Ltd., Delhi.

Web References:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/engg_physics/index_cont.htm :

Course relevant website : www.rvrjcce.ac.in/moodle/first year/2011-12/engineeringphysics

I/IV Year B.Tech. - First Semester

EC/EE/ME/CE/CS/IT – 113
ENGINEERING CHEMISTRY - I

Lectures	: 3 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: **3**

Course Objectives:

- To know the quality parameters of water used in industries and for drinking purpose.
- To understand the methods of determining hardness, softening and desalination.
- To define the terms associated with phase rule and batteries.
- To acquire knowledge on advanced and latest material systems like liquid crystals, composites, etc.

Course Outcomes:

- Students acquire knowledge on quality and utility of water, useful in studying public health engineering.
- Knowledge acquired on phase rule gives good foundation for engineering students. (Specifically to Mechanical Engineering)
- Students know suitable replacements of metal after knowing about composite materials.
- Able to understand functioning of electrochemical energy systems.
- Would be capable of selecting appropriate lubricant for a given system.

UNIT-I: (Text book-1) (16 periods)

Water Technology : various impurities of water, , hardness UNITs and determination by EDTA method (simple problems), water technology for industrial purpose: boiler troubles- scales, sludges, caustic embrittlement, boiler corrosion, priming and foaming- causes and prevention. Internal conditioning - phosphate, calgon and carbonate treatment. External conditioning-lime soda process (simple problems), softening by ion exchange process. Desalination of brackish water by electro dialysis and reverse osmosis.

UNIT-II: (Textbook-1)(14 periods)

Water treatment for drinking purpose- WHO guidelines ,sedimentation, coagulation, filtration (slow sand filter), various methods of chlorination, breakpoint chlorination.
Phase Rule: Statement and explanation of the terms involved, one component water system, condensed phase rule- construction of phase diagram by thermal analysis, simple eutectic system (Pb-Ag system only) ,applications eutectic compounds.

UNIT-III: (Text book-1)(15 periods)

Electrochemistry: Electrode potential, electrochemical series and its significance, Nernst equation-related problems, Reference electrodes (SHE and Calomel electrode) Ion-selective electrode-glass electrode and measurement of pH.

Electrochemical Energy Systems: Types of electrochemical energy systems, electrochemistry of primary batteries (Lachlanche or dry cell), Secondary cells (Lead Acid cell, Ni-Cd cell), Lithium batteries (Li-MnO_2 ,Lithium organic electrolyte) and their advantages. Fuel cells(Oxygen-Hydrogen)

UNIT-IV: (Text book-1) (15 periods)

Composites: Introduction, Constituents of Composites, Types –Fibre reinforced, Particulate and layered composites and their applications.
Liquid crystals: Structure of liquid crystal forming compounds, Classification and applications.
Lubricants: Classification ,liquid lubricants- viscosity,Viscosity index, Flash point, Fire point, Cloud point, Pour point, oilyness. Solid lubricants –Graphite and Molybdenum sulphide, Additives

TEXT BOOKS:

1. Engineering Chemistry, P.C. Jain and Monika Jain, 15th Edition, 2008, Dhanpat Rai Publishing Company, New Delhi.
2. A Text Book of Engineering Chemistry, Shashi Chawla, 3rd Edition, 2009, Dhanpat Rai and Co.(P) Ltd., New Delhi.

REFERENCE BOOK:

1. A Text Book of Engineering Chemistry, S.S. Dara and S.S. Umare, 12th Edition, 2010, S.Chand and Co.Ltd.

WEB REFERENCES:

http://www.wiziq.com/tutorial/
http://www.powerstream.com/BatteryFAQ.html#lec
http://www.cdeep.iitb.ac.in/nptel/Core%20Science/

I/IV Year B.Tech. - First Semester

BT/CHE/CE/CS/IT 114

TECHNICAL ENGLISH & COMMUNICATION SKILLS

Lectures	: 4 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Semester Exam	: 3 hrs	Credits	: **4**

Course objectives:

- To make the student have better awareness on interpersonal skills and case studies
- To establish the importance of the meaning of new vocabulary as well as the form and of showing how words are used in context.
- To help the student to develop their overall knowledge and understanding of advanced grammar.
- To develop their abilities of written communication related to office communication and also to use foreign expressions situationally.

Course outcomes:

- The student is able to have better inter and intra personal skills and also have good understanding on case studies.
- Able to use vocabulary contextually.
- Able to learn and applying the knowledge of advanced grammar in the day-to-day life.
- Able to develop all kinds of written communication including office communication and also foreign expressions.

UNIT – I **(15 Periods)**

1. Kinesis
2. Interpersonal Skills
3. Intrapersonal Skills
4. Case Studies

UNIT – II Lexis **(15 Periods)**

1. Vocabulary
2. Analogies
3. Homonymys, Eponyms, Acronyms
4. Confusable words
5. One word substitute

UNIT – III Syntax And Advanced Grammar **(15 Periods)**

1. Correction of sentences
2. Advanced grammar
    1. Parallelism
    2. Dangling modifiers
    3. Tantology
    4. Ambiguity
    5. Word order
    6. Shift in tense, mood, voice

UNIT – IV Office Communication (15 Periods)

1. Letter writing
2. Memos
3. E-mail
4. Note taking, Note making
5. Routing slips
6. Foreign Expressions
    a. French -20
    b. Spanish – 10
    c. Italian/Latin – 20
    d. Japanese – 10
    e. German – 10
    f. Russian – 10
    g. Chinese – 10

TEXT BOOKS:

1. Communication Skills – Sanjay Kumar & Pushpa Latha (OUP)- 2nd Impression, 2012

REFERENCE BOOKS:

1. Technical Communication – Meenakshi Raman & Sangeeta Sharma, Oxford Semester Press, 6th Impression, 2012
2. Oxford Dictionary of English Idioms – John Ayto, OUP Oxford, 08-Jul-2010
3. Dictionary of word origins – John Ayto, Bloomsbury, 2001
4. Harbrace Hand book of English
5. Mc Graw Hill's Hand Book of English Grammar and Usage – Markm Lysstar, Larry Beason, 2005
6. College Hand book.

I/IV Year B.Tech. - First Semester

CS/IT - 115

Environmental Studies

Lectures	: 4 periods / week	Sessional Marks	: 40
Tutorials	: -- period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: 4

Course Objectives:

- To Create an awareness on various environmental pollution aspects and issues
- To give a comprehensive insight into natural resources , eco system and bio diversity
- To educate the ways and means to protect the environment from various types of pollution
- To impart some fundamental knowledge on human welfare measures and environmental acts
- To demonstrate the environmental problems like global warming, ozone layer depletion and acid rains.

Course Outcomes:

The students are able

- To define and explain the basic issues concerning the ability of the human community to interact in a sustainable way with the environment.
- To describe and discuss the environmental implications of the cycles of biologically important materials through the eco system.
- To discuss the benefits of sustaining each of the following resources ; food, health , habitats, energy , water ,air , soil and minerals
- To understand the causes, effects and controlling measures of different types of environmental pollutions with some case studies

UNIT-I **(15 Periods)**

Introduction:

Definition, Scope and Importance.

Natural Resources:

Forest Resources: Use and over-exploitation, Deforestation, Mining, dams and their effects on forests and tribal people.

Water Resources: Use and over-utilization of surface and ground water, floods and droughts, Water logging and salinity, Dams – benefits and problems, Conflicts over water.

Energy resources: Energy needs, Renewable and non-renewable energy sources.

Land resources: Land as a resource, land degradation, soil erosion & desertification, Effects of modern agriculture on land resources.

Ecosystems: Definition, Structure and functions of an Ecosystems, Biogeochemical cycles-water, carbon, nitrogen and water cycles, Types-Forest, Greenland, Desert, Aquaticecosystem.

UNIT-II **(15 Periods)**

Biodiversity and its Conservation:

Definition, Value of biodiversity. Bio-geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to bio-diversity, Endemic and endangered species of India, Conservation of biodiversity.

Environmental Pollution: Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear pollution, Solid waste management.

UNIT-III **(15 Periods)**

Social Issues and Environment:

From unsustainable to sustainable development, Population growth and environment, Green revolution, Rain water harvesting, watershed management, cloud seeding, Resettlement and rehabilitation of people - problems and concerns, Environmental Impact Assessment.

Climate Changes:

Global warming & Green house effect, Acid rain, Ozone layer depletion.

UNIT-IV **(15 Periods)**

Environmental acts:

Prevention and Control of Water pollution & Air Pollution act, Environmental protection act, Wild life protection act, Forest Conservation act.

International Conventions:

Stockholm Conference 1972, Earth Summit 1992. Copenhagen Summit 2009.

Case Studies:

Chipko movement, Narmada Bachao Andolan, Silent Valley Project, Madhura Refinery and Taj Mahal, Chernobyl Nuclear Disaster, Ralegaon Siddhi, Florosis and Bhopal Tragedy.

Field work:

Visit to a local area to document environmental assets – river/ forest/ grassland / hill /mountain.
Study of local environment-common plants, insects, birds.
Study of simple ecosystems – pond, river, hill, slopes etc.
Visits to industries, water treatment plants, effluent treatment plants.

TEXT BOOK:

1. Environmental Studies, by Dr. Suresh K. Dhameja, Published by S.K. Kataria & Sons, Ludhiana., 2009-10

REFERENCE BOOKS:

1. Environmental studies by Anubha Kaushik and C.P.Kaushik., New Age International Publishers, New Delhi., 3rd Edition, 2012.
2. T Benny Joseph, Environmental Studies, the Tata McGraw-Hill Publishing Company Limited, New Delhi., 3rd print, 2006.

I/IV Year B.Tech. - First Semester

BT/ChE/CE/CS/IT 151

PHYSICS LAB

.

Practicals : 3 periods / week — Sessional Marks : 40

Semester End Exam Marks : 60

Sem End Exam duration : 3 hrs — Credits : **2**

COURSE OBJECTIVES:

- The General Physics Laboratory is designed to give students a background in experimental techniques and to reinforce instruction in physical principles in the companion courses. These techniques and principles are quite general and applicable to aspects of all sciences.
- This is a one-credit class that meets at least once a week for about three hours. Each meeting of the class focuses on a particular experiment described in the lab manual issued to the students. Each experiment is designed to incorporate a new lesson on measurement, data, error, or graphical analysis in addition to illustrating a physical principle.
- Experiment descriptions in the manual are not meant to be recipes for performing an experiment, but guidelines. That is, goals for each project are normally spelled out, but decisions regarding the specific procedures to be followed to attain these goals often must be made by the student and his or her partner, under the guidance of the lab instructor. rather than passively following directions to get through the experiment. In addition to reinforcing the physics concepts, this will give skills that can transfer critical thinking and problem solving skills. It will also help you to learn how to identify what data is important, how to collect that data, and then draw conclusions from it. At the end of the lab period, there will either be a short class discussion of everyone's results.
- Adequate preparation before class is therefore the key to success in the laboratory. This preparation has two components: studying the experiment description in the lab manual and the relevant sections in the companion course textbook.

COURSE OUT COMES:

After going through lab manual and experiments, the students will be able to understand:

- Know, understand, and use a broad range of basic physical principles.
- a working capability with mathematics, numerical methods, and application of solutions.
- Will have a wide idea on various components & instruments.
- Additional problem –solving skills and practical experience are through design projects and laboratory assignments, which also provide opportUNITies for developing team- building and technical communication skills.
- Have an ability to learn independently.

(Any 10 out of the following experiments)

1. Interference fringes – measurement of thickness of a foil using wedge method.
2. Newton’s rings - measurement of radius of curvature of Plano- convex lens.
3. Lissajous’ figures – calibration of an audio oscillator.
4. Photo cell – characteristic curves and determination of stopping potential.
5. Diffrraction grating - measurement of wavelengths.
6. Torsional pendulum – determination of Rigidity modulus of a wire.
7. Photo-Voltaic cell – determination of fill factor.

8. Series LCR resonance circuit –determination of Q factor.
9. Sonometer – determination of A.C. frequency.
10. Laser – determination of single slit diffraction.
11. B – H Curve
12. Optical Fiber – Determination of Numerical Aperture and Acceptance Angle

REFERENCE BOOK: PhysicsLab Manual, R.V.R. & J.C. College of Engineering, Guntur.

I/IV Year B.Tech. - First Semester

BT/CHE/CE/CS/IT – 152

ENGLISH LANGUAGE LAB

Practicals : 3 periods / week — Sessional Marks : 40

Semester End Exam Marks : 60

Sem End Exam Duration : 3 hrs — Credits : **2**

Course Objectives:

- To identify various reasons for incorrect pronunciation and make the student understand and learn Standard Pronunciation, i.e., R.P.
- To develop skills to describe something, participate and present various presentations interesting and captivating.
- To provide sufficient understanding on the importance of reading and get to know the basic hurdles in efficient reading.
- To give a comprehensive understanding of having good vocabulary and learn large number of words.
- To make the student learn within a context by working out some situations using phrasal verbs and idioms.

Course Outcomes:

- The student is able to speak with Standard Pronunciation.
- Able to participate in activities and make better presentations.
- Able to develop good and efficient reading skills.
- Able to acquire sufficient knowledge on vocabulary and also use them in day-to-day life.
- Able to use phrasal verbs and idiomatic expressions situationally.

UNIT-I

Introduction – Reasons for Incorrect Pronunciation – Received Pronunciation – Misconception about sounds. Sounds – Vowels – Consonants – Transcription – Problems of Indian English – Syllable – Word Stress – Weak Forms – Intonation.

UNIT – II

Dynamics of Professional Presentations – Individual & Group Presentations – Delivering Just-a-minute (JAM) Sessions – Body Language – Group Discussions – Job Interviews- Public Speaking – Making Speeches Interesting – Delivering Different types of Speeches – Conversations, Dialogues and Debates – Features of a Good Conversation – Short Conversations – Telephonic Skills – Debate – Situational Dialogues.

UNIT – III

The Art of Effective Reading – Benefits of Effective Reading – Types – Methods of Reading – Different Passages for Reading Comprehension – Reading Comprehension – Identifying the Central Idea – Inferring Lexical and Contextual Meaning.

UNIT – IV

Introduction – Word Formation – Synonyms- Antonyms – Learning words through Situations – Substitution – Idioms – Phrasal Verbs – Developing Technical Vocabulary.

UNIT – V

What are phrasal verbs? What they mean? Particles in phrasal verbs – Nouns and Adjectives based on Phrasal Verbs. Types of Idioms – Idioms for Situations – Idioms that comment on People, Stories & Reports.

I/IV Year B.Tech. - First Semester

BT/CHE/CS/IT – 153
Engineering Graphics Lab

Lectures : 2 periods / week	Sessional Marks : 40
Drawing : 4 periods /week	Semester End Exam Marks : 60
Sem End Exam Duration : 3 hrs	Credits : 4

Course Objectives:

- Comprehend general projection theory with emphasis on orthographic projection to represent three dimensional objects in two dimensional views.
- Construct letters & Numerals in a legible freehand form
- To be able to plan and prepare neat orthographic drawings of points, Straight lines, Regular planes and solids
- Draw and identify various types of section and Auxiliary views
- To enable the students the aspects of development of surfaces in sheet metal working
- Introduce Auto CAD software for the creation of basic entities and usage of different tool bars.

Course Outcomes:

- Acquire basic skills in Technical graphic communication
- The students will be able to visualize and communicate with 2D as well as three dimensional shapes.
- Understands the application of Industry standards and best practices applied in Engineering Graphics
- The student is able to apply the knowledge of development of surfaces in real life situations
- Student is introduced to modern CAD system using Auto CAD.
- The students will be able to draw simple 2D Engineering Drawings using Auto CAD.

(To be taught & examined in First angle projection)

UNIT - I

General: Use of Drawing instruments, Lettering .-Single stroke letters, Dimensioning- Representation of various type lines. Geometrical Constructions. Representative fraction.

Curves : Curves used in Engineering practice - conic sections - general construction and special methods for ellipse, parabola and hyperbola. cycloidal curves - cycloid, epicycloid and hypocycloid; involute of circle and Archemedian spiral.

UNIT - II

Method of Projections: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

P**rojections of Planes :** Projections of planes, projections on auxiliary planes.

UNIT - III

Projections of Solids : Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.

Sections Of Solids: Sections of Cubes, Prisms, Pyramids, cylinders and Cones.true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes).

UNIT IV

Development of Surfaces: Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones.

Isometric Projections : Isometric Projection and conversion of Orthographic Projections into isometric views. (Treatment is limited to simple objects only).

UNIT - V

Orthographic Projections: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

UNIT - VI (Demonstration only)

Computer aided drafting (Using any standard package): Setting up a drawing: starting , main menu (New, Open, Save, Save As etc.), Opening screen, error correction on screen, UNITs, co-ordinate system, limits, grid, snap, ortho.

Tool bars: Draw tool bar, object snap tool bar, modify tool bar, dimension tool Bar

Practice of 2D Drawings: Exercises of Orthographic views for simple solids using all commands in various tool bars.

TEXT BOOK:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand), Charotar publishing house, 50th Edition, 2010.

REFERENCE BOOKS:

1. Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah, Scitech Publications , 2010.
2. Engineering Graphics with AutoCAD 2002 by James D. Bethune , PHI , 2011.

I/IV Year B.Tech – SecondSemester

BT/CE/CHE/CS/IT/ECE/EE/ME – 121
Engineering Mathematics – II

Lectures	: 4 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Semr End Exam Duration	: 3 hrs	Credits	: **4**

Course Objectives:

- To apply rank concept of matrices in solving linear system of equations, finding the eigen values and eigen vectors and inverse of a matrix and getting familiarity with diagonalization and quadratic forms
- To get knowledge of mean value theorems, writing series expansion of functions and finding extreme values or stationary values of functions of two (or) three variables.
- To provide sufficient theoretical and analytical background of differentiation and integration of vector functions.
- To make the student to learn Laplace and inverse transforms of a function and able to solve differential equation using Laplace transforms.

Course Outcomes:

- Understand the basic linear algebraic concepts.
- Assess the importance of derivative in mean value theorems and extreme values.
- Able to solve gradient, divergence, curl and integration of vector function problems.
- Obtain the solution of differential equation using Laplace transform.
- Ability of applying mathematical concepts in relevant engineering applications.

UNIT – I **(15 periods)**

Matrices: Rank of a matrix, vectors, Consistency of linear system of equations, Linear transformations, Characteristic equation, Properties of Eigen values (without proofs), Cayley-Hamilton theorem (without proof), Reduction to diagonal form.

UNIT- II **(15 periods)**

Reduction of quadratic form to canonical form, Nature of a quadratic form, Complex matrices.

Differential Calculus: Rolle's Theorem (without proof), Lagrange's Mean value Theorem (without proof), Taylor's and Maclaurin's Series for single variable (without proof). Maxima and minima of two variables, Lagrange's method of undetermined multipliers.

UNIT–III **(15 periods)**

Vector Calculus: Scalar and vector point functions, Del applied to scalar point functions, Gradient, Del applied to vector point functions, Physical interpretation of divergence and curl, Del applied twice to point functions, Del applied to products of point functions. Integration of vectors, Line integral, Surface integral, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Volume integral, Gauss divergence theorem (without proof).

UNIT–IV **(15 periods)**

Laplace Transforms: Introduction, Transforms of elementary functions, properties of Laplace Transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, multiplication by t^n,

division by t. Evaluation of integrals by Laplace Transforms, Periodic function, Inverse Transforms, Convolution theorem(without proof), Application to Differential equations with constant coefficients.

TEXT BOOK:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna publishers, 40th edition, 2007.

REFERENCE BOOK:

1. Advanced Engineering Mathematics by Kreyszig, 8th edition, 2007.

I/IV Year B.Tech. - Second Semester

BT/CE/CHE/CS/IT/ECE/EE/ME – 122

Engineering Physics - II

Lectures	: 3 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: **3**

Course Objectives:

- The evaluation of modern physics is required to explain the microscopic phenomena occurred in nature through quantum physics was introduced. The formation of the band structure and distinction of solids was explained by introducing the famous Kronig-penny model its salient features.
- Semiconductor concepts such as Energy band formation and classification of solids, intrinsic & extrinsic semiconductors, Hall effect & its uses are presented in the first part of the UNIT.
- Optoelectronics is the technology that combines optics and electronics. To understand the various optical phenomenon, photo diode, LED and LCD are presented second part of the UNIT.
- Various magnetic materials and their characterisation are presented to enable the student with materials science. Now,a days, the super-conducting materials are widely used in the production of very strong magnetic fields, loss less electric power transmissions, in moving the Hi-Tech trains, switching circuits, memory devices in computers and electronic instruments. So, the student is made to acquaint himself with the super conductivity property and their related phenomena.
- Understanding of dielectric properties with respect to the frequency, temperature and their phenomena is essential for usage of the materials in engineering applications.
- The buzzword in present science & technology is nanotechnology & nano science which deals with the confinement of at least one dimension less than 100 n.m. The reduction of size influences the surface to volume ratio thus the properties of the materials are drastically varied in nano realm. The student was introduced to the basics of nano world and the various applications that are presently marketed are discussed with XRD and Transmission electron microscope (TEM).

Course Outcomes:

After going through these UNITs, the students will be able to understand:

- Debroglie concept of matter waves and its experimental evidence.
- Uncertainty principle and its significance in microscopic phenomena.
- Wave function and wave equation and its application for one dimensional box.
- Periodic wave function(Bloch) and its significance, Kronig-Penny model and its salient features in explaining the formation the bands.
- Energy band formation and classification of solids, intrinsic & extrinsic semiconductors, Hal effect & its uses
- Devices based on interaction of light and electrons especially on the basis of junction diode, Liquid crystals.
- Classification of Magnetic materials, characterization and their properties.
- Critical parameters of superconducting materials and their classification, applications.
- Various types of polarizations, dependence on frequency/temperature, applications.
- Nano scale, preparation of nano materials(sol-gel, CVD), properties & applications.

UNIT-I **(16 Periods)**

Principles of Quantum Mechanics: de Broglie's concept of matter waves, Davisson and Germer experiment, Heisenberg's uncertainty principle-experimental verification, time independent Schrodinger's wave equation, physical significance of the wave function, particle in a box (one dimensional).

Electron Theory of metals: Failures of Classical free electron theory and quantum free electron theory(qualitative).

Band theory of Solids: Bloch theorem (Qualitative), Kronig-Penney model (Qualitative treatment), effective mass of electron.

UNIT-II **(14 Periods)**

Semiconductor Physics: Energy band formation in solids, Classification of solids into metals, semiconductors and insulators, intrinsic & extrinsic semiconductors, density of states, intrinsic semiconductor carrier concentration, Hall effect and its uses.

Optoelectronic devices: Photo diode, LED,LCD and solar cell (qualitative treatment).

UNIT -III **(15 Periods)**

Magnetic Materials: Introduction,orbital magnetic moment of an electron, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve, soft and hard magnetic materials, Ferrites and their applications.

Superconductivity: Introduction, critical parameters (T_c, H_c, I_c), Meissner effect, types of superconductors, entropy, specific heat, energy gap and isotope effect, BCS Theory(in brief), applications of superconductors, high T_c superconductors(qualitative).

UNIT –IV **(15 Periods)**

Dielectric Materials: Fundamental definitions: Electric dipole moment, polarization vector, polarizability, electric displacement, dielectric constant and electric susceptibility. Types of polarizations - Electric and ionic polarizations, internal fields in solids(Lorentz method), Clausius-Mossotti equation, Frequency dependence of polarization, Ferroelectrics and their applications.

Nano Technology : Basic Concepts of Nanotechnology, nano scale, introduction to nano materials, surface to volume ratio, fabrication of nano materials (sol-gel and chemical vapour deposition methods), applications of nano materials. XRD, Transmission Electron Microscope(TEM).

TEXT BOOKS:

1. Applied Physics- P. K. Palanisamy, Scitech Publications.
2. Materials Science - M.Arumugam, Anuradha Publications, Chennai, 5th Edition , 2006.

REFERENCE BOOKS:

1. Materials science – M. Vijaya and G. Rangarajan, TMH, New Delhi
2. Solid state physics by A. J. Dekkar
3. Physics of atom – Wehr and Richards.
4. Engineering Physics – B. K. Pandey & S. Chaturvedi, Cengage Learning India Pvt. Ltd., Delhi.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/115104043/1
http://people.seas.harvard.edu/~jones/ap216/lectures/lectures.html
http://galileo.phys.virginia.edu/classes/252/home.html

Course relevant website: www.rvrjcce.ac.in/moodle/first year/2011-12/engineeringphysics

I/IV Year B.Tech. - Second Semester

CE/CS/IT/ECE/EE/ME – 123

Engineering Chemistry - II

Lectures	: 3 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: **3**

Course Objectives:

- To acquire knowledge on various polymers and their mechanisms.
- To study the mechanisms, different types and factors influencing corrosion.
- To acquire knowledge on latest analytical techniques.
- To know the importance of green chemistry related to environmental management.

Course Outcomes:

- Students know the utility of plastics in automobile, electronics, electrical and other fields.
- Students can relate corrosion and environment and suggest methods to prevent corrosion.
- Knowledge acquired on fuels gives good foundation for engineering students.
- Can analyse substances using techniques like Spectrophotometry, Colorimetry, Conductometry and Potentiometry.
- Able to design new techniques based on green chemistry principles.

UNIT-I: (Text books-1 & 2) (18 periods)

Polymers: Monomer functionality, degree of polymerization, Tacticity, classification of polymerization-addition, condensation and co-polymerization, mechanism of free radical polymerization.

Plastics**-** Thermoplastic and thermosetting resins, preparation, properties and uses of Bakelite, polyesters, Teflon and PVC. Compounding of plastics.

Conducting polymers: Introduction, examples and applications, Polyacetylene- mechanism of conduction .

Rubber- Processing of latex, Drawbacks of natural rubber- Vulcanization, Synthetic rubbers- Buna-S and Buna-N, polyurethane rubber and silicone rubber.

UNIT-II: (Textbook-1) (13 periods)

Corrosion and its control: Introduction, dry corrosion, electrochemical theory of corrosion, Types of corrosion- differential aeration, galvanic (galvanic series), Intergranular and Stress Factors affecting corrosion-oxidizers, pH, over voltage and temperature.

Protection methods: Cathodic protection, (Impressed current and sacrificial anode) corrosion inhibitors- types and mechanism of inhibition, metallic coatings-Galvanization, Tinning, Electroplating (Cu) and electro less plating (Ni).

UNIT-III: (Text book-1) (14 periods)

Fuels: Classification of fuels, calorific value, LCV and HCV-UNITs and determination (Bomb calorimeter), Coal- Ranking, proximate and ultimate analysis, carbonization of coal-types (using Beehive oven), Metallurgical coke-properties and uses.

Petroleum based**:** Fractional distillation, cracking-fixed bed, reforming, composition and uses of petrol, diesel**,** CNG and LPG.

UNIT-IV: (Text books-1 & 2) (15 periods)

Analytical Techniques: Spectroscopy- Beer-Lambert's law, UV and IR-principles, Instrumentation (block diagram), Colorimetry- estimation of Iron, Conductometric (HCl vs NaOH) and potentiometric titrations (Fe(II)vs $K_2Cr_2O_7$).

Green Chemistry: Introduction, Principles and applications.

TEXT BOOKS:

1. Engineering Chemistry, P.C. Jain and Monika Jain, 15th Edition, 2008, Dhanpat Rai Publishing Company, New Delhi.
2. A Text Book of Engineering Chemistry, Shashi Chawla, 3rd Edition, 2009, Dhanpat Rai and Co.(P) Ltd., New Delhi.

REFERENCE BOOKS:

1. A Text Book of Engineering Chemistry, S.S. Dara and S.S. Umare, 12th Edition, 2010, S.Chand and Co.Ltd.
2. Principles of Polymer Science, P.Bahadur and N.V. Sastry, Narora Publishing House.

WEB REFERENCES:

http://www.wiziq.com/tutorial/

http://www.chem1.com/acad/webtext/states/polymers.html

http://freevideolectures.com/Course/3029/Modern-Instrumental-Methods-of-Analysis

http://www.cdeep.iitb.ac.in/nptel/Core%20Science/

I/IV Year B.Tech. - Second Semester

BT/CHE/CE/CS/IT 124C - Programming

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Lectures	: 4 periods / week	Sessional Marks	: 40
Tutorials	: -- period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: **4**

Course Objectives:

- Be familiar with computer software and hardware components, how they interact and its block diagram.
- Understand the basic problem-solving process using algorithm, Flow Charts and pseudo-code development.
- Understand the phases of compilation, from preprocessing through linking and loading. Learn how to customize compilation to produce intermediate files, etc
- Be well-versed with various conditional and iterative structures and should be able to use them effectively for efficient programming.
- Able to recognize the need for arrays and develop thorough knowledge on the concept of numerical and character arrays and get a better handle on multi-dimensional arrays, pointers, Learn to effectively use pointers for Dynamic memory allocation.
- Learn to use structures and unions to create custom data types in C.
- Have basics in File Operations
- Have sound theoretical and practical knowledge in C .

Course Outcomes:

- Thorough understanding of basic components of a computer and their operations.
- The ability to be equipped with the basic problem-solving skills using algorithm, flow charts and pseudo-code.
- Thorough knowledge about various phases of compilation, from preprocessing through linking and loading. Learn how to customize compilation to produce intermediate files, etc.
- The ability to use the control structures effectively to write efficient programs.
- Sound knowledge regarding the numerical and character arrays
- Profound skills to develop various user-defined string handling functions which mimic the built-in string manipulation functions.
- Skills to control program's memory consumption by dynamically allocating and freeing memory as needed.
- The ability to use structures and unions and develop various user-defined data types in C.
- The basic knowledge to work with File I/O and perform various operations on sequential and random access files, including reading and writing text and binary data.
- Have sound theoretical and practical knowledge in C and could effectively use their skills to develop programs for complex applications.

UNIT – I (15 Periods)

Introduction: Computer Fundamentals: Computer & it's Components, Hardware / Software**,** Algorithm, Characterstics of algorithm, Flowchart, Symbols are used in flowchart, history of C, Basic structure of C, C language features.

C Tokens: Character set, Variables, Keywords, Data types and sizes, Type qualifiers, Numeric Constants and their forms of representation, Character Constants, String Constants, Declarations and Initialization of variables.

Operators & Expressions: Arithmetic operators, and expressions, Type-conversion rules, Coercion, Assignment operators and expressions, Increment and decrement operator, Conditional operator, Statements, Preprocessor directives, Input/ Output functions and other library functions. Relational operators and expressions. Boolean operators and expressions.

Programming Exercises for UNIT I :
C-Expressions for algebraic expressions, Evaluation of arithmetic and boolean expressions. Syntactic errors in a given program, Output of a given program, Values of variables at the end of execution of a program fragment, Filling the blanks in *a* given program, Computation of values using scientific and Engineering formulae, Finding the largest of three given numbers.

UNIT– II (15 Periods)

Conditional Statements: Blocks, If-Else statement, Else-lf statement and Switch statement.
Iterative Statements: While loop, For loop, Do-While loop, Break, and continue.
Arrays: One - dimensional and character arrays, Two-dimensional numeric arrays.

Programming Exercises for UNIT - II:
Computation of discount on different types of products with different ranges of discount Finding the type of triangle formed by the given sides, Computation of income-tax, Computation of Electricity bill, Conversion of lower case character to its upper case, Finding the class of an input character; Sum of the digits of a given number, Image of a given number, To find whether a given number is-prime; Fibonacci; abundant; perfect, Strong, Amstrong; deficient, Prime factors of a given number, Merging of lists, Transpose of a matrix, Product and sum of matrices, String processing-length of a string; comparison of strings; reversing a string; copying a string, Sorting of names using arrays, Graphics patterns, To print prime numbers and Fibonacci numbers in a given range, and Amicable numbers.

UNIT – III (15 Periods)

Functions: Function Definition, types of User Defined Functions, Parameter passing mechanisms, and simple recursion.
Scope & extent: Scope rules, Storage Classes, Multi-file compilation.
Pointers: Pointers Arithmetic, Character array of pointers, Dynamic memory allocation, array of Pointer, Pointer to arrays.

Programming Exercises for UNIT- III:
Recursive Functions: factorial, GCD(Greatest Common Divisior),Fibonacci; To evaluate the pointer arithmetic expressions; An interactive program to perform Pointers & Functions - Insertion sort, Bubble sort, Linear search Binary search, Computation of Statistical parameters of a given list of numbers, Counting the number of characters, words and lines in a given text, Table of values of f (x,y) varying x and y; Using Storage Classes to implement the multifile compilation; implement the string operations using Dynamic memory allocation functions;

UNIT – IV (15 Periods)
Structures: Structures, Array of structures, structures within structures, Pointer to structures, self referential structures, Unions.

Files: File Handling functions, File error handling functions, Command-line arguments.

Programming Exercises for UNIT- IV:

Operations on complex numbers, operations on rational number (p/q form), Matrix operations with size of the matrix as a structure; Frequency count of keywords in an input program, Sorting a list of birth records on name and date of birth using File handling functions, Student marks processing, Library records processing - sorting on name, author, Copy one file to another.

TEXT BOOK:

1. Programming with C (Schaum's Outlines) by Byron Gottfried, Tata Mcgraw-Hill, 2010. (Unit-III & Unit-IV)
2. Programming with C by K R Venugopal & Sudeep R Prasad, TMH., 1997 (Unit-I & Unit-II).

REFERENCE BOOKS:

1. Programming in C by Pradip Dey and Manas Ghosh ,Second Edition,OXFORD
2. 'C' Programming by K.Balaguruswamy, BPB.
3. 'C' Complete Reference, Herbert Sheildt, TMH., 2000

WEB REFERENCES:

1. http://lectures-c.blogspot.com/
2. http://www.coronadoenterprises.com/tutorials/c/c_intro.htm
3. http://www.cprogramming.com/tutorial/c/lesson1.html
4. http://vfu.bg/en/e-Learning/Computer-Basics--computer_basics2.pdf
5. http://cprogramminglanguage.net/

I/IV Year B.Tech. - Second Semester

CS/IT - 125 Mechanics for Engineers

Lectures	: 4 periods / week	Sessional Marks	: 40
Tutorials	: 1 period / week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: 4

Course objectives:

- To study and know Physical quantities and terms
- To study various types of force systems. To teach students the basic principles of mechanics of rigid bodies and to analyze problems in a simple and logical manner
- To teach students to draw free body diagrams and equilibrium methods in problem solving
- To study and determine centroids of various standard geometrical plane figures
- To study and know the application of various trussed members
- To teach the students to analyze simple trusses using method of joints under equilibrium
- To study and analyze the static friction and its applications
- To study Rectilinear and Curvilinear translation of a particle
- To study principle of dynamics and apply it to impulse and momentum , Work and Energy which is useful to analyze turbo machinery.
- To study the principle of conservation of energy and direct central impact
- To teach the area moments of inertia and radius of gyration of mathematically definable areas as well as composite areas of standard geometric shapes.
- To study and to analyze moments of inertia of material bodies .
- To study and know the kinematics of rotation of a rigid body about a fixed axis.

Course Outcomes:

- Able to apply principles of mechanics to determine the resultant of several concurrent forces acting on a particle
- Simplify a system of forces and couples applied to a rigid body into a single resultant force and couple
- Able to apply the principle of rigid body equilibrium and to determine unknown forces and moments acing on a static rigid body
- Determine the centriods and center of gravity of mathematically definable areas as well as composite areas of standard geometrical shapes
- Perform Basic structural analysis of trusses using Method of Joints
- Able to apply the basic concepts of dry friction on inclined planes and wedges
- To determine velocity and acceleration of a particle under rectilinear translation
- Able to apply dynamic Equilibrium Equation for rigid bodies under rectilinear translation in the fields of Railways, Ships, Aircrafts, guns, rockets..etc.,
- To determine the area moments of inertia and radius of gyration of mathematically definable areas as well as composite areas of standard geometric shapes .
- Able to apply dynamic Equilibrium Equation for rigid bodies under curvilinear translation in the fields of Railways, Ships, guns, automobiles, projectiles..etc.,
- To determine the velocity and acceleration (both tangential and radial) of a particle under curvilinear translation.
- To determine the mass moments of inertia and radius of gyration of mathematically definable 3D bodies of standard solid shapes.
- Able to understand the rotation of a rigid body about a fixed axis.

UNIT – I **(15 Periods)**

Introduction: Engineering Mechanics, Basic concepts, system of UNITs.

Concurrent Forces in a Plane: Principles of statics, composition and resolution of forces, equilibrium of concurrent forces in a plane, method of projections, Method of moments.

Non Concurrent Forces in a Plane: Couple, equilibrium of parallel forces in a plane, resultant and equillibrum of general case of forces in a plane, plane trusses-method of joints.

UNIT – II **(15 Periods)**

Centroid and Centre of Gravity: Concept of centroid and centre of gravity, Centroids of simple figures from basic principles, centroids of composite plane figures.

Friction: **Types of friction, laws of friction, simple contact friction, wedge friction.**

UNIT – III **(15 Periods)**

Rectilinear Motion: Kinematics of rectilinear motion, D'Alemberts principle, work and energy, impulse and momentum, direct central impact.

Curvilinear Motion: Kinematics of curvilinear motion, D'Alembert's principle in curvilinear motion.

Rotation of a Rigid Body about a Fixed Axis: Kinematics of rotation, Equation of motion for a rigid body rotating about a fixed axis.

UNIT – IV **(15 Periods)**

Moment of Inertia of Plane Figures: Moment of inertia of a plane figure with respect to an axis in its plane, polar moment of inertia, parallel axis theorem, moment of inertia of composite areas.

Moment of Inertia of Material Bodies: Moment of inertia of a rigid body, Moment of inertia of a lamina, Moments of inertia of three – dimensional bodies (sphere, right circular cone and cylinder).

TEXT BOOKS:

1. Engineering mechanics by S. Timoshenko, D. H. Young and J V Rao –Tata McGraw-Hill Publishing Company Limited, New Delhi(For concepts) , 2009
2. Engineering mechanics-statics and dynamics by A. K. Tayal – Umesh publications, Delhi (For numerical problems) , 2008

REFERENCE BOOKS:

1. Engineering Mechanics by S.S.Bhavikatti, New Age international Publishers , 2012
2. Engineering Mechanics- Statics and Dynamics by Irving H. Shames, Pearson Education , 2006
3. Singer's Engineering Mechanics: Statics and Dynamics, K.Vijaya Kumar Reddy and J Suresh Kumar, 3rd Edition SI UNITs-BS Publications , 2010
4. A Textbook of Engineering mechanics statics and dynamics by J. L. Meriam and L. Kraige , 6th Edition , Wiley – India , 2010

I/IV Year B.Tech. - Second Semester

BT/CHE/CE/CS/IT 161Chemistry Lab

Practicals	: 3 periods / week	Sessional Marks	: 40
		Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hrs	Credits	: **2**

Course Objectives :

- To learn concepts of equivalent weight, molecular weight, normality, molarity, weight and volume percent and to prepare molar solutions of different compounds.
- To know the methods of determining alkalinity, hardness and chloride ion content of water sample.
- To know the methods to determine purity of washing soda, percentage of available chlorine in bleaching powder.
- To know principles and methods involved in using instruments like conductivity bridge, spectrophotometer, pH meter and potentiometer.

Course Outcomes:

- Students acquire knowledge on equivalent weight, molecular weight, normality, molarity, oxidants and reductants.
- Students can prepare solutions of different concentrations.
- Students can analyze water for its hardness, alkalinity, chloride ion and iron content.
- Student understands the principles behind the development of the instruments suitable for chemical analysis. Later he can use the knowledge in modifying the instruments.

List of Experiments:

1. Estimation of total alkalinity of water sample.
2. Determination of purity of washing soda.
3. Estimation of Chlorides in water sample.
4. Determination of Total Hardness of water sample by EDTA method.
5. Estimation of Mohr's salt-Permanganometry.
6. Estimation of Mohr's salt –Dichrometry.
7. Determination of available chlorine in bleaching powder-Iodometry.
8. Estimation of magnesium using EDTA.
9. Conductometric titration of a strong acid vs strong base.
10. Potentiometric titrations: Ferrous vs. Dichromate.

Demonstration Experiments:

11. pH metric titrations of an acid vs base.
12. Spectrophotometry: Estimation of Mn/Fe.

I/IV Year B.Tech. - Second Semester

BT/CHE/CE/CS/IT 162Workshop

Practicals : 3 periods / week	Sessional Marks : 40
	Semester End Exam Marks : 60
Sem End Exam Duration : 3 hrs	Credits : **2**

Course Objectives:

- To provide the students hands on experience to make different joints in carpentry with hand tools like jack plane, various chisels & hand saws
- To provide the students hands on experience to make different joints in welding with tools & equipment like electric arc welding machine, TIG Welding Machine, MIG Welding Machine, hack saws, chipping tools etc.
- To provide the students hands on experience to make different joints in Sheet metal work with hand tools like snips, stacks, nylon mallets etc.
- To provide the students hands on experience to make different connections in house wiring with hand tools like cutting pliers ,tester ,lamps& lamp holders etc .

Course Outcomes:

To familiarize with

- The Basics of tools and equipment used in Carpentry, Tin Smithy, Welding and House Wiring.
- The production of simple models in the above four trades

LIST OF EXPERIMENTS:

Minimum four experiments should be conducted from each trade

1. CARPENTRY

To make the following jobs with hand tools

a) Lap joint
b) Lap Tee joint
c) Dove tail joint
d) Mortise & Tenon joint
e) Cross-Lap joint

2. WELDING USING ELECTRIC ARC WELDING PROCESS / GAS WELDING.

The following joints to be welded.
a) Lap joint
b) Tee joint
c) Edge joint
d) Butt joint
e) Corner joint

3. SHEET METAL OPERATIONS WITH HAND TOOLS.

a) Rectangular Scoop
b) Rectangular Tray
c) Traingular Tray
d) Pipe Joint
e) Funnel

4. HOUSE WIRING

a) To connect one lamp with one switch
b) To connect two lamps with one switch
c) To connect a fluorescent tube
d) Stair case wiring
e) Go down wiring

REFERENCE BOOKS:

1. Kannaiah P. & Narayana K. C., "Manual on Work Shop Practice", Scitech Publications, Chennai, 1999.
2. WorkshopLab Manual, R.V.R. & J.C. College of Engineering, Guntur.

I/IV Year B.Tech. Second Semester

BT/CHE/CE/CS/IT 163C – PROGRAMMING LAB

Practicals : 3 periods / week — Sessional Marks : 40

Semester End Exam Marks : 60

Sem End Exam Duration : 3 hrs — Credits : **2**

Course Objectives:

- Understand the ANSI C/Turbo C compilers.
- Be able to develop various menu driven programs using conditional and control flow statements.
- Be able to effectively use the arrays, strings and pointers in programming.
- Develop programs using structures, unions and files.
- Develop 'C' programs for various applications.
- Be able to participate and succeed in competitive examinations.

Course Outcomes:

- The understanding ANSI C/ Turbo C compilers.
- The ability to develop various menu driven programs like generation of electricity bill, evaluation of series etc.
- The ability to develop menu driven for displaying various statistical parameters.
- The practical knowledge to write C programs using 1D, 2D and Multi Dimensional arrays.
- Skills to develop various programs on strings and pointers.
- Able to write C programs to develop various applications using structures, unions and Files.
- Thorough practical knowledge to develop 'C' programs for various applications.
- The capability to participate and succeed in competitive examinations.

List of programs (to be recorded)

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement or Switch statement).

Domestic level Consumption As follows:	
Consumption UNITs	**Rate of Charges(Rs.)**
0 – 200	0.50 per UNIT
201 – 400	100 plus 0.65 per UNIT
401 – 600	230 plus 0.80 per UNIT
601 and above	390 plus 1.00 per UNIT
Street level Consumption As follows:	
Consumption UNITs	**Rate of Charges(Rs.)**
0 – 50	0.50 per UNIT
100 – 200	50 plus 0.6 per UNIT
201 – 300	100 plus 0.70 per UNIT
301 and above	200 plus 1.00 per UNIT

2. Write a C program to evaluate the following (using loops):
   a. $1 + x^2/2! + x^4 / 4!+$ upto ten terms
   b. $x +x^3/3! + x^5/5!+$ upto 7 digit accuracy
   c. $1+x+x^2/2! +x^3/3!+$……upto n terms
   d. Sum of 1 + 2+ 3 +……..+n

3. A menu driven program to check the number is (using Loops):
   i) Prime or not
   ii) Perfect or Abundant or deficient
   iii) Armstrong or not
   iv) Strong or not

4. A menu driven program to display statistical parameters (using one – dimensional array)
   i) Mean ii) Median iii) Variance iv) Standard deviation

5. A menu driven program with options (**using one -Dimensional array)**
   (i) To insert an element into array
   (ii) To delete an element
   (iii) To print elements
   (iv) To remove duplicates

6. A menu driven program with options (using two dimensional array)
   (i) To compute A+B
   (ii) To compute A x B
   (iii) To find transpose of matrix A
   Where A and B are matrices. Conditions related to size to be tested

7. A menu driven program with options (using Two-dimensional Character arrays)
   (i) To insert a student name
   (ii) To delete a name
   (iii) To sort names in alphabetical order
   (iv) To print list of names

8. A menu driven program (using pointers)
   a. Linear search b. Binary search

9. A menu driven program with options (**using Dynamic memory allocation**)
   a. Bubble sort b. Insertion sort

10. A menu driven program with options (**using Character array of pointers**)
    (i) To insert a student name
    (ii) To delete a name
    (iii) To sort names in alphabetical order
    (iv) To print list of names

11. Write a program to perform the following operations on Complex numbers (**using Structures & pointers):**
    i) Read a Complex number
    ii) Addition of two Rational numbers
    iii) Subtraction of two Complex numbers
    iv) Multiplication of two Complex numbers
    v) Display a Complex number

12. a) Write a C program To copy the one file contents to the another file (**using command line arguments).**
    b) Write a C Program to count the frequencies of words in a given file.

TEXT BOOKS:

1. Programming with C (Schaum's Outlines) by Byron Gottfried, Tata Mcgraw-Hill, 2010.
2. Programming with C by K R Venugopal & Sudeep R Prasad, TMH., 1997

REFERENCE BOOKS:

1. Programming in C by Pradip Dey and Manas Ghosh ,Second Edition,OXFORD
2. 'C' Programming by K.Balaguruswamy, BPB.
3. C Complete Reference, Herbert Sheildt, TMH., 2000

WEB REFERENCES:

a. http://cprogramminglanguage.net/
b. http://lectures-c.blogspot.com/
c. http://www.coronadoenterprises.com/tutorials/c/c_intro.htm
d. http://www.cprogramming.com/tutorial/c/lesson1.html
e. http://vfu.bg/en/e-Learning/Computer-Basics--computer_basics2.pdf

II/IV Year B.Tech. - Third Semester

CS/IT 211 **MATHEMATICS-III**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To provide to the students with a strong foundation in Mathematics, Basic & Engineering Sciences and core area Knowledge through rigorous education to enable him to pursue higher education / take up employment in India / board.
- To provide students with a solid foundation in Electrical & Electronics Engineering and allied subjects to enable him to solve technological problems related to Electrical & Electronics Engineering.
- To provide basic knowledge of numerical methods including solving systems of linear equations, numerical quadrature and numerical solution to ordinary and partial differential equations.
- To develop and implement a prototype of a mathematical assignment to connect Fourier transforms to real world problems.

Course Outcomes:

- An ability to apply knowledge of Applied Mathematics, Basic Engineering sciences.
- An ability to identify, formulate and solve Electrical Engineering Problems.
- An ability to carry out interdisciplinary programs and research in National/International organizations.
- To solve linear system of equations numerically and to solve algebra equation by Newton-Raphson method.
- Apply Euler's method, fourth order Runge-Kutte method to advance a single ordinary differential equation for one or two steps of the independent variable.
- Improve capabilities in differential equation of interest to electrical and electronic communication and computer engineers.
- Make the students learn certain important methods used for solving partial differential equations exactly and approximately.
- Solve the first order linear and non linear, higher order homogeneous linear and nonlinear partial differential equations.

UNIT– I **(15 periods)**

Partial Differential Equations: Introduction, Formation of Partial Differential Equations, Solutions of a Partial Differential Equation, Equations solvable by direct integration, Linear equations of the first order, Non-Linear equations of the first order using Charpit's Method, Homogeneous Linear Equations with Constant Coefficients, Rules for finding the Complementary Function, Rules for finding the Particular Integral, Non-Homogeneous Linear Equations.

UNIT– II **(15 periods)**

Integral Transforms: Introduction, Definition, Fourier Integral Theorem (without proof), Fourier sine and cosine integrals, Complex form of the Fourier Integral, Fourier Transforms, Fourier sine and cosine transforms, Finite Fourier sine and cosine transforms, Properties of Fourier Transforms.

Numerical Methods: Solution of Algebraic and Transcendental Equations: Introduction, Newton-Raphson Method, Solution of Linear Simultaneous Equations: Gauss Seidel Iterative Method.

UNIT– III **(15 periods)**

Finite Differences & Interpolation: Introduction, Finite difference operators, Symbolic relations, Differences of a polynomial, Newton's forward and backward interpolation formulae, Central Difference Interpolation Formulae: Stirling's formulae, Interpolation with Unequal intervals: Lagrange's Interpolation, inverse interpolation.

Numerical Differentiation: Finding First and Second order Differentials using Newton's formulae.

UNIT– IV **(15 periods)**

Numerical Integration: Trapezoidal rule, Simpson's one-third rule.

Numerical Solutions of Ordinary Differential Equations (first order): Picard's Method, Euler's Method, Runge-Kutta Method of fourth order, Simultaneous equations (R.K.Method).

Numerical Solutions of Partial Differential Equations: Classification of Partial Differential Equation of second order, Solutions of Laplace's and Poisson's Equations by iteration methods.

TEXT BOOK:

1. Higher Engineering Mathematics, B.S. Grewal, 40th Edition, Khanna publishers.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics by Erwin Kreyszig
2. Introductory Methods of Numerical Analysis by S.S. Sastry.
3. A text book of Engineering Mathematics by N.P. Bali.

II/IV Year B.Tech. - Third Semester

CS/IT 212 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- To understand semiconductor basics like semiconductor material, its types, concepts of Drift current, diffusion current.
- To understand the principle of operation and characteristics of all Electronic Devices i.e., Diode, transistor, FET, UJT, Tunnel Diode and Power devices such as SCR, DIAC, TRIAC.
- To analyze the transistor biasing and thermal stabilization of transistor and its compensation techniques.
- To understand the principle of operation and characteristics of Photo Devices i.e., LED, LCD, Photo multiplier tubes & Photo transistor.

Course Outcomes:

- Will have a wide idea on Specifications of various Electronic devices.
- Can know about Various Electronic devices and their operation.
- Can able to design the various Equipment which are used in the construction and operation of electronic devices.
- Will have an idea about Electronic devices Engineering Laboratory and the Equipments used for measuring and testing different types of materials.

UNIT – I (16 Periods)

Introduction To Circuit Elements: Basic definition of the UNIT of charge, Voltage, Current, Power and Energy, Circuit concept, Active and Passive circuit elements; Ideal, Practical and dependent sources and their V-I characteristics, Source transformation, Voltage and Current division; V-I characteristics of Passive elements and their series / Parallel combination; Kirchhoff's Voltage law and Kirchhoff's Current law, Mesh and Nodal Analysis.

UNIT-II (16 Periods)

Network Theorems: Star – Delta transformation, Superposition, Thevenin, Norton, Maximum power, and Application of theorems to DC circuits.

Alternative Periodic Waveforms: Instantaneous current, voltage and power, peak, effective and average voltage and current, crest factor and form factor, phase difference.

J notation and phasor representation. Response of RLC series and parallel circuits to sinusoidal excitation.

Introduction to 3-phase circuits: Analysis of 3-phase balanced loads only.

UNIT - III (16 Periods)

Semiconductor Diodes: Semiconductor diode, Zener diode, Load line analysis, Half-Wave Rectifier, Full-Wave rectifier, Clippers and Clampers.

Bipolar Junction Transistor: Transistor operation, Common base configuration, Common emitter configuration, Common collector configuration, Operating point, JFET and characteristics of JFET.

UNIT – IV (15 Periods)

Amplifiers: Need of biasing, Thermal runaway, Types of biasing-fixed bias, collector base bias, self bias. Transistor h-parameter model, Analysis of transistor amplifier using h-parameters.

Feedback and Oscillator Circuits: Feedback concepts, feed back connection types, Barkhausen criteria, Phase-Shift oscillator, Wien bridge oscillator, Hartley oscillator, Colpitts oscillator.

TEXT BOOKS:

1. A.Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 3rd Edition, TMH, 2006.
2. B.L.Theraja – Textbook of Electrical technology-S.Chand & Co.
3. Robert Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", 6th Edition, PHI.

REFERENCE BOOKS:

1. Mahmood Nahvi and Joseph Edminister, Electric Circuits, 4th Edition, Schaum's outline series, TMH, 2004.
2. Jacob Millman, Christos C.Halkias, "Integrated Electronics", Tata McGrawHill Publishers.
3. S.Salivahanan, A.Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill Publishers
4. N.N.Bhargava & D.C.Kulshreshtha, "Basic Electronics", Tata McGrawHill Publishers.

II/IV Year B.Tech. - Third Semester

CS/IT 213 **DIGITAL LOGIC DESIGN**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To Provide the basic concepts used in the Design and Analysis of Digital Systems.
- To understand the basic gates which are used to construct combinational circuits.
- To understand all aspects of Digital System form the electronic gate circuits to the complex structure of micro computer systems.
- To understand about the memory elements such as flip-flops and registers.
- To understand about the programmable logic devices like PAL, PLA.
- To understand different types of IC logic families.

Course Outcomes:

- Understand the basic digital logic fundamentals such as numbering system, binary codes and Boolean algebra.
- Understand different types of number systems used in Digital Systems.
- Understand the different codes used which are used to provide easy communication between Man & Machine.
- Understand the Boolean algebra concepts which are used to describe mathematical relationship between input and output signals.
- Understand Karnaugh maps and tabulation method which are used to construct combinational circuits.
- Understand various methods and techniques to simplify the Boolean algebra functions.
- Able to design the various digital circuits like encoders, decoders and counters.
- Become familiar with different types of memory elements and IC logic families.

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UNIT-I **(18 periods)**

Number Systems and Codes: Decimal, Binary, Octal, Hexadecimal Number systems and their conversions, Arithmetic additions, subtraction using the method of complements. Codes: BCD, Excess 3, Gray codes.

Boolean Algebra and Logic Gates: Basic theorems and Properties of Boolean Algebra, Boolean functions, Digital Logic gates, Universal gates, Canonical and standard forms, simplification of Boolean functions using K maps (up to five variables), Don't-Care conditions, Tabulation method, Two level NAND and NOR implementations.

UNIT-II **(15 periods)**

Combinational Logic Circuits: EX-OR, EX-NOR Circuits, General design procedure for Combinational logic circuits, Adders, Subtractors.

Combinational Logic with MSI and LSI: Binary parallel adder, Carry look ahead adder, Magnitude comparator, Encoders, Decoders, Multiplexers, and Demultiplexers, Code conversion.

UNIT-III **(18periods)**

Sequential Logic Circuits: Latches,Flip Flops, Characteristic Table, Truth Table, Characteristic Equation

and Excitation tables for SR, JK, D and T Flip-flops, State table and State diagrams, Design of Sequential logic circuits.

UNIT-IV **(15 periods)**

Registers: Register, Left Shift register, Right shift register, Bidirectional Shift register, Universal Shift register

Counters: Design of Synchronous counters, Ripple counters, Up/Down counters, Ring counter, Johnson counter.

Programmable Logic Devices: Classification of ROMS,PROM, EPROM,EEPROM, Programmable logic array (PLA), Programmable array logic (PAL).

TEXT BOOKS:

1. M Morris Mano, Digital Logic and Computer Design, PHI/Pearson Education, 2003.
2. RP Jain, Modern Digital Electronics, 3rd Edition, TMH, 2003.

REFERENCE BOOKS:

1. Donald e Givone, Digital Principles and Design, TMH.
2. A.Anand Kumar ,Fundamentals of Digital Circuits,4th Edition,PHI
3. Zvi Kohavi, Switching and Finite Automata Theory, 2nd Edition, TMH, 1978.
4. H.Taub and D.Schilling, Digital Integrated Electronics, Mc-Graw Hill, 1977.

WEB REFERENCES:

- http://www.wiley.com/college/engin/balabanian293512/pdf/preface.pdf
- http://www.filecrop.com/Digital-Logic-Design-Principles.html
- http://people.seas.harvard.edu/~jones/es154/lectures/lecture_7/lecture_7.html
- http://s3.amazonaws.com/cramster-resource/104438_Logic%20Families.pdf

II/IV Year B.Tech. - Third Semester

CS/IT-214 DISCRETE MATHEMATICAL STRUCTURES

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To know the notations used in the discrete mathematics associated with computer science and engineering.
- To learn the rudiments of elementary mathematical reasoning (elementary proofs; proofs by induction)
- To understand the theoretical parts of all further courses in CSE.
- To learn logic and Boolean algebra from a mathematical perspective, but relating it to computer engineering applications.
- To understand basic set-theoretical notions: relations, functions, graphs, equivalence relations, and orderings.
- To relate these notions to applications in CSE.

Course Outcomes:

- Able to understand truth tables, the concept of logical equivalence and its relationship to equivalent logic circuits and Boolean functions. Able to extend this to predicate calculus and in predicate calculus using quantifiers.
- Able to express English assertions in propositional calculus and in predicate calculus using quantifiers.
- Able to understand and use the basics of set theory notation, Boolean operations on sets. Understand why the Boolean algebra of sets is different from the Boolean algebra of propositional equivalence classes.
- Able to carry out simple direct and indirect proofs about domains like the integers and the real numbers, using quantified statements about these domains. Able to do simple proofs by mathematical induction.
- Able to understand and write recursive definitions, in mathematical and programming notation, and to prove their properties using induction.
- Understand binary and n-ary relations and their applications. Know the major types of binary relations on a set. Able to use graphs as representing relations, algorithms for relations based on graphs or matrices (e.g. transitive closure).
- Know the properties of equivalence relations and partial orderings.
- Understand lattices and Boolean algebras as universal algebras.
- Know the fundamentals of counting and discrete probability.
- Be able to apply these tools to CSE applications.(eg. Cryptography)

UNIT– I **(15 Periods)**

Foundations: Sets, Relations and Functions, Methods of Proof and Problem Solving Strategies, Fundamentals of Logic, Logical Inferences, Methods of Proof of an implication, First order Logic & Other methods of proof, Rules of Inference for Quantified propositions, Mathematical Induction.

UNIT– II **(16 Periods)**

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations with Constrained repetitions.

Recurrence relations: Generating functions of sequences, Calculating Coefficients of Generating Functions.

UNIT– III **(16 Periods)**

Recurrence Relations: Solving recurrence relations by Substitution and generating functions. The methods of characteristic roots, solutions of inhomogeneous recurrence relations.

Relations and digraphs: Relations and directed graphs, Special properties of binary relations, Equivalence relations, Operations on relations.

UNIT– IV **(17 Periods)**

Ordering relations, Lattices and Enumerations, Paths and Closures, Directed Graphs and Adjacency Matrices.

Graphs: Basic Concepts, Isomorphisms and Subgraphs, Planar Graphs, Euler's Formula; Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.

TEXT BOOK:

1. Joe L.Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI 2nd Edition, 2008.

REFERENCE BOOKS:

1. C.L. Liu and D.P., Mohapatra-Elements of Discrete Mathematics, Tata McGraw-Hill, 3rd Edition, 2008.
2. Kenneth H Rosen-Discrete Mathematics & its Applications, TMH, 6th Edition, 2009.
3. J.P.Trembly and R.Manohar, Discrete Mathematical Structures with Applications toComputer Science: TMH, 1997.

II/IV Year B.Tech. - Third Semester

CS/IT-215 DATA STRUCTURES

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Understand the different time complexity notations and finding the time and space complexities of algorithms.
- Understand the list ADT, different linked list ADT's, polynomial ADT and their algorithms.
- Understand stack ADT, queue ADT, Circular Queue ADT and the applications of STACK and their algorithms.
- Understand different searching and sorting techniques and their time complexities.
- Understand the data structure Tree, Binary Tree and Expression Trees and different tree terminologies.
- Understand the binary search tree ADT and the algorithm for its implementation.
- Understand AVL Tree and its rotations.
- Understand Hashing and different hashing techniques.
- Develop algorithms for the implementation of different Hashing Techniques, graph traversals and Heap Sorting.

Course Outcomes:

- Ability to determine the time complexities of different algorithms.
- Ability to implement List Abstract Data Type (ADT) and different linked list ADT's and polynomial ADT.
- Ability to implement Stack ADT using arrays and linked-lists.
- Ability to implement different Stack applications.
- Ability to implement Queue ADT and Circular Queue ADT using both arrays and linked-lists.
- Ability to implement and analyze different searching techniques.
- Ability to implement and analyze different sorting algorithms like Bubble, Insertion, selection, and Quick, Merge, Shell and Heap sorting.
- Ability to implement binary search ADT.
- Ability to construct and implement Expression Tree.
- Ability to construct AVL tree and implement AVL tree operations.
- Ability to implement different hashing techniques like separate chaining and open addressing.
- Ability to implement BFS and DFS graph traversal methods.
- Ability to write well-structured complex programs using the Concepts of data Structures.

UNIT– I (18 periods)

Algorithm Analysis: Mathematical Back Ground, Model, What to Analyze, Running Time Calculations.

Lists: Abstract Data Types, The List ADT, Singly Linked List ADT, Doubly Linked List ADT, Circular Linked List ADT, Polynomial ADT.

UNIT– II **(17 periods)**

Stacks: The Stack ADT implementations using Arrays and Linked Lists, Stack applications such as Infix to Postfix expression conversions, Evaluation of Postfix expressions, Delimiter Matching.

Queues: The Queue ADT implementations using Arrays and Linked Lists, The Circular Queue ADT.

UNIT– III **(15 periods)**

Searching: Linear and Binary searching., Hashing-Hash functions, separate chaining, Open Addressing.

Internal Sorting: Preliminaries, Bubblesort, Selectionsort, Insertionsort, Shellsort, Mergesort, Quicksort, Comparision of searching and sorting in terms of time complexities.

UNIT– IV **(15 periods)**

Trees: Preliminaries – Binary Trees – Expression trees, Binary tree traversals, The search tree ADT-Binary search trees, implementation, Heap-building Heap, Heap Sorting, AVL trees-single Rotations, Double Rotations.

Graphs: Definitions, representations, graph traversals.

TEXT BOOK:

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Y.Langsam, M.J.Augeustein and A.M.Tenenbaum, “Data Structures Using C”, Pearson Education Asia, 2004.
2. E.Horowitz and Sahani, “Fundamentals of Data Structures”
3. Debasis Samantha, “ Classical Data Structures”, PHI
4. Jean Paul Trembly and P.G.Sorenson, “An Introduction of Data Structures with Applications”.

II/IV Year B.Tech. - Third Semester

CS/IT 216 OBJECT ORIENTED PROGRAMMING

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand the fundamentals of C++.
- To understand the need for friend functions, Inline functions and static members of a class.
- To become familiar with constructors and their types and also destructors.
- To effectively use Dynamic Allocation Operators for efficient memory management.
- To have thorough theoretical knowledge regarding Inheritance and polymorphism.
- To understand the power of Templates and also the need for Exceptional Handling.
- To acquire thorough knowledge in Basic I/O streams and File I/O streams and Have the basics of Namespaces,RTTI and STL

Course Outcomes:

- Able to demonstrate mastery of C++ syntax and semantics.
- Effectively apply fundamental object-oriented programming techniques for efficient programming.
- Able to use friend functions and inline functions when required.
- Able to overload constructors in a class and use the destructor when required
- Able to effectively use the DMA operators-New and Delete and there by achieve efficient memory management.
- Possess sound knowledge regarding inheritance and its types and also thoroughly understand the concept of virtual base classes.
- Possess the skills to achieve compile time polymorphism using function overloading and operator overloading and the skills to achieve run time polymorphism using virtual functions and pointers to the base class objects.
- Able to use templates to create generic functions and generic classes and there by reduce the code size.
- Able to use the C++ Exception handling techniques to get error free codes.
- Able to use streams to perform basic I/O and also File I/O operations and possess knowledge regarding the syntax, features of Namespaces ,RTTI and STL.

UNIT– I (17 periods)

An Overview of C++: The Origins of C++, What is Object Oriented Programming, some C++ fundamentals, Old-Style Vs Modern C++, Introducing C++ Classes, Function Overloading, Operator Overloading, Inheritance, Constructors and Destructors, The C++ Keywords, The General Form of a C++ Program

Classes and Objects: Classes, Structures and Classes, Unions and Classes are Related, Friend Functions, Friend Classes, Inline Functions, Parameterized Constructors, Static Class Members, When Constructors and Destructors are Executed, Scope Resolution Operator, Nested Classes, Local Classes, Passing and Returning Objects, Object Assignment.

Arrays, Pointers, References and the Dynamic Allocation: Arrays of Objects, Pointers, References, Dynamic Allocation Operators, and The Placement Forms of new and delete.

UNIT–II **(18 periods)**

Function Overloading, Copy Constructors and Default Arguments: Function Overloading, Overloading Constructor Functions, Copy Constructors, Finding the Address of an Overloaded Function, Overload Anachronism, Default Arguments, Function Overloading and Ambiguity.

Operator Overloading: Creating Member Operator Function, Overloading Using a Friend Function, Overloading new delete, Overloading Special Operators & Comma Operator

Inheritance: Base-Class Access Control, Inheritance and protected members, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Granting Access, Virtual Base Classes.

UNIT–III **(15 periods)**

Virtual Functions & Polymorphism: Virtual Functions, The Virtual Attribute is inherited, Virtual Functions are Hierarchical, Pure Virtual Functions, Using Virtual Functions, Early Vs Late Binding.

Templates: Generic Functions, Applying Generic Functions, Generic Classes, Typename and export Keywords, Power of Templates.

Exception Handling: Fundamentals, Derived-Class Exceptions, Options, Terminate() and unexpected(), uncaught_exception(), exception and bad_exception Classes, Applying Exception Handling.

UNIT– IV **(15 periods)**

The C++ I/O System Basics: Old Vs. Modern C++ I/O, Streams, Stream Classes, Formatted I/O, Overloading << and >>, Creating Manipulators.

C++ File I/O: File Classes, Opening and Closing a File, Text Files, Unformatted Binary I/O, get(), Getline() functions, Detecting EOF ,Random Access Files**Runtime Type ID and the Casting Operators:** RTTI, Casting Operators, Dynamic_cast, Reinterpret_cast.

Namespaces, Conversion Functions and other Advanced Topics: Namespaces, The std Namespace, Creating Conversion Functions, const Member Functions and mutable, Volatile Member Functions, Explicit Constructors, asm Keyword, Differences between C and C++.

Introducing Standard Template Library: An Overview of STL

TEXT BOOK:

1. The Complete Reference - C++ - Herbert Schieldt, 4/e, Tata McGraw Hill.

REFERENCE BOOKS:

1. Bjarne Stroustrup, “The C++ Programming Language”, Special Edition, Pearson Education.
2. C++ - How to Program – Dietel & Dietel (Paul J.Dietel, Harvey M.Dietel)
3. Object Oriented Programming in C++ by Robert Lafore
4. Mastering C++ by K.R.Venugopal

WEB REFERENCES

1) **http://www.cplusplus.com/reference/**
2) http://en.cppreference.com/w/
3) http://www.decompile.com/
4) http://www.programmingsimplified.com/cpp
5) http://www.learncpp.com/
6) http://www.prog2impress.com
7) http://www.stroustrup.com/

II/IV Year B.Tech. - Third Semester

CS/IT 251 BASIC ELECTRICAL &ELECTRONICS ENGINEERING LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- To provide hands-on experience with elementary electrical and electronic devices and circuits.
- To learn principles of operation of fundamental electronic devices such as PN Junction diodes, Transistors, FETs and UJTs.
- To learn Diode characteristics, and basic diode applications as rectifiers and regulators .
- To learn BJT and MOSFET characteristics and basic transistor applications as amplifiers.

Course Outcomes:

- An ability to explain working of electronic devices , analyze and design.
- An ability to calculate the parameters from the characteristics like static, dynamic and reverse resistances of PN junction diode.
- An ability to design the Zener voltage regulator to meet the specifications.
- An ability to verify experimentally popular BJT applications such as amplification and digital logic.

List of Experiments:

1. Verification of KVL & KCL
2. Parameters of choke coil
3. Verification of Thevenin's Theorem
4. Verification of Superposition theorem
5. Verification of maximum power transfer theorem
6. Time response of RL & RC Circuits
7. Time response of RLC Circuits
8. Characteristics of Silicon, Germanium diodes.
9. Characteristics of Zener diode.
10. Half Wave Rectifier and Full Wave Rectifier.
11. Transistor Characteristics in CE configuration.
12. Characteristics of FET
13. Self Bias circuit
14. Wein Bridge Oscillator
15. Colpitt's Oscillator

II/IV Year B.Tech. - Third Semester

CS/IT-252 **DATA STRUCTURES LAB**

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To write programs using procedure-oriented design principles.
- To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.
- To learn Principles for good program design, especially the uses of data abstraction and modular program composition.

Course Outcomes:

- Able to write well-structured procedure-oriented programs of up to 1000 lines of code.
- Understand Big-O notation and apply it to simple methods, including methods that utilize complex loops and recursion.
- Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quick sort.
- Able to implement the List Abstract Data Type (ADT) using both array based and linked-list based data structures, including singly, doubly, and circular linked-lists.
- To implement the Stack ADT using both array based and linked-list based data structures.
- To implement the Queue ADT using both array based circular queue and linked-list based implementations.
- Able to implement binary search trees.
- To implement heaps using an array based tree data structure.
- To implement hash table data structures.
- Able to implement principles for good program design, especially the uses of data abstraction and modular program composition.
- Able to assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- Able to choose the appropriate data structure and algorithm design method for a specified application.

1. Write C programs to perform the following ADT operations on singly linked list and Double linked list.

a)Creation	b) insert at begin	c) insert at end
d) insert after specified position	e)deletion	f) display
g) search an element	h)sorting the list	i) reversing the list

j)concatenation of two linked lists.

2. If L1 and L2 are two sorted singly linked lists, Write a C program to perform the following operations

   a) L1 U L2 b) L1 ∩ L2
3. Write a C program to perform insertion and deletion operations on single circular linked list.
4. Write a C program to perform polynomials addition and multiplication using linked lists.
5. Write a C program that reads two lists of elements, prints the lists, reverses the lists, prints the reverse lists, sorts the lists, prints the sorted lists, merges the lists and printsthe merged list.
6. Write a C program to implement stack using arrays and linked lists.
7. Write a C program to convert infix expression to postfix expression and evaluation of postfix expression.
8. Write C programs to implement Queues using arrays and linked list.
9. Write a C program that reads postfix arithmetic expression, builds an Expression tree and perform tree traversals on it.
10. Write a C program to construct Binary search tree and to perform the following operations.
    a. Insertion
    b. Deletion
    c. Find_min
    d. Find_max
    e. Searching
    f. Sorting
11. Write c programs to implement Hashing Techniques.
12. Implement the following searching and sorting techniques
    a. Binary search
    b. Shell Sort
    c. Heap Sort
    d. Merge Sort
    e. Quick Sort

II/IV Year B.Tech. - Third Semester

CS/IT 253 OBJECT ORIENTED PROGRAMMING LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- To demonstrate adeptness of object oriented programming in developing solutions to complex problems.
- To acquire thorough practical understanding of usage of data abstraction, encapsulation, inheritance, polymorphism and skills to become a proficient C++ programmer.
- To get skilled enough to develop programs using member functions, friend functions, Inline functions and static members of a class.
- To make use of constructors and destructors for dynamic initialization and destruction of objects.
- To develop programs using Dynamic Memory Allocation Operators for efficient memory management.
- To be able to develop programs for implementing Early Binding and Late Binding.
- To be able to develop efficient code by effectively using Templates and also Exceptional Handling mechanism.
- To become proficient in using I/O streams and File I/O streams for effective programming.

Course Outcomes:

- Possess the ability to develop solutions to complex problems using OOP concepts.
- Got Sound practical knowledge on classes, objects, their behaviors, and relationships.
- Develop programs using TIME class and DATE class by applying the concepts of constructors and destructors
- Have the skills to create user defined data types like STRING, RATIONAL and perform operations for overloading various operators using both friend and member functions.
- Develop programs using friend functions, Inline functions and static members of a class.
- Got the ability to develop programs using Dynamic Memory Allocation Operators for efficient memory management.
- Possess excellent programming skills to develop various programs using Inheritance and it's types and the basic knowledge for developing programs using abstract base class concept.
- Ability to write programs for implementing Early Binding and Late Binding.
- Sufficient knowledge to write programs using function templates and class templates.
- Good programming skills to develop efficient code using C++ Exceptional Handling techniques.
- Understand the means of handling I/O streams and File streams and develop programs to perform sequential and random access file operations.

1. Create a class HUGEINT by which we would be able to use much wider range of integers. Perform addition operation on two HUGEINTs.

2. Create a class TIME with appropriate data members to represent TIME. Construct a class implementation section to compare two TIMEs, to increment TIME by one second, to decrement TIME by one second and appropriate constructors to create TIME objects.

3. Write a class declaration for DATE and allow the operations to find nextday(), previousday(), leapyear(), comp()- which returns later DATE with appropriate constructors and destructors.

4. Create a user defined datatype STRING, allow possible operations by overloading (Relational operators,[], ( ), <<,>>, =).

5. Define COMPLEX class. Allow possible operations on RATIONALs by overloading operators (Arithmetic, Unary operators,<<,>>).

6. a. A program to implement Single inheritance
   b. A program to implement Multiple inheritance
   c. A program to implement Hierarchical inheritance
   d. A program to implement Multipath inheritance

7. a. A program to implement runtime polymorphism
   b. A program to implement abstract base class concept.

8. Develop a program to sort elements using function template

9. A program on class template

10. A program to implement Exception Handling

11. Write a program to read STUDENT records and write into file “STUDENT” by defining STUDENT class. Display STUDENTs data in a tabular format by defining appropriate manipulators.

12. a. A program on FILEs.
    b. A program on command line arguments.

II/IV Year B.Tech. - Fourth Semester

CS/IT 221 PROBABILITY & STATISTICS

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To provide knowledge on fundamental concepts of Probability and statistics from engineering prospective, emphasizing applications, more precisely, on basic probability distributions and densities, joint distributions and their applications.
- To provide knowledge on Sampling distributions, Inferences concerning means, and variances which enables to make predictions related to the data.
- To provide skills in applying the basic principles of statistical inference to practical problems.

Course Outcomes:

- Understand and apply the concepts of Probability and Statistics to solve a range of different problems, and understand their applications in a variety of engineering situations.
- Define Probability distributions and densities, understand and solve problems related to these distributions.
- Calculate probabilities related to joint distributions and apply them in understanding sampling distributions.
- Test Statistical hypotheses concerning means, variances and proportions.

UNIT-I (18 periods)

Probability: Sample space and events, Counting, Probability, The axioms of probability, some elementary theorems, Conditional probability, Baye's theorem.

Probability Distributions: Random variables, Binomial distribution, Hypergeometric distribution, Mean and Variance of a probability distribution, Chebyshev's theorem, Poisson approximation to the Binomial distribution, Poisson processes.

UNIT-II (18 periods)

Probability Densities: Continuous random variables, Normal Distribution, Normal approximation to the Binomial distribution.

Other probability densities, Exponential, Uniform distribution, Log-normal distribution, Gamma distribution, Beta distribution, Weibull distribution.

Joint Distributions- Discrete and Continuous.

UNIT-III (15 periods)

Sampling Distribution: Population and Samples, Sampling distribution of the Mean (σ known), Sampling distribution of the Mean (σ unknown) , Sampling distribution of Variance.

Inferences Concerning Means: Point estimation, Interval estimation, Tests of hypotheses, Null hypotheses and tests of hypotheses, Hypothesis concerning one mean, Relation between tests and confidence intervals, Operating Characteristic curves, Inferences concerning two means.

UNIT-IV **(15 periods)**

Inferences concerning Variances: Estimation of variances, Hypotheses concerning one variance, Hypotheses concerning two variances.

Inferences Concerning Proportions: Estimation of proportions, Hypothesis concerning one proportion, Hypothesis concerning several proportions, Analysis of r×c tables.

TEXT BOOK:

1. Probability and Statistics for Engineers, 6th Edition by Richard A. Johnson, (Prentice Hall of India).

REFERENCE BOOK:

1. Fundamentals of Mathematical Statistics by S.C.Gupta & V.K.Kapoor, (Sultan Chand & Sons).

II/IV Year B.Tech. - Fourth Semester

CS/IT 222 COMPUTER ORGANIZATION

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand the basic organization of modern computer systems
- To interpret how computer programs are organized, stored, and executed at the machine level.
- To analyze an instruction-set architecture and propose a suitable datapath and control UNIT implementation.
- To understand the input/output mechanisms used to connect computers to their external environments.
- To familiarize the design of high performance processors using single-cycle, multi-cycle and pipelined execution of instructions
- To learn the concepts of memory hierarchy and do operations with various types of memories.

Course Outcomes:

- An ability to analyze system performance at an overall level based on throughput and response time.
- A capability to make computer architecture design decisions based on measures such as cycles-per-instruction and instructions-per-cycle.
- An ability to understand memory hierarchy both with respect to physical organization and virtual memory as provided in modern operating systems.
- An ability to use binary and hexadecimal number systems.
- Knowledge of implementing fast integer multiplication methods such as Booth's algorithm.
- Detailed knowledge of floating point representation and arithmetic, including discussion of rounding and precision errors.
- An Understanding of design and implementation of single-cycle, multi-cycle, pipelined, and super-scalar architectures.

UNIT–I (15 periods)

Basic structure of computers: Computer types, Functional UNIT, Basic operational concepts, Bus structures, Performance, multiprocessors and multi computers

Machine instructions and programs : Numbers, Arithmetic operations and characters, Memory location and addresses , Memory operations, Instructions and instruction sequencing ,Addressing modes, Basic Input and Output operations, Stacks and Queues, Subroutines, Additional instructions ,Encoding of machine instructions.

UNIT-II **(15 periods)**

Basic processing UNIT: Some fundamental concepts, Execution of a complete instruction, Multiple bus organization, Hard wired control, Micro programmed control.
Arithmetic: Addition and subtraction of signed numbers, Design of fast adders, Multiplication of positive numbers, Signed operand multiplication, Fast multiplication,Integer division, Floating point numbers and operations.

UNIT-III **(18 periods)**

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence of instruction sets, Data path and control considerations, Super scalar operation, Performance considerations.
The Memory system: Some basic concepts, Semi conductor RAM memories- Internal Organization of memory chips, Read only memories, Speed, size and cost, Cache memories, Performance considerations,Virtual memories.

UNIT- IV **(12 periods)**
Input/Output organization: Accessing I/O devices, Interrupts, Direct memory access, Buses Standard I/O interfaces: PCI , SCSI, USB.

TEXT BOOK:
1. Computer Organization – Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Fifth Edition, McGraw Hill.

REFERENCE BOOKS:
1. Computer Architecture and Organization-John P.Hayes,Third Edition, McGraw Hill
2. Computer Organization and Architecture – William Stallings, Sixth Edition, Pearson/PHI.
3. Computer Systems Architecture – M.Moris Mano, Third Edition, Pearson/PHI.

WEB REFERENCES:
- http://prezi.com/swvy4dq3jzyb/comorla-basic-structure-of-computer-hardware-and-software/%Basic structure of computers
- http://publib.boulder.ibm.com/infocenter/iseries/v5r3/index.jsp?topic=%2Fapis%2FMIintro.htm%Machine interface instructions
- https://www.classle.net/large-content/hardwired-control-vs-microprogram %Hardwired Control Vs Microprogram
- https://www.classle.net/node/23942 % Superscalar Operation
- http://www.eecg.toronto.edu/~moshovos/ACA05/004-pipelining.pdf Overview of pipelining

II/IV Year B.Tech. - Fourth Semester

CS/IT 223 JAVA PROGRAMMING

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Understand the syntax and principles of platform independent Object Oriented Programming language of the java and to write simple Java applications using control statements, classes and interfaces.
- Design and development of secure and extendable java applications.
- Design and development of event driven Graphical User Interface (GUI) and Web Browser related applications by using awt and Swing components, with necessary Exception handling mechanisms.
- Introduce Multi tasking application programs using Threads and understanding different I/O Streams with their functionalities.
- Gain an in-depth understanding of database programming in Java using JDBC and network programs using TCP and UDP

Course Outcomes:

- Familiar the syntaxes and semantics of java programming language.
- Understanding the concepts of OOPs, different predefined classes and packages.
- Students will learn how to use and manipulate several core data structures: Arrays, linked lists, trees, stacks, and queues.
- Students will be able to construct simple Java user interfaces and identify where data structures are appearing in those user interfaces.
- Students are able to develop event driven GUI and web related applications to handle multiple tasks.
- Students are able to develop the Database and networking Applications.

UNIT-I (16 periods)

Introduction: Introduction to java, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals.

Classes and Objects : Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes.

Inheritance: Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, Object class, Date class.

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.

Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.

UNIT-II (18 periods)

Strings: Exploring the String class, String buffer class, Command-line arguments.

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.
Multithreading : Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.
I/O Streams: Streams, Byte streams, Character streams, File class, File streams.

UNIT-III **(15 periods)**

Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.
AWT: AWT Components, windows, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.

UNIT-IV **(15 periods)**

Swing: Swings introduction, JFrame and JComponent, Radio buttons ,Tabbed Panes, Scroll Panes, JTree, and JTable.
JDBC Conectivity : JDBC connectivity , types of Jdbc Drivers, connecting to the database, JDBC Statements, JDBC Exceptions, Manipulations on the database, Metadata .
Networking: Basics of Networking, InetAddress, URL, URL connection, TCP/IP sockets, Datagrams, java.net package.

TEXT BOOKS:

1. The Complete Reference Java J2SE 7th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi. (UNTI – I and UNIT– II)
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons,Pearson Edu.(UNIT–IV)

REFERENCE BOOKS:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Introduction to Java programming, By Y.Daniel Liang,Pearson Publication.

WEB REFERENCES:

i. http://www.scribd.com/doc/13452103/Advanced-Java-Programming-by-Kute-T-B Advanced Java Applet programs.
ii. http://www.exampledepot.com/egs/java.awt/pkg.html java AWT example programs
iii. http://www2.sis.pitt.edu/~peterb/2470-031/L4j1.pdfEvent Handling Mechanisims.
iv. http://www.indiabix.com/java-programming/exceptions/ Exception programs.
v. https://wiki.smu.edu.sg/w/is480/images/2/20/The_Java_Swing_tutorial.pdf java swing example.
vi. http://www.tutorialspoint.com/jdbc/jdbc_pdf_version.htmJDBC
vii. http://www.cafeaulait.org/books/jnp/javanetexamples/index.htmlNetworking Concepts.

II/IV Year B.Tech. - Fourth Semester

CS/IT 224 DATABASE MANAGEMENT SYSTEMS

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of Databases
- To understand the structural constraints of relationships
- To understand the types of integrity constraints in a relational database system
- To understand the concepts provided by Relational Algebra, Relational Calculus and SQL and able to specify queries on any database using them
- To recognize the importance of database analysis and design in the implementation of any database application
- To understand how to perform the normalization process of relations before implementation
- To describe the role of transaction processing in a database system
- To understand various concurrency control mechanisms for a database system
- To describe the roles of recovery and security in a database system

Course Outcomes:

- An understanding of basic concepts and current trends of different database systems
- An understanding of various database system architectures
- An ability to enforce various integrity constraints
- An ability to write relational algebra and Relational calculus expressions
- An ability to use Standard Query Language and its various versions
- An ability to design and develop a database that is in specified normal form
- An understanding of the Importance of transaction processing
- An ability to use different concurrency control techniques while implementing real time applications
- An understanding of the importance of backup and recovery techniques
- An ability to build Database systems that can handle real world problems

UNIT– I (16 Periods)

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach - A Brief History of Database Applications - When Not to Use a DBMS.

Database System Concepts and Architecture: Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs - Classification of Database Management Systems.

Data Modelling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types - Refining the ER Design for the COMPANY Database - ER Diagrams, Naming Conventions, and Design Issues.

UNIT– II **(18 Periods)**

The Relational Data Model and Relational Database Constraints: Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations - Relational Database Design Using ER-to-Relational Mapping.
The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT - Relational Algebra Operations from Set Theory - Binary Relational Operations: JOIN and DIVISION - Additional Relational Operations - The Tuple Relational Calculus - The Domain Relational Calculus.
SQL-99: Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types - Specifying Constraints in SQL - Schema Change Statements in SQL - Basic Queries in SQL - More Complex SQL Queries - INSERT, DELETE, and UPDATE Statements in SQL - Views (Virtual Tables) in SQL.

UNIT– III **(14 Periods)**

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.
Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions - Algorithms for Relational Database Schema Design – Multivalued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form.

UNIT– IV **(16 Periods)**

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability - Characterizing Schedules Based on serializability.
Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering – Multiversion Concurrency Control Techniques - Validation (Optimistic) Concurrency Control Techniques - Granularity of Data Items and Multiple Granularity Locking.
Database Recovery Techniques: Recovery Concepts - Recovery Techniques Based on Deferred Update - Recovery Techniques Based on Immediate Update - Shadow Paging.
Database Security: Introduction to Database Security Issues - Discretionary Access Control Based on Granting and Revoking Privileges - Mandatory Access Control.

TEXT BOOK:

1. "Fundamentals of Database Systems", Ramez Elmasri and Navate Pearson Education, 5th edition.

REFERENCE BOOKS:

1. "Introduction to Database Systems", C.J.Date Pearson Education.
2. "Data Base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill, 3rdEdition.
3. "Data base System Concepts", Abraham Silberschatz, Henry.F.Korth, McGraw hill, 5th edition.

II/IV Year B.Tech. - Fourth Semester

CS/IT-225 OPERATING SYSTEMS

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

COURSE OBJECTIVES

- Provides brief insight of operating system and its goals and services.
- Understand various kinds of Operating systems.
- Understand processes, threads, and schedulers, explanation of CPU scheduling.
- Understand Semaphores and Monitors
- Study conditions necessary for deadlock occurrence and detection and recovery of deadlock.
- Understand various Memory management techniques.
- Understand Microkernel and virtual Machines and Non-virtual machines.
- Understand I/O Management, Disk scheduling, and File management techniques.

COURSE OUTCOMES:

- Have an appreciation of the role of an operating system
- Become aware of the issues in the management of resources like processor, memory and input-output.
- Will be able to select appropriate productivity enhancing tools or utilities for specific needs like filters or version control
- Obtain some insight into the design of an operating system
- Should be able to differentiate different types of Operating Systems.
- Should be able to design and develop multi process and inter process applications
- Able to design efficient scheduling algorithms.
- Able to design dead lock handling applications.

UNIT–I (16 Periods)

Introduction : Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Special purpose Systems – Computing Environments.

System Structure: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – Operating System Design and Implementation – Operating System Structure – Virtual Machine – Operating System Generation – System Boot.

Process Concept : Overview – Process Scheduling – Operations on Processes – Interprocess Communication – Examples of IPC Systems – Communication in Client Server Systems.

UNIT–II (16 Periods)

Multithreaded Programming : Overview – Multithreading Models – Thread Libraries – Threading Issues – Operating System Examples.

Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Thread Scheduling.

Synchronization: Background – The Critical Section Problem – Peterson's solution – Synchronization Hardware – Semaphores – Classic Problem of Synchronization – Monitors – Synchronization Examples – Atomic Transaction.

UNIT–III **(16 Periods)**

Deadlocks : System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

Memory Management Strategies: Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation – Example: The Intel Pentium.

UNIT–IV **(16 Periods)**

Virtual Memory Management: Background – Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing.

File System : File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

Implementing File Systems : File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance – Recovery – Log structured File Systems.

Secondary Storage Structure : Overview of Mass – Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management – RAID structure.

TEXT BOOK:

1. Silberschatz & Galvin, 'Operating System Concepts', 7th edition, John Wiley & Sons (Asia) Pvt.Ltd.

REFERENCE BOOKS :

1. William Stallings, "Operating Systems – Internals and Design Principles", 5th edition, Pearson.
2. Charles Crowley, 'Operating Systems : A Design-Oriented Approach', Tata McGraw Hill Co.,1998 edition.
3. Andrew S.Tanenbaum, 'Modern Operating Systems', 2nd edition,1995,
4. Bhatt, An Introduction to Operating Systems-PHI.

WEB REFERENCES:

1. http://www.cs.kent.edu/~farrell/osf03/oldnotes/index.html : Lecture Notes
2. http://www.computerhope.com/os.htm : Different Types of Operating Systems
3. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems/New_index1.html : Question Bank and Test Problems
4. http://www.personal.kent.edu/~rmuhamma/OpSystems/os.html : OS Lecture Notes
5. http://web.cs.wpi.edu/~cs3013/c07/lectures/Section07-Deadlocks.pdf : Process Panagement
6. http://web.cs.wpi.edu/~cs3013/c07/lectures/Section07-Deadlocks.pdf : DeadLocks
7. http://web.cs.wpi.edu/~cs3013/c07/lectures/Section08-Memory_Management.pdf : Memory Management
8. http://cti.itc.virginia.edu/~ttspeng/Basic_File_Management.pdf : Basic File Management.

II/IV Year B.Tech. - Fourth Semester

CS/IT 226 DESIGN AND ANALYSIS OF ALGORITHMS

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

COURSE OBJECTIVES:

- To introduce methods for designing efficient algorithms using basic data structures for fundamental problems and evaluating their performance.
- To introduce the student how to analyze the performance of algorithms.
- To introduce the student with the fundamental algorithmic design strategies.
- To become more experienced in the application of logical and mathematical tools and techniques in computing, and they will build a library of algorithms for the solution of some fundamental problems.
- To build a solid foundation of the most important fundamental subject in computer science.

COURSE OUTCOMES:

- Know the big O, omega, and theta notations and their usage to give asymptotic upper, lower, and tight bounds on time and space complexity of algorithms.
- Know how to deduce the recurrence relations that describe the time complexity of recursively-defined algorithms, and solve recurrence relations.
- Know how to design algorithms using various design strategies and recite algorithms that employ these strategies.
- Know how to design new data structures by augmenting existing data structures, and design algorithms that employ data structures.
- Can solve problems using fundamental graph algorithms.
- Can define the classes P and NP and explain the significance of NP-completeness.

UNIT-I (19 periods)

Introduction- Algorithm, Algorithm specification, performance analysis
Divide and Conquer- Finding Maximum and Minimum, Merge sort, quick sort, Strassen's matrix multiplication
The Greedy Method – The general method, Knapsack Problem, Tree vertex splitting, Job sequencing, Minimum-cost spanning trees, Single source shortest paths.

UNIT-II (13 periods)

Dynamic Programming – The General method, Multistage graph, All pairs shortest path, Single-source shortest path, Optimal Binary search trees, String Editing, 0/1 Knapsack, Reliability design, The traveling salesman problem.

UNIT-III **(14 periods)**

Basic traversal & search techniques - Techniques for binary trees, techniques for graphs, connected components & spanning trees, Bi-connected components.

Back tracking - The General Method, The 8-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycle, Knapsack problem.

UNIT-IV **(14 periods)**

Branch and Bound - The general method, 0/1 Knapsack problem, Traveling salesperson.
NP hard and NP Complete Problems - Basic concepts, Cook's Theorem statement.

TEXT BOOK:

1. L Ellis Horwitz, Sartaj Sahni, 'Fundamentals of Computer Algorithms', Galgotia Pubs.

REFERENCE BOOKS:

1. Alfred.V.Aho, John.E.Hopcroft & Jeffry.D.Ullman, 'The Design and Analysis of Computer Algorithms', Addison Wesley.
2. Thomas H.Corman et al, 'Introduction to Algorithms', PHI.

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www.cse.iitd.ernet.in/~ssen/csl356/**notes**/root.pdf
www.personal.kent.edu/~rmuhamma/**Algorithms**/**algorithm**.html
www.free**book**zone.com/fetch.php?bkcls=cs_ds&bkidx=13

II/IV Year B.Tech. - Fourth Semester

CS/IT 261 JAVA PROGRAMMING LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- Understand the syntax and principles of Object Oriented Programming language to write simple Java applications using control statements, classes and interfaces.
- Implementation of secure and extendable java applications.
- Design and development of event driven Graphical User Interface (GUI) and Web Browser related applications by using awt and Swing components, with necessary Exception handling mechanisms.
- Implementation of Multi tasking application programs using Threads and developing different I/O Stream oriented applications.
- Perform operations on database using JDBC and network communication programs using TCP and UDP.

Course Outcomes:

- Students are familiar with the syntaxes and semantics of java programming language.
- Understands the concepts of OOPs, different predefined classes and packages.
- Students will learn how to develop secure java applications.
- Students will be able to construct simple Java user interfaces and identify where data structures are appearing in those user interfaces.
- Students are able to develop event driven GUI and web related applications to handle multiple tasks.
- Students are able to develop the Database and networking Applications.

LAB CYCLE

1. Write a java program to demonstrate static member, static method and static block.
2. Write a java program to demonstrate method overloading and method overriding.
3. Write a java program to demonstrate finals, blank finals, final methods, and final classes.
4. Write a java program to demonstrate synchronous keyword.
5. Write a java program to implement multiple inheritance.
6. Write a program to demonstrate packages.
7. Write a java program to crate user defined exception class and test this class.
8. Write an applet program to demonstrate Graphics class.
9. Write GUI application which uses awt components like label, button, text filed, text area, choice, checkbox, checkbox group.
10. Write a program to demonstrate MouseListener, MouseMotionListener, KeyboardListener, ActionListener, ItemListener.
11. Develop swing application which uses JTree, Jtable, JComboBox.
12. Write a JDBC Application to implement DDL and DML commands.
13. Write a program to implement client/server applications using connection oriented & connection less mechanisms.

II/IV Year B.Tech. - Fourth Semester

CS/IT-262 **DBMS LAB**
(USING ORACLE: SQL*PLUS AND PL/SQL)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To understand the concept of Database system and Client Server Architecture
- To understand and develop the concepts of Relational Data Model, Security and Integrity.
- To understand and execute different SQL queries and PL / SQL programs.
- To understand the concept of Transaction Control and Data Control language.

Course Outcomes:

- An ability to define, manipulate and control data using Structured Query Language (SQL
- An ability to enforce Database Integrity Constraints (primary & foreign keys; null, unique & check constraints)
- An ability to develop applications using various features of PL/SQL like Database Function, Stored Procedure, Package, Trigger
- An ability to develop Database system to handle the real world problem.

1. **DDL Commands.**
    a. Creating objects: tables and views.
    b. Altering the Schema of objects
    c. Dropping the objects
2. **Simple queries: selection, projection, sorting on a simple table**
    a. Small-large number of attributes
    b. Distinct output values
    c. Renaming attributes
    d. Computed attributes
    e. Simple-complex conditions (AND, OR, NOT)
    f. Partial Matching operators (LIKE, %, _, *, ?)
    g. ASC-DESC ordering combinations
    h. Checking for Nulls
3. **Multi-table queries(JOIN OPERATIONS)**
    a. Simple joins (no INNER JOIN)
    b. Aliasing tables – Full/Partial name qualification
    c. Inner-joins (two and more (different) tables)
    d. Inner-recursive-joins (joining to itself)
    e. Outer-joins (restrictions as part of the WHERE and ON clauses)
    f. Using where & having clauses
4. **Nested queries**
    a. In, Not In
    b. Exists, Not Exists
    c. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)

5. **Set Oriented Operations**
    a. Union
    b. Difference
    c. Intersection
    d. Division
6. **TCL Commands**
    a. Privilege management through the Grant/Revoke commands
    b. Transaction processing using Commit/Rollback
    c. Save points.
7. **PL/SQL Programming I**
    a. Programs using named and unnamed blocks
    b. Programs using Implicit and Explicit Cursors
    c. Exception Handling
8. **PL/SQL Programming II**
    a. Creating stored procedures, functions and packages
    b. Triggers and auditing triggers

TEXT BOOKS:

1. Oracle Database 10g The Complete Reference by Kevin Loney, Tata McGraw-Hill Publishing Company Limited.
2. Oracle 9i PL/SQL Programming by Scott Urman, Tata McGraw-Hill Publishing Company Limited.
3. Simplified Approach to Oracle by Parteek Bhatia, Sanjiv Datta, Ranjit Singh, Kalyani Publishers.

II/IV Year B.Tech. - Fourth Semester

CS/IT263 **COMMUNICATION SKILLS LAB**

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- To develop the intellectual, emotional and social understanding of every student and to make students become productively engaged citizens with knowledge, skills, dispositions and confidence to participate fully in life.
- To get competency in Thinking and Reasoning Skills, Social and Civic Responsibility, character, communication and Employability.
- To improve their ability to read and understand various articles to think about them critically, and to communicate about them in English and also learns to use language related to their scientific and technical fields in speaking, giving presentations and writing.

Course Outcomes:

- Able to develop the intellectual, emotional and social understanding of every citizen with knowledge, skills, dispositions and confidence to participate fully in life.
- Succeed best in developing higher-order skills (critical thinking, written and oral communication) and able to interact effectively among the group and present themselves according to the situation.
- Able to read and understand various articles to think about them critically, and communicate about them in English and also learns to use language related to their scientific and technical fields in speaking, giving presentations and writing.

1. Analytical Thinking
   - Emotional intelligence, emotional quotient, cognitive skills, analysis and logical thinking, creative thinking and lateral thinking
   - Managing anger, failures, disappointments
   - Positive approach

   <u>Interpersonal Skills / People Skills</u>
2. Behavioral skills - Attitude, self esteem, time management, punctuality, confidence, integrity
   - Case studies
   - Role play
   - Mock press
3. Listening skills – Effective listening
4. News paper reading – Reading aloud
5. Group discussion – Do's and Don'ts, modulation of voice

BOOKS:

1. Listening Skills – Shrinky slicy
2. Call centre stories – Case studies

III/IV Year B.Tech. - Fifth Semester

CS/IT 311 PROFESSIONAL ETHICS AND HUMAN VALUES

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- To introduce to the Ethical concepts that are relevant to resolving Moral issues in Engineering and to impart reasoning and analytical skills needed to apply ethical concepts to Engineering decisions.
- Recognize the need for life long learning and have the knowledge and skills that prepare them to identify the Moral issues involved in both Management and Engineering areas and to provide an understanding of the interface between Social, Technological and Natural environments.
- Enter into engineering work environment with well developed reasoning and analytical skills.
- To help the students appreciate the essential complementarily between "VALUES" and "SKILLS" to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with nature.

Course Outcomes:

- The students were able to understand the moral requirements of engineering experiments.
- A clear understanding about, Lack of communication, prejudice in not asking for clarification, fear of law and plain neglect will lead to the occurrence of many repetitions of past mistakes.
- The students were able to clearly point out that the Engineer should not fully depend on hand books and they should also have some review of the past cases relating to their current tasks.
- They were able to comprehend a specific set of behaviors and values the professional interpreter must know and must abide by, including confidentiality, accuracy and integrity.
- They were able to realize the significance of the need of laws and regulations in directing Engineering practices.

  - ❖ Protect the safety, health and welfare of the public and speak out against abuses in these areas affecting the public interest.
  - ❖ Know and respect existing laws pertaining to professional work.
  - ❖ Strive to achieve the highest quality, effectiveness and dignity in both the process and products of professional work.
  - ❖ Have the ability to apply their knowledge to the solution of practical and useful problems;
  - ❖ To impart reasoning and analytical skills needed to apply ethical concepts to Engineering decisions.

UNIT-I HUMAN VALUES (18 Periods)

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

UNIT-II ENGINEERING ETHICS (12 Periods)

Senses of 'Engineering Ethics' – variety of moral issues – types of inquiry – moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of professional roles – Theories about right action – Self interest – customs and religion – uses of ethical theories

UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION (18 Periods)

Engineering as experimentation – Engineers as responsible experimenters – Codes of ethics – A balanced outlook on law – The challenger case study. safety, responsibilities and rights Safety and risk – Assessment of safety and risk – Risk benefit analysis and reducing risk – The Three Mile Island and Chernobyl case studies – Collegiality and loyalty – Respect for authority – Collective bargaining – Confidentiality – Conflicts of interest – Occupational crime – Professional rights – Employee rights – Intellectual property rights (IPR) – Discrimination.

UNIT-IV GLOBAL ISSUES (12 Periods)

Multinational corporations – Environmental ethics – Computer ethics – Weapons development – Engineers as managers – Consulting engineers – Engineers as expert witnesses and advisors – Moral leadership – Sample code of ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronic and telecommunication engineers (IETE), India, etc.

TEXT BOOKS:

1. Mkie Martin and Roland Schinzinger, "Ethics in Engineering", McGraw – Hill, New Jersey, 2004 (Indian Reprint)
2. Govindarajan M, & Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCE BOOKS:

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint).
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, UNITed States, 2000 (Indian Reprint now available).
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

III/IV Year B.Tech. - Fifth Semester

CS/IT 312 **COMPUTER NETWORKS**

Lectures	:	4 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**4**

Course Objectives:

- To analyze problems associated while connecting components for sharing information.
- To select a protocol stack for specific network.
- To select proper algorithm for the protocols.
- To identify the parameters that effects the Quality Of Service.
- To identify the parameters for real time applications in networks.
- To integrate the OS and networking software.

Course Outcomes:

- Ability to analyze the working of LAN in an organization.
- Ability to designs a network architecture for an organization.
- Ability to design and implement a network for scalability and robustness and security.

UNIT-I (**15 periods**)

Foundation:
Applications, Requirements, Network Architecture, Network Software, Performance.
Getting connected:
Perspectives on connecting, Encoding, Framing, Error Detection, Reliable transmission, Ethernet and multiple access networks (802.3), Wireless

UNIT-II (**15 periods**)

Internetworking:
Switching and bridging, Basic internetworking (IP), Routing, Implementation and performance.
Advanced Internetworking:
Global Internet, Multicast

UNIT-III (**15 periods**)

Advanced Internetworking:
Multi Protocol Label switching (MPLS), Routing among mobile devices.
End-to-End Protocols:
Simple de-multiplexer (UDP), Reliable byte stream (TCP), Remote procedure call, Transport for real time applications (RTP).

UNIT-IV (**15 periods**)

Congestion control and resource allocation:

Issues in resource allocation, Queuing Disciplines, TCP congestion control, Congestion avoidance mechanism, Quality of service.

Applications:

Traditional applications, Multimedia applications, Infrastructure Services, Overlay networks.

TEXT BOOK:

1. Peterson Larry.L, Davie Bruce.S, Computer Networks – a systems approach, 5th edition – 2012Morgon Kaufmann.

REFERENCE BOOKS:

1. Andrew. S. Tannenbaum ,Computer Networks .
2. Kurose & Ross, Computer Networks: A top down approach featuring the Internet, Pearson Education.
3. Behrouz A Forguzan, Data Communications and Networking, Fourth Edition, TMH.

III/IV Year B.Tech. - Fifth Semester

CS/IT313 **UNIX PROGRAMMING**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

COURSE OBJECTIVES:

- Understand UNIX Architecture and its key features
- Be using shell commands for solving problems
- Write shell scripts for solving problems which can't be solved by using commands and pipes
- Understand the process management in UNIX
- Understand and use IPC mechanisms like pipes, sockets, shared memory, and semaphores

COURSE OUTCOMES:

- An ability to use commands for solving problems.
- An ability to write shell scripts for solving problems that can't besolving by simple commands.
- An ability to use system calls for system programming.
- An ability to manipulate the file system.
- An ability to use resources of computers effectively and efficiently.

UNIT I **(15 periods)**

Introduction: UNIX architecture, Features of UNIX.

UNIX Utilities: pwd, mkdir, ls, cd , rmdir, , cat, more, page, head, tail, Editing a file: vi, cp, mv, rm, wc, ln, unlink, chmod, chown, chgrp, who, sort ,nl, grep, egrep, fgrep, find, cmp, diff, uniq, tr, sed, cut, paste, join, tee, tty.

Programmable text processing: awk - awk programs, accessing individual fields, Begin and end, operators, variables, control structures, extended regular expressions, condition ranges, field separators, Built – in functions.

UNIT-II **(15 periods)**

UNIX Shells: Introduction, shell functionality- Built – in commands, meta characters, input/output redirection, filename substitution, pipes, command substitution, sequences, grouping commands, background processing, scripts, subshells, shell variables, Quoting.

Bourne Shell: Working with variables, Arithmetic, conditional expressions, control structures, positional parameters, passing command line arguments, shell programs, functions, and arrays.

UNIT-III **(18 periods)**

File management : Introduction to system calls and file management, Regular file management system calls – open( ), read( ), write( ), lseek( ), Close(),unlink( ),stat( ), getdents( ). Miscellaneous file management system calls – chown( ) and fchown( ), chmod( ) and fchmod( ), dup( ) and dup2( ), fcntl( ), ioctl( ), link( ), mknod( ), sync( ), truncate( ) and ftruncate( ).

Process Management: Inroduction, Creating a new process – fork( ),orphan processes, terminating a process – exit( ), zombie processes, waiting for a child – wait( ), Differentiating a process – exec( ), changing directories – chdir( ), changing priorities- nice( ), Accessing user and Group ID's.
Signals: Introduction, A list of signals, terminal signals, Requesting an Alarm signal – alarm( ), handling signals – signal( ), protecting critical code and chaining interrupt handlers, sending signals – kill( ), Death of children, suspending and Resuming processes, process Group's and control terminals.

UNIT IV **(17 periods)**
Inter process communication: Pipes, Sockets, shared memory, semaphores.
UNIX Internals: Kernel Basics, File System, Process Management, Memory Management.

LEARNING RESOURCES:

TEXT BOOK:
1. "**Unix for programmers and users**" 3rd edition by Graham Glass, King Ables, Pearson education .

REFERENCE BOOKS:
1. "**Advanced programming in the unix environment**", W. Richard Stevens 2nd Edition Pearson education.
2. "**Unix programming environment"**, Kernighan W.Brian and Pike Rob, Pearson education.
3. "**Your Unix the ultimate guide**", Sumitabha Das, TMH 2nd edition.
4. "**Advanced UNIX programming**" by Marc J.Rochkind, 2nd edition Pearson Education.
5. **The "C" Odyssey UNIX - The Open, Boundless C**, Meeta Gandhi, Rajiv Shah, Tilak Shetty, BPB Publications.

III/IV Year B.Tech. - Fifth Semester

CS/IT 314 AUTOMATA THEORY & FORMAL LANGUAGES

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To introduce formal languages and automata theory.
- To understand relationship among formal languages, formal grammars, and automata.
- To develop design Techniques for construction of different types of finite automatas.
- To understand construction of different types parsers for derivations and its automata.
- To understand the relation between the Turing machine and computer.
- To know how to design of Turing machines

Course Outcomes:

- Ability to analyze and design basic finite automata machines.
- Ability to understand the relation between languages and machines.
- Ability to understand theoretical approach to design LEX tool for recognitions of tokens.
- Ability to understand theoretical approach to design parser tool for syntax tree construction.
- Ability to design Turing Machines as Mathematical models of computation.

UNIT– I (18 periods)

Automata: Introduction to Automata, The central concepts of automata theory - Alphabets, Strings, Languages.

Finite Automata: An Informal picture of finite automata, Deterministic finite automata (DFA) - Definition of DFA, DFA processing strings, Notations for DFA, Extended transition function, the language of DFA, Non deterministic finite automata (NFA) – Definition of NFA, Extended transition function, the language of NFA,Equivalence of DFA and NFA Finite

Automata with $\in$ transitions: Use of $\in$ - transition, notation for an $\in$ - NFA, Epsilon closures, extended transitions and languages, Applications.

UNIT– II (16 periods)

Regular Expressions and Languages: Regular expressions, finite automata and regular expressions, Algebraic laws of regular expressions.

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 and minimization of automata – Minimization of DFA

UNIT– III (15 periods)

(Construction based treatment & proofs are excluded)

Context Free Grammars: Context Free Grammars, Parse Trees, Constructing parse trees, derivations and parse trees, ambiguous grammars.

Pushdown Automata: Definition of the Pushdown automata, the languages of PDA, Equivalences of PDA's and CFG's.

Context free languages: Normal form's for context- Free grammars, the pumping lemma for context free languages.

UNIT– IV **(15 periods)**

Properties of Context free languages: closure properties for context free languages, Decision properties for CFL's.

Introduction to Turing Machines: The Turing Machine, programming techniques for Turing machines.

Undecidability: a language that is not recursively enumerable, an undecidable problem that is RE, Undecidability problems about TM, Post's Correspondence problem.

TEXTBOOK:

1. John.E.Hopcroft, R.Motwani, & Jeffery.D Ullman, "Introduction to Automata Theory,Languages and Computations", Second Edition, Pearson Education, 2003

REFERENCE BOOKS:

1. Daniel I.A.Cohen, 'Computer Theory',
2. KLP Mishra & N.Chandrasekharan, 'Theory of Computation', PHI.
3. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
4. R.K.Ragade, "Automata and Theoretical Computer Science", First Edition, Pearson Education, 2004.
5. John E Hopcroft & Jeffery D Ullman' 'Introduction to Automata Theory & Languages and Computation', Narosa Publishing House.

WEB REFERENCES:

- www-db.stanford.edu/~ullman/ialc.html
- www. appsrv.cse.cuhk.edu.hk/~csc3130/
- www.cse.ogi.edu/class/cse533/
- http://met.guc.edu.eg/Courses/Material.aspx?crsEdId=83

III/IV Year B.Tech. - Fifth Semester

CS/IT 315 **WEB TECHNOLOGIES**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Describe the basic infrastructure and architecture of the Internet, including the main protocols.
- Write a valid XHTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms.
- Use CSS to implement a variety of presentation effects in XHTML and XML documents, including explicit positioning of elements
- Understand the need of scripting language, accessing XHTML elements using DOM, dynamic styles, validating user inputs, events for user interactions.
- Understand the need of XML documents, XML DTDs differ from XML schemas, discuss ways in which an XSL transform differs from processing an XML document using a DOM API.
- Understand the working of web server, strengths and weaknesses of the program-centric and markup-centric approaches to server-side development, and generation of query strings from forms and server-side processing.
- Develop server side application using Ruby on Rails and Servlets.
- Develop a reasonably sophisticated rich internet applications using AJAX and MVC architecture.

Course Outcomes:

- Understand the basic infrastructure and architecture of the Internet, including the main protocols.
- Ability to create static XHTML web pages and to apply style sheets for uniform look and feel for web pages using CSS.
- Ability to write client side scripting using JavaScript, understand how to construct programs modularly with functions, concept of arrays, and understand the object-based programming terminology.
- Ability to use scripting for creation of dynamic web pages, accessing elements using DOM, user interactions with events.
- Ability to create valid XML documents using DTDs & XML Schemas, providing styles to XML documents using XSL, and understand the importance of RSS feeds in the modern web.
- Ability to working with web servers and deploy web applications.
- Ability to develop rich internet applications using AJAX & MVC architecture.
- Ability to write server-side programs to enhance the server capabilities.

UNIT-I **(18 periods)**

Introduction to XHTML
Cascading Style Sheets (CSS)
JavaScript: Introduction to Scripting
JavaScript: Control Statements, Part 1
JavaScript: Control Statements, Part 2
JavaScript: Functions.

UNIT-II **(16 periods)**

JavaScript: Arrays
JavaScript: Objects
DOM: Objects and Collections
JavaScript: Events.

UNIT-III **(15 periods)**

XML & RSS: XML Basics, XML Namespaces, DTD, XML Schema, MathML, XSL & XSLT, RSS.
Web Servers (IIS and Apache)
Ruby on Rails: Introduction, Ruby Script, Rails framework, Database driven web application.

UNIT-IV **(15 periods)**

Ajax-Enabled Rich Internet Applications: Introduction
Servlets: Servlet Life cycle, The javax.servlet package, The javax.servlet.http package, Generic Servlet, Http Servlet, Servlet Parameters, Handling Http Request & Responses, Cookies, Session Tracking.

TEXT BOOKS:

1. Harvey M. Deitel and Paul J.Deitel, "Internet & World Wide Web How to Program", 4/3, Pearson Education.
2. Herbert Schildt "Java The Complete Reference" 5th Edition, Tata McGrawHill.

REFERENCE BOOKS:

1. Jason Cranford Teague "Visual Quick Start Guide CSS, DHTML & AJAX", 4/e, "Perason Education".
2. Tom Nerino Doli Smith "JavaScript & AJAX for the Web" Pearson Education, 2007.
3. Joshua Elchorn "Understanding AJAX" Prentie Hall, 2006.
4. Hal Fulton "The Ruby Way", 2/e, Pearson Education, 2007.
5. David A. Black "Ruby for Rails" Dreamtech Press, 2006.
6. Bill Dudney, Johathan Lehr, Bill Willies, Lery Mattingly "Mastering Java Server Faces" Wiely India, 2006.
7. Web Technology – Uttam K.Roy, Oxford University Press, 2010.

WEB REFERENCES

www.deitel.com
www.w3schools.com
www.tutorialspot.com

III/IV Year B.Tech. - Fifth Semester

CS/IT 316 SOFTWARE ENGINEERING

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To make the students learn about the basic concepts on Software Engineering Methods and Practices and their appropriate application in Software industry.
- To develop an understanding of Software Process Models and Software Development Life Cycle.
- To provide an idea on Software testing techniques.
- To teach an understanding role of the different aspects of Software Project Management.
- To develop an approach on ethical and professional issues those are important for software Project Management.

Course Outcomes:

- Capabilities to identify, formulate, and solve Software Engineering problems.
- Be able to elicit, analyze and specify software requirements with various stakeholders of a software development project.
- Ability to participate in design, development, deployment and maintenance of a medium scale software development project.
- Knowledge to convey technical material through oral presentation and interaction with an audience.
- Ability to evaluate the impact of potential solutions to software engineering problems in a global society, using the knowledge of models, tools, and techniques.

UNIT-I (15 periods)

Introduction to Software Engineering:

The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software, Software Myths.

A Generic View of Process:

Software Engineering - A Layered Technology, A Process Framework, The CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Process Models:

Prescriptive Models, The Waterfall Model, Incremental Process Models, Evolutionary Models, Specialized Process models, The Unified Process .

An Agile View of Process:

What Is Agility? , What Is an Agile Process? , Agile Process Models.

UNIT-II (15 periods)

Software Engineering Practice:

Software Engineering Practice, Communication Practices, Planning Practices, Modeling Practices, Construction Practice, Deployment.

System Engineering:

Computer-Based Systems, The System Engineering Hierarchy, Business Process Engineering: An Overview, Product Engineering: An Overview, System Modeling.

Requirements Engineering:

A Bridge To Design and Construction, Requirements Engineering Tasks, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use-cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

Building The Analysis Model:

Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Flow-Oriented Modeling, Class Based Modeling Creating a Behavioral Model.

UNIT-III (15 periods)

Design Engineering:

Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts The Design Model, Pattern Based Software Design.

Creating an Architectural Design:

Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into Software Architecture.

Modeling Component-Level Design:

What Is a Component? , Designing Class-Based Components, Conducting Component-Level Design, Object Constraint Language, Designing Conventional Components.

Performing User Interface Design:

The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation

UNIT-IV (15 periods)

Software Process and Project Metrics:

Introduction: Metrics Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics with Process, Statistical Quality Control, Metrics for Small Organizations, Establishing a Software Metrics Programming.

Software Quality Assurance:

Quality Concepts, Quality Movement, SQA, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, ISO 9000 Quality Standards, SQA Plan.

Software Testing Strategies:

Strategic Approach, Strategic Issues, Test strategies for Conventional Software, Test strategies for Object Oriented Software, Validation Testing, System Testing, The Art of Debugging.

Testing Tactics:

Software Testing Fundamentals, Black-Box and White-Box Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Object-Oriented Testing Methods, Testing for Specialized Environments, Architectures, and Applications, Testing patterns.

Product Metrics:

Software Quality, A Framework for Product Metrics, Metrics for the Analysis Model, Metrics for the Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

TEXT BOOK:

1) Roger S.Pressman, 'Software Engineering- A Practitioner's Approach', Sixth Edition, McGraw- Hill International.

REFERENCE BOOKS:

1) Ian Sommerville, 'Software Engineering', Sixth Edition, Pearson Education.
2) Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, 'Fundamentals of Software Engineering', Second Edition, PHI.
3) RajibMall, 'Fundamentals of Software Engineering', Second Edition, PHI.

Web Resources:

- www.rspa.com/spi/
- www.sei.cmu.edu/
- http://www.pearsonhighered.com/educator/product/Software-Engineering/9780137035151.page
- http://www.agilemanifesto.org/
- http://www.isworld.org/

III/IV Year B.Tech. - Fifth Semester

CS/IT-351 UNIX PROGRAMMING LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

COURSE OBJECTIVES:

- Understand the use of UNIX commands
- Be using shell commands for solving problems
- Write shell scripts for solving problems which can't be solved by using commands and pipes
- Understand the file management in UNIX
- Understand the process management in UNIX
- Understand and use IPC mechanisms like pipes, sockets, shared memory, and semaphores

COURSE OUTCOMES:

- An ability to use commands for solving problems.
- An ability to write shell scripts for solving problems that can't be solving by simple commands.
- An ability to use system calls for process management
- An ability to manipulate the file system.
- An ability to use signals in UNIX
- An ability to use inter process communication in UNIX

LABCYCLE I: (Using Commands and Shell Programming)

1. Working with different Unix commands, Pipes, I/O redirection, awk programming.
2. Write Shell Programs for the following
    a) Display all the words which are entered as command line arguments.
    b) Changes Permissions of files in PWD as rwx for users.
    c) To print the list of all sub directories in the current directory.
    d) Program which receives any year from the keyboard and determine whether the year is leap year or not. If no argument is supplied the current year should be assumed.
    e) Program which takes two file names as arguments, if their contents are same then delete the second file.
3. Write shell scripts for the following
    a) To print the given number in the reversed order.
    b) To print first 25 Fibonacci numbers.
    c) To print the Prime numbers between the specified range.
    d) To print the first 50 Prime numbers.

4. Write shell scripts for the following
    a) To delete all lines containing the word 'unix' in the files supplied as arguments.
    b) Menu driven program which has the following options.
    i) contents of /etc/passwd
    ii) list of users who have currently logged in.
    iii) present working directory. iv) exit.
    c) For sorting, searching and insertion, deletion of elements in the list

LABCYCLE II : (Using System Calls)

1. Program to transfer the data from one file to another file by using un-buffered I/O.
2. Write a C program for demonstrating dup() and dup2() system calls.
3. Program to create two processes to run a loop in which one process adds all even numbers and the other adds all the odd numbers. (use fork ( ))
4. Program to create process ‘i’ and sends data to process ‘j’, prints the same after receiving it. (use vfork( ))
5. Program to demonstrate orphan process.
6. Programs to demonstrate how to create a zombie process and to avoid Zombie using wait( ) .
7. Write a C program for Requesting an alarm signal to executes user defined alarm handler.
8. Write a C program to demonstrate Suspending and Resuming Processes.
9. Programs on Inter process communication using pipes and shared memory.
10. Client/Server Socket Programming.

III/IV Year B.Tech. - Fifth Semester

CS/IT 352 WEB TECHNOLOGIES LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- Use CSS to implement a variety of presentation effects in XHTML and XML documents, including explicit positioning of elements
- Understand the need of scripting language, accessing XHTML elements using DOM, dynamic styles, validating user inputs, events for user interactions.
- Understand the need of XML documents, XML DTDs differ from XML schemas, discuss ways in which an XSL transform differs from processing an XML document using a DOM API.
- Understand the working of web server, strengths and weaknesses of the program-centric and markup-centric approaches to server-side development, and generation of query strings from forms and server-side processing.
- Develop server side application using Ruby on Rails and Servlets.
- Develop a reasonably sophisticated rich internet applications using AJAX and MVC architecture.

Course Outcomes:

- Ability to write client side scripting using JavaScript, understand how to construct programs modularly with functions, concept of arrays, and understand the object-based programming terminology.
- Ability to use scripting for creation of dynamic web pages, accessing elements using DOM, user interactions with events.
- Ability to create valid XML documents using DTDs & XML Schemas, providing styles to XML documents using XSL, and understand the importance of RSS feeds in the modern web.
- Ability to working with web servers and deploy web applications.
- Ability to develop rich internet applications using AJAX & MVC architecture.
- Ability to write server-side programs to enhance the server capabilities.

1. Write codes different types of styles in CSS.
2. Write java scripts covering Arrays and Objects, Function, recursive functions.
3. Demonstrate All, Child and anchor collection objects.
4. Demonstrate Mouse events, Form events.
5. Demonstrate event bubbling and keyboard events
6. Write well-formed and valid XML documents.
7. Write code for displaying XML using XSL.
8. Programs on Ruby & Ruby on Rail.
9. Develop google suggests using Ajax technology with XHR object
10. Write a program to demonstrate Generic & HTTP Servlets.
11. Write a program to demonstrate cookies
12. Write a program to demonstrate Sessions using HTTP Servlets.

WEB REFERENCES

www.deitel.com
www.w3schools.com
www.tutorialspot.com

III/IV Year B.Tech. - Fifth Semester

CS/IT-353 ADVANCED COMMUNICATION SKILLS LAB

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To expose the students to a variety of learner-friendly methods of language learning
- To train the students to use language effectively to face interviews, group discussion and public speaking
- To initiate the students to speak better
- To expose the students to corporate etiquette
- To develop proficiency in presentation
- To train the students in speech writing
- To develop employability skills
- To develop civic sense and concern to the society.

Course Outcomes:

- The student develops a variety of learner –friendly methods of language learning
- The students are capable of using language effectively to face interviews, group discussion and public speaking
- The students develop confidence level to speak better
- The students learn the corporate etiquettes
- They are proficient in presentations
- The students develop felicity of expression
- The students develop employability skills
- The students turn out to be responsible and become service minded.

1. Employability skills – Interview skills
2. Critical appreciation
   - Poems
   - Short stories
   - Life stories
   - Excerpts of great personalities
3. Film clippings
4. Briefing and explaining
5. Board room discussions
6. Presentations
7. Mini Projects
   Assignment on – Visiting orphanages, old age homes, hospitals, bank, traffic etc.,
8. Speech writing
   - Acceptance speech
   - Hosting
   - Vote of thanks
   - Introducing people on the stage
   - Farewell speech
   - Compeering
   - Commentary
   - Thank you speech

III/IV Year B.Tech. - Sixth Semester

CS/IT 321 **NETWORK PROGRAMMING**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To analyze client/server programming design issues and protocols.
- To analyze the network data transfer standards and the related system calls.
- To analyze the TCP/UDP and client/server system calls.
- To analyze the DNS name to IP address and vice versa.
- To analyze the daemon processes.
- To analyze and improve the server process performance using threads
- To explore the TCP client/server design alternatives.

Course Outcomes:

- Write simple client/server program in c
- Write simple architecture independent client/server program
- Write concurrent client/server program.
- Write client/Server program using threads.

UNIT-I (**15 periods**)

Introduction:

Data in client , Protocol independence, Error Handling, Data in Server, Client Server examples, OSI model, Text networks and hosts, Unix Standards, 64 bit architectures.

The Transport Layer:

Introduction, User datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP), TCP Connection Establishment and Termination, TIME_WAIT State, SCTP association Establishment and Termination, Port Numbers, TCP Port Numbers and Concurrent Servers, Buffer Sizes and Limitations, Standard Internet Services, Protocol Usage

Sockets Introduction:

Introduction, Socket Address structures, Value-Result Arguments, Byte Ordering Functions, inet_aton, inet_addr,and inet_ntoa Functions, inet_pton and inet_ntop Functions, sock_ntop and Related Functions, readn, written and readline Functions

Elementary TCP Sockets:

Introduction, socket Function, connect Function, bind function, listen function, accept Function, fork and exac Functions, Concurrent Servers, close Function, getsockname and getpeername Functions

UNIT-II (**15 periods**)

TCP Client-Server Example:

Introduction, TCP Echo Server: main Function, TCP Echo Server: str_echo Function, TCP Echo Client: main Function, TCP Echo Client: str_cli Function, Normal Startup, Normal Termination, POSIX Signal Handling, Handling SIGCHLD Signals, wait and waitpid Functions, Connection Abort before accept Returns, Termination of Server Process, SIGPIPE Signal, Crashing of Server Host, Crashing and rebooting of Server Host

I/O Multiplexing: The select and poll Functions:

Introduction, I/O Models, select Function, str_cli Function, Batch Input and Buffering, shutdown Function, str_cli Function,TCP Echo Server,pselect Function,poll Function,TCP Echo Server

Elementary UDP Sockets:

Introduction, recvfrom and sendto Functions, UDP Echo Server: main Function, UDP Echo Server:dg_echo Function, UDP Echo Client:main Function, UDP Echo Client:dg_cli Function,Lost Datagrams, Verifying Received Response, Server Not Running, Summary of UDP Example, connect Function with UDP,dg_cli Function (Revisited), Lack of Flow Control with UDP, Determining Outgoing Interface with UDP,TCP and UDP echo Server Using select

UNIT-III (**15 periods**)

Name and Address Conversions:

Introduction, Domain Name System (DNS),gethostbyname Function, gethostbyaddr Function, getservbyname and getservbyport Functions,getaddrinfo Function, gai_strerror Function, freeaddrinfo Function, getaddrinfo Function:IPV6, getaddrinfo Function Examples, host_serv,tcp_connect, tcp_listen, udp_client, udp_connect, udp_server and getnameinfo Functions, Reentrant Functions, gethostbyname_r and gethostbyadddr_r Function,Obsolete IPV6 Address Lookuo Functions,Other Networking Information

Daemon Processes and the inetd Superserver:

Introduction, syslogd Daemon, syslog Function, daemon_init Function, inetd Daemon, daemon_inetd Function

Advanced UDP Sockets:

Introduction, Receving Flags, Destination IP Address, and Interface Index, Datagram Truncation, When to use UDP Instead of TCP, Adding Reliability to a UDP Application, Binding Interface Addresses, Concurrent UDP Servers, IPv6 Packet Information, IPv6 Path MTU Control

UNIT-IV (**15 periods**)

Out-of-Band Data:

Introduction, TCP Out-of-Band Data, socket:mark Function, TCP Out-of-Band Data Recap

Signal-Driven I/O:

Introduction, Signal-Driven I/O for Sockets, UDP Echo Server Using SIGIO

Threads:

Introduction, Basic Thread Functions: Creation and Termination, str_cli Function Using Threads, TCP Echo Server Using Threads, Thread-Specific Data, Web Client and Simultaneous Connections, Multexes:Mutual Exclusion, Condition Variables, Web Client and Simultaneous Connections (Continued)

Client/Server Design Alternatives:

Introduction, TCP Client Alternatives, TCP Test Client, TCP Iterative Server, TCP Concurrent Server, One Child per Client, TCP Preforked Server, No Locking Around accept, TCP Preforked Server,File Locking Around accept, TCP Preforked Server, Thread Locking Around accept, TCP Preforked Server, Descriptor Passing, TCP Concurrent Server, One Thread per Client, TCP Prethreaded Server, per-Thread accept, TCP Prethreaded Server, Main Thread accept.

Streams:

Introduction, Overview, getmsg and putmsg Functions, getpmsg and putpmsg Functions, ioctl Function, Transport provider Interface (TPI)

TEXT BOOK:

1. W.Richard Stevens, Bill Fenner, Andrew M. Rudoff, Unix Network Programming. The Sockets Networking API, Volume 1 , 3rd edition – 2004.

REFERENCE BOOKS:

1. Douglas E.Comer, David L.Stevens, Internetworking With TCP/IP: Design, Implementation and Internals

2. Rochkind, Advanced Unix Programming, 2nd edition

WEB REFERENCES:

a. **http://www.pearsoned.co.in/wrichardstevens**
b. **http://www.iana.org**

III/IV Year B.Tech. - Sixth Semester

CS/IT322 OBJECT ORIENTED ANALYSIS AND DESIGN

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand the importance of advantages of Object-Oriented methodologies over traditional methods.
- To apply the process of object-oriented analysis and design to software development.
- To improve software designs and to see how software objects can be altered to build software systems that are more robust and less expensive
- To emphasize the most practical analysis and design methods, including the application of problem domain analysis, UML models and diagrams.
- Providing students with the necessary knowledge and skills to decompose a system using object-oriented CASE tools.

Course Outcomes:

- Ability to expose the importance of object-oriented systems analysis and design in solving complex problems.
- Ability to create a project plan, analyzing design models by making engineering design trade-offs.
- Capability to develop and construct UML models to build a new system by using principles of OO programming.
- Adapt to changing requirements with iterative techniques and component-based design.
- Knowledge to decompose a System into Sub-systems with Interfaces and refactor design models by applying proven design patterns.
- Be able to understanding the practical aspects of software project management and implementation using object-oriented methodologies.

UNIT- I (15 periods)

Information Systems-what are they? Problems in Information SystemsDevelopment, Avoiding the Problems.

What is Object-Orientation: Basic Concepts, The Origins of Object Orientation, Object-Oriented Languages Today; **Agate Ltd Case Study** – Introduction to Agate Ltd.

Modeling Concepts: Models and diagrams, Drawing Activity Diagrams, A Development Process;

Requirements Capture: User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modeling;

Agate Ltd Case study - Requirements Model.

Requirements Analysis: What Must a Requirements Model Do? Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC Cards, Assembling the Analysis Class Diagram.

Agate Ltd Case study - Requirements Analysis.

UNIT– II **(15 periods)**

Refining the Requirements Model: Component based development, Adding further structure, Software development patterns.

Object Interaction: Object Interaction and Collaboration, Interaction Sequence Diagrams, Collaboration Diagrams, Model Consistency;

Specifying Operations: The Role of Operation Specifications, Contracts, Describing Operation Logic, Object Constraint Language, Creating an Operation Specification;

Specifying Control: States and Events, Basic Notation, Further Notation, Preparing a State chart, Consistency Checking, Qualify Guidelines;

Agate Ltd Case study - Further Analysis

UNIT-III **(15 periods)**

Moving Into Design: How is Design Different from Analysis?, Logical and Physical Design, System Design and Detailed Design, Qualities and objectives of Analysis and Design, Measurable Objectives in Design, Planning for Design.

System Design: The Major Elements of System Design, Software Architecture. Concurrency, Processor Allocation, Data Management Issues, Development Standards, Prioritizing Design Trade-offs, Design for Implementation;

Object Design: Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization;

Design Patterns: Software Development Patterns, Documenting Patterns-Pattern Templates, Design Patterns, How to Use Design Patterns, Benefits and Dangers of Using Patterns;

UNIT-IV **(15 periods)**

Designing Boundary Classes: The Architecture of the Presentation Layer, Prototyping the User Interface, Designing Classes, Designing Interaction with Sequence Diagrams, The Class Diagram Revisited, User Interface Design Patterns, Modelling the Interface Using Statecharts; **Agate Ltd Case Study -** Design

Implementation: Software Implementation, Component Diagrams, Development Diagrams, Software Testing, Data Conversion, User Documentation and Training, Implementation Strategies, Review and Maintenance;

Managing Object-Oriented Projects: Resource Allocation and Planning, Managing Iteration, Dynamic Systems Development Method, Extreme Programming, Software Metrics, Process Pattems, Legacy Systems, Introducing Object Oriented Technology;

TEXT BOOK:

1. Object-Oriented Systems Analysis And Design Using UML - Simon Bennett, Steve McRobb and Ray Farmer - Tata McGraw-Hill Edition - Second Edition

REFERENCE BOOKS:

1. James Rumbaugh, Ivar Jacobson, Grady Booch, 'Unified Modeling Language Reference Manual', PHI.
2. Ivar Jacobson et al., 'The Unified Software Development Process', AW, 1999.
3. Atul Kahate, Object Oriented Analysis &Design, The McGraw-Hill Companies, 2004.

WEB REFERENCES:

- http://www.mcgraw.hill.co.uk/textbooks/bennett
- http://www.umsl.edu/~sauterv/analysis/488_f01_papers/quillin.htm
- http://www.omg.org/
- http://www.uml.org/
- http://www.db.informatik.uni-bremen.de/umlbib/home.html
- http://www.w3.org/
- http://www.umsl.edu/~sauterv/analysis/488_f01_papers/quillin.htm
- http://www.isworld.org/

III/IV Year B.Tech. - Sixth Semester

CS/IT-323 INTERACTIVE COMPUTER GRAPHICS

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Describe the functions and operations of display hardware and associated devices.
- To study algorithms for drawing 2D primitives.
- Describe and implement geometric transformations of 2D objects.
- Describe and implement geometric transformations of 3D objects.
- Understand the design of graphical user interfaces.
- Use the methods of enlarging visible portion of drawing with viewing and clipping techniques.

Course Outcomes:

- Ability to understand the functions and operations of display hardware and associated devices.
- Design of data structures to the management of computer graphics entities.
- Ability to draw lines, circles, ellipses and polygon shapes.
- Ability to design 2D transformations.
- Ability to design 3D transformations.
- Develop the simple graphics animation applications.

UNIT–I (17 periods)

Introduction : Basic concepts, Application areas of Computer Graphics, overview of graphics systems - video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations, input devices and their logical classifications, Hard copy devices and Graphics software.

Output primitives: Points and lines, line drawing algorithms – DDA, Bresenham's, mid-point circle and ellipse algorithms, Filled area primitives - Scan line polygon fill algorithm, inside-outside tests, boundary-fill and flood-fill algorithms, character generation and Antialiasing.

UNIT-II (17 periods)

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

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Liang-Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III (15 periods)

Three Dimensional Concepts: 3-D Display method, 3-D object representation: Polygon surfaces, Curved lines and surfaces, quadric surfaces, spline representation, Bezier curve and surfaces.

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

UNIT-IV (15 periods)

3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

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

TEXT BOOKS:

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education 2nd Edition.

REFERENCES:

1. "Computer Graphics Principles & Practice", Second Edition in C, James.D.Foley, Andries VanDam, Steven K.Feiner and Hughes, Pearson Education.
2. Computer Graphics, Steven Harrington, TMH
3. "Computer Graphics Second edition", Zhigand Xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw Hill edition.
4. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw Hill, 2nd edition.
5. "Principles of Interactive Computer Graphics", Willam.M.Neuman and Robert.F.Sproul, TMH.
6. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

WEB REFERENCES:

- http://kat.ph/hearn-baker-computer-graphics-c-version-2nd-ed-t3295235.html
- http://users.abo.fi/jawester/compgraph/
- http://research.cs.wisc.edu/graphics/Courses/559-s2002/cs559.html
- http://www.cs.umd.edu/~mount/427/Lects/427lects.pdf

III/IV Year B.Tech. - Sixth Semester

CS/IT 324 MICROPROCESSORS AND INTERFACING

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Understand components of the computers and microprocessors.
- Learning role of CPU, registers, and operation of 8086 Microprocessor
- Understand concept of memory mapping.
- Learning addressing modes (Immediate, direct, extended, indexed, indexed-indirect, inherent and relative addressing modes)
- Learning 8086 Microprocessor instruction sets (Load, store, transfer, move, arithmetic, logic conditional and unconditional branch, loop, condition code, interrupt Instructions) .
- Learning how to write program in assembly language using 8086 Microprocessor.
- Learning and programming parallel input/output ports of 8086 Microprocessor
- Learning interrupt vectors interrupt process, interrupt priorities, external and advanced interrupts of 8086 Microprocessor.
- Understand Digital Interfacing and Analog interfacing with 8086.

Course Outcomes:

- Students will be able to understand components of the computers, microprocessors and microcontrollers.
- Students will be able to understand the concepts of architecture of 8086 family, 8086 programming and system connections.
- Students will be able to use 8086 microprocessor addressing modes, registers and instruction sets and writing program in assembly.
- Students will be able to debug their assembly language programs.
- Students will be able to program parallel input/output ports of 8086 microprocessor
- Students will be able to design memory systems, design memory system layout and analyze timing and electrical compatibility of the memory UNITs.
- Students will be able to use vector interrupt and understand interrupt process.
- Students will be able to understand Digital Interfacing, Analog interfacing with 8086.

UNIT-I (20 Periods)

The 8086 Microprocessor Family, The 8086 Internal Architecture, Introduction to Programming the 8086,Addresing modes, writing programs using with an assembler , Assembly language program development tools,8086 Instruction descriptions and Assembler directives, Strings : 8086 strings Instructions, writing Assembly language program using strings, Procedures and Macros:8086 CALL, RET, PUSH and POP instructions, 8086 stack , A near procedure call example, passing parameters to from procedures, reentrant and recursive procedures, writing programs using assembler macros.

UNIT-II (15 Periods)

8086 System Connections, Timing: 8086 pin Diagram,8086 minimum mode configuration, 8086 maximum mode configuration ,system bus timing ,Bus activities (timing diagrams) during the Read and

Write Machine Cycles. Addressing memory and ports in microcomputer systems: address decoder concepts, An example ROM decoder, An example RAM decoder,8086 Memory Banks.

UNIT-III **(20 Periods)**

8086 Interrupts and Interrupts Responses, 8086 Interrupt types, an 8086 Interrupt response example for type 0, software Inrerrupts, INTR (Hardware) Interrupts, 8259 Priority Interrupt Controller, 8237 DMA Controller.

UNIT-IV **(15 Periods)**

Digital Interfacing:8255A Internal block diagram and system connections ,8255A operation modes and initialization ,Constructing and sending 8255A control words, Interfacing Microprocessor to keyboards: Keyboard circuit connections and Interfacing,software keyboardInterfacing,Interfacing to the Alphanumeric displays: Interfacing LED Displays.

TEXT BOOKS:

1. Douglas V. Hall, "Microprocessors and Interfacing" Tata McGraw-Hill, Revised Second Edition.
2. Yu-cheng Liu, Glenn A. Gibson, Microcomputer systems: The 8086 /8088 Family architecture, Programming and Design, Second edition, Prentice Hall of India, 2003.

REFERENCE BOOKS:

1. Barry B. Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", Sixth Edition, Pearson Education / Prentice Hall of India, 2002.
2. John Uffenbeck, the 80X86 Family, Design, Programming and Interfacing, 3rd Edition, Pearson Education, 2002.

WEB REFERENCES:

- http://en.wikipedia.org/wiki/Intel_8086
- http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Microprocessors%20and%20Microcontrollers/pdf/Teacher_Slides/mod1/M1L3.pdf
- http://www.cpu-world.com/Arch/8086.html
- http://vmcpatiala.com/download/1271489378.pdf

III/IV Year B.Tech. - Sixth Semester

CS/IT 325 COMPILER DESIGN

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand the theory and practice of different phases of a compiler.
- To learn lexical analyzer for identification of tokens in a given program
- To study a variety of parsing techniques and semantic analysis of a programming language, along with error detection and recovery for checking the syntax.
- To understand various intermediate code forms for compiling a given program.
- To understand the concepts of code generation and code optimization techniques.
- To learn various storage allocation strategies.
- To learn various symbol table organization mechanisms.

Course Outcomes:

- Able to define a compiler and various phases of a compiler.
- Implement the Lexical Analyzer using LEX tool
- Apply knowledge of context free grammars to language translation and parsing.
- Implement the Parser using LEX and YACC tools.
- Able to use a lexical analyzer and parser generator to write and compile a front-end for a compiler.
- Able to write and integrate a scanner, parser, semantic analyzer, and code generator into a simple working compiler.
- Understand semantic analysis principles; use synthesized and inherited grammar attributes; able to employ symbol tables and implement type checking algorithms.
- Confident to use language processing technology for various software developments.
- Confident to design, develop, understand, modify/enhance, and maintain compilers for (even complex!) programming languages.

UNIT- I (14 periods)

Introduction to Compiling: Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools.

Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens-, Recognition of tokens, implementing transition diagrams, a language for specifying lexical analyzers.

UNIT- II (18 periods)

Syntax Analysis:Role of the parser – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser-Yacc Tool.

Syntax – Directed Translation: Syntax Directed definition, construction of syntax trees

UNIT- III (16 periods)

Intermediate Code Generation:Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

Code Generation:Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG

representation of Basic Blocks – Peephole Optimization.

UNIT- IV (16 periods)

Code Optimization: Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis.

Run Time Environments:Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

Symbol Tables: Symbol table entries, Data structures to symbol tables, representing scope information.

TEXT BOOK:

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2007.

REFERENCE BOOKS:

1. Alfred V.Aho, Jeffrey D. Ullman, 'Principles of Compiler Design', Narosa publishing.
2. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
3. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.
4. Engineering a Compiler – Keith Cooper & Linda Torezon, Elsevier.
5. Compiler Construction, Kenneth C.Louden, J.J.Thomson.

WEB REFERENCES:

1. www. lambda.uta.edu/cse5317/notes/
2. www.cs.pdx.edu/~apt/cs301_1999/
3. www.cs.pdx.edu/~apt/cs302_1999/
4. www.cs.rpi.edu/~moorthy/Courses/compilerf05/ ---ppts
5. www-db.stanford.edu/~ullman/dragon.html
6. www.kdelab.cis.nctu.edu.tw/course/cp05/LectureNote.html
7. www.parasol.tamu.edu/people/rwerger/Courses/434/
8. www.owlnet.rice.edu/~comp412/Lectures/
9. www.cs.bilkent.edu.tr/~ilyas/Courses/CS416/

III/IV Year B.Tech. - Sixth Semester

CS/IT-326(A) **ARTIFICIAL INTELLIGENCE**
(Elective-I)

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To present fundamental concepts of artificial intelligence, both theory and practice
- To present various problem-solving methodologies
- To learn logical representation of natural language sentences
- To understand different learning strategies
- To understand the role of various planning techniques in solving problems
- To describe how to develop an expert systems for given knowledge base

Course Outcomes:

- Understand the fundamental concepts of artificial intelligence
- Ability to apply problem solving techniques for solving simple AI problems
- Ability to represent the given natural language sentences in predicate/ proposition logic
- Ability to represent the information given natural language as weak or strong slot-and-filler structures
- Ability to understand various planning and learning techniques
- Understand how to develop an expert systems for given knowledge base

UNIT- I **(14periods)**

Problems, Problem Spaces and Search:
Defining the Problem as a State Space Search,Production Systems, Problem Characteristics,Production System Characteristics,and Issues in theDesign of Search Programs.
Heuristic Search Techniques:
Generate-and-Test, Hill Climbing,Best-First Search, Problem Reduction,Constraint Satisfaction,Means-Ends Analysis.

UNIT-II **(14 periods)**

Knowledge Representation Using Predicate Logic:
Representing Simple Facts in Logic,Representing Instance and ISA Relationships,Computable Functions and Predicates,Resolution.
Representing Knowledge Using Rules:
Procedural versus Declarative Knowledge,Logic Programming,Forward Versus Backward Reasoning,Matching,Control Knowledge.

UNIT-III(14 periods)

Slot – And – Filler Structures :
Semantic Nets, Conceptual Dependency, Scripts.
Planning:
Overview - An Example Domain: The Blocks Word, Component of Planning Systems, Goal Stack Planning, Non-linear Planning using constraint posting, Hierarchical planning, Reactive systems.

UNIT-IV **(14 periods)**

Connectionist Models:
Introduction: Hopfield Networks, Learning in Neural Networks, Applications of Neural Networks
Expert Systems:
Representing and using domain knowledge, Expert system shells, Explanation, Knowledge Acquisition.

TEXT BOOK:
1. Elaine Rich & Kevin Knight, 'Artificial Intelligence', 2nd Edition, (TMH).

REFERENCE BOOKS:
1. Patrick Henry Winston, 'Artificial Intelligence', Pearson Education,
2. Stuart Russel and Peter Norvig, 'Artificial Intelligence', Pearson Education/ PHI.

WEB REFERENCES:
1. https://www.ai-class.com/
2. https://www.ai-depot.com/**Intro**.html
3. https://en.wikipedia.org/wiki/**Artificial_intelligence**

III/IV Year B.Tech. - Sixth Semester

CS/IT 326(B) **MULTIMEDIA SYSTEMS**
(Elective-I)

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Develop and understand popular standard and basic file formats of video and audio.
- Understand and evaluate compression techniques like Run-length coding, Variable length coding techniques, Dictionary based coding, Arithmetic coding, loss less, Image compression schemes.
- Understand coding techniques like transform coding, Wavelet based coding Techniques
- Understand various audio and video compression techniques.
- Use and apply various Multimedia Media communication and Network technologies with assured Quality of Service to the users.

Courses Outcomes:

- Able to develop and handle the Graphics/Image data types and popular file formats on a computer or other systems like cell phones.
- Able to modify and edit various Color images, Color models in a computer system.
- Evaluates and use various coding techniques like Run-length coding, Variable length coding Techniques arithmetic coding, transform coding, Wavelet based coding techniques in different applications.
- Evaluates the Quality of Multimedia data transmission, multimedia over IP, Multimedia over ATM networks.
- Can switch to Multimedia Database and Image Database applications.

UNIT I **(15 Periods)**

Multimedia Authoring and data representations: Introduction to multimedia and hypermedia, WWW, overview of multimedia software tools.
Multimedia Authoring and Tools: Multimedia authoring some useful editing and authoring tools, VRML.
Graphics and Image data representation: Graphics/Image data types , popular file formats.
Color in image and Video: Color models in images, Color models in Video.
Fundamental concepts in video: types of video signals, analog video, digital video.

UNIT II **(15 Periods)**

Basics of Digital Audio: Digitization of sound, MIDI, Quantization and transmission of audio.
Lossless compression algorithms: Run-length coding, Variable length coding, Dictionary based coding, Arithmetic coding, loss less image compression.
Lossy Compression Algorithms: Quantization, Transform coding, Wavelet based coding.

UNIT III **(15 Periods)**

Image compression Standards: JPEG standard, JPEG 2000 standard, Bi-level image compression standards
Basic Video Compression Techniques: Introduction to video compression, Video compression based on motion compensation. Search for motion vectors, H.261, H.263

MPEG Video Coding: MPEG – 1 and MPEG – 2

UNIT IV **(10 Periods)**

Multimedia Network Communications and applications: Quality of Multimedia data transmission, multimedia over IP, Multimedia over ATM networks

Content Based retrieval in Digital Libraries: Current Image search systems, C-BIRD, multimedia databases

LEARNING RESOURCES:

TEXT BOOK:

1. Fundamentals of multimedia, Ze-Nian Li, Mark S. Drew, Pearson education 2007.

REFERENCE BOOKS:

1. Multimedia Applications, Steinmetz, Naharstedt, Springer
2. Multimedia Communications,Applications, Networks, Protocols and Standards Fred Halsall, pearson education.
3. Multimedia systems design, Prabhat K. Andeliegh, Kiran Thakrar, PHI,2007.
4. Multimedia producers Bible, Ron Goldberg, comdex computer publishing.

CS/IT326 (C) ADVANCED DATABASE MANAGEMENT SYSTEMS
(Elective-I)

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Discusses the Translating SQL queries into relational algebra-algorithms and narrates the importance and design of external sorting-algorithms.
- Implementing aggregate operations and outer joins-combining operations using pipelining-using heuristics in query optimization.
- To defines and discuss the importance of Distributed Transaction and Recovery Management.
- To understand the Object-Oriented DBMSs-Concepts and Design and models required for Object-Oriented Data design.
- Narrates Emerging database technologies and applications like Mobile databases, multimedia databases, geographic information systems, genome data management, XML and Internet Databases like Structured, semi structured, and unstructured data-XML Hierarchical (Tree).

Course Outcomes:

- Able to understand Translating SQL queries and Query Processing and Optimization.
- Can understand and implement examples of external sorting-algorithms for select, join, project set operation algorithms, and other algorithms required for query processing and optimization.
- Able to design Distributed Relational Database system, ORDBMS Object DBMSs and OO DBMSs design and implementation concepts.
- Able to understand and create the solutions related to advanced database concepts like Mobile databases, multimedia databases, genome data bases, XML and Internet Databases like Structured, semi structured, and unstructured data-XML Hierarchical (Tree).

UNIT – I **(14 Periods)**

Algorithms for Query Processing and Optimization: Translating SQL queries into relational algebra-algorithms for external sorting-algorithms for select and join operations-algorithms for project and set operations-implementing aggregate operations and outer joins-combining operations using pipelining-using heuristics in query optimization.
Data base systems architecture and the system Catalog: System architectures for DBMSs, Catalogs for Relational DBMSs, System catalog information in oracle.

UNIT – II **(16 Periods)**

Distributed DBMS Concepts and Design: Introduction-function and architecture ofa Distributed DBMS-Distributed Relational Database Design-transparencies in a Distributed DBMS-Date's Twelve Rules for Distributed DBMS.

Distributed DBMS-Advanced Concepts: Distributed Transaction Management-Distributed Concurrency Control-Distributed Deadlock Management-Distributed Database Recovery-The X/Open Distributed Transaction processing model-Replication Servers.

UNIT – III **(19 Periods)**

Introduction to Object DBMSs: Advanced Database Applications-Weaknesses of RDBMSs-Object oriented Concepts-Storing objects in a Relational Database-Next generation Database systems.
Object-Oriented DBMSs-Concepts and Design : Introduction to Object-Oriented Data Models and DBMSs-OODBMS perspectives-Persistence-Issues in OODBMSs-The object Oriented Database System Manifesto-Advantages and Disadvantages of OODBMSs-Object oriented Database Design.
Object relational DBMSs: Introduction to Object-relational Database systems-the third generation Database manifesto-Postgres-an early ORDBMS-SQL3.

UNIT – IV **(15 Periods)**

Emerging database technologies and applications: Mobile databases-multimedia databases-geographic information systems-genome data management.
XML and Internet Databases: Structured, semi structured, and unstructured data-XML Hierarchical (Tree) Data model-XML documents, DTD and XML Schema-XML Documents and Databases-XML querying.

LEARNING RESOURCES:

TEXT BOOK:
1. "Database Systems: A practical approach to design, implementation and management", ThomasM Connolly and Carolyn E.Begg.
2. "Fundamentals of Database Systems", ElmasriNavate, 5/e, Pearson Education.

REFERENCES BOOKS:
1. "Principles of Distributed Database Systems", Ozsu, 2/e, PHI.

III/IV Year B.Tech. - Sixth Semester

CS/IT326(D) **DIGITAL IMAGE PROCESSING**
(Elective-I)

Lectures	:	4 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**4**

Course Objectives:

- To cover the basic theory and algorithms those are widely used in digital image processing.
- Understand the basic approaches to digital image processing.
- To develop hands-on experience in using computers to process images.
- To expose students to current technologies and issues those are specific to image processing systems.
- To develop critical thinking about shortcomings of the state of the art in image processing.

Course Outcomes:

- Familiarize with overview of image processing systems, Image formation and perception, Continuous and digital image representation.
- Familiarize with image sampling, quantization and sampling rate conversion (resize).
- Familiarize with continuous and discrete-time Fourier Transforms in 2D and linear convolution in 2D.
- Familiarize with image enhancement in spatial and frequency domain filtering.
- Familiarize with image Restoration in spatial domain and frequency domain.
- Familiarize with lossless image compression and lossy image compression.
- Familiarize with the mathematical morphology for processing an image.
- Familiarize with image segmentation and representation techniques.

UNIT – I **(10 periods)**

Introduction: Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.
Digital Image Fundamentals: Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships Between Pixels.

UNIT – II **(18 periods)**

Image Enhancement in the Spatial Domain: Some Basic Gray Level Transformation, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing spatial Filters, Sharpening spatial Filters.
Image Enhancement in the Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain, Smoothing frequency-domain Filters, Sharpening frequency-domain Filters, Homomorphic Filtering, Implementation.

UNIT – III **(20 periods)**

Image Restoration: A Model of the Image Degradation/Restoration Process, Linear, Position-Invariant Degradations, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering.

Image Compression: Image Compression Models, Error-free Compression, Lossy Compression, Image Compression Standards.

UNIT – IV **(13 periods)**

Morphological Image Processing: Dilation and Erosion, The Hit-or-Miss Transformation, Some basic Morphological Algorithms, Extension to Gray-Scale Images.
Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

TEXT BOOK:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing' Addison Wesley Pubs (Second Edition).

REFERENCE BOOKS:

1. Milan Sonka, Vaclav Hlavac, Roger Boyle Image Processing. Analysis, and Machine Vision (Second Edition).
2. A.K.Jain, 'Fundamentals of Digital Image Processing' PHI.

WEB REFERENCES:

http://www.imageprocessingbasics.com/
www.**imageprocessing**place.com/root_files_V3/**tutorials**.htm
www.library.cornell.edu/preservation/**tutorial**/intro/intro-01.html
www.olympusmicro.com/primer/**digital**imaging/javaindex.html

III/IV Year B.Tech. - Sixth Semester

CS/IT 361 NETWORK PROGRAMMING LAB

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To write client/server programs using transport layer protocols .
- To implement iterarative and concurrent servers.
- To implement domain name space protocol.
- To implement client/server programming using signals.
- To apply network simulators for different application.

Course Outcomes:

- Ability to design a server for given application
- Ability to design a client for given application.

1. Implementation of Iterative Echo Server.
2. Implementation of Concurrent Echo Server.
3. Implementation of file transfer from server to client (Iterative).
4. Implementation of file transfer from server to client (Concurrent).
5. Implementation of Domain Name Space.
6. Implementation of Address conversion routines.
7. Downloading file from HTTP Server.
8. Implementation of peer to peer connection using UDP.
9. Implementation of SIGPIPE error with Socket.
10. Implementation of restart server by capturing SIGHUP signal.
11. Implementation of HTTP client.
12. Study of network simulators like NS2/NS3.

III/IV Year B.Tech. - Sixth Semester

CS/IT362 OBJECT ORIENTED ANALYSIS & DESIGN LAB

Practicals	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- Explore the importance of a component and functionality of each UML model element throughout the software process.
- To demonstrate how to read and interpret the artifacts of requirements that are used as starting points for analysis and design.
- To analyze interactions of analysis classes in identify design model elements: design classes, subsystems and subsystem interfaces.
- To overcome limitations by developing Software models in Analysis and Design Phase.
- Analyze and Design a model or a software component for a particular application or Software project
- Applying the concepts to give Software architecture for a mini project problem
- Providing capability to students with the necessary knowledge and skills in using object-oriented CASE tools

Course Outcomes:

- Ability to analyze interactions of analysis classes in identifies design model elements: design classes, subsystems and subsystem interfaces.
- Capability to understand the importance of systems analysis and design in solving computer Based problems.
- Familiarity with the object-oriented approach which differs from the traditional approach to systems analysis and design of Software.
- Develop UML models which are used during the six phases of the Rational Unified Process (RUP).
- Ability to perform a System Analyst role and identify the functionality of each UML model in developing object-oriented software.
- Ability to construct various UML models and diagrams.

CYCLE - 1

1. Problem Statement

ANALYSIS

2. Requirements elicitation
3. System Requirements Specification

USECASE VIEW

4. Identification of Actors
5. Identification of Use cases
6. Flow of Events
7. Construction of Use case diagram
8. Building a Business Process model using UML activity diagram

CYCLE - 2

LOGICAL VIEW

9. Identification of Analysis Classes
10. Identification of Responsibilities of each class
11. Construction of Use case realization diagram

12. Construction of Sequence diagram
13. Construction of Collaboration diagram
14. Identification of attributes of each class
15. Identification of relationships of classes
16. Analyzing the object behavior by constructing the UML State Chart diagram
17. Construction of UML static class diagram

CYCLE - 3

DESIGN

18. Design the class by applying design axioms and corollaries
19. Refine attributes, methods and relationships among classes

MINI PROJECT

The above three cycles are to be carried out in the context of a problem / system chosen by the Project batch and a report is to be submitted at the semester end by the batch.

III/IV Year B.Tech. - Sixth Semester

CS/IT363 MICROPROCESSORS& INTERFACING LAB

Practical	: 3 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **2**

Course Objectives:

- To understand the MASM / TASM.
- To develop the microprocessor based programs for various problems and applications.

Course Outcomes:

- An ability to understand MASM / TASM.
- An ability to develop microprocessor based programs for various problems.
- An ability to interface microprocessor to external devices like keyboard, DAC,Stepper motor.

1. Write a 8086 assembly language program to arrange the given numbers in ascending order.
2. Write a 8086 assembly language program to count number of +ve elements, -ve elements, zeros in the given array.
3. Write a 8086 assembly language program to find the square of a number using look-up-table.
4. Write a 8086 assembly language program to move a sting byte from a memory location to another memory location.
5. Write a 8086 assembly language program to calculate the maximum and minimum in an array.
6. Write a8086 assembly language program to convert BCD to binary using near procedures.
7. Write a8086 assembly language program to calculate nCr by using near procedures.
8. Write a program to display a string of characters (use Keyboard/Display Interfacing)
9. Write a program to generate an interrupt using 8259 Interrupt Controller. Assume two sources are connected to the IR lines of the 8269. Of these key board has highest priority and printer has the lowest priority.
10. Assume that 5 BCD data items are stored in RAM locations starting at 40H. Write a program to find the sum of all the numbers. The result must be in BCD.
11. Write a program with three sub-routine to transfer the data from on-chip ROM to RAM location starting at 30H b)add them and save in 70Hc)find the average of the data and store it in R7.notice that data is stored in a code space of on-chip ROM.
12. Program the 8051 timers to generate time delay.

IV/IV Year B.Tech. - Seventh Semester

CS/IT 411 CRYPTOGRAPHY & NETWORK SECURITY

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To define the requirements of network security.
- To develop an understanding of the architecture of network security.
- To narrate and evaluate the design principles of conventional encryption.
- To analyze the concepts of public key encryption and public key algorithms.
- To discuss authentication methods like MAC and Hash functions.
- To give examples for network security applications including Kerberos, PGP and SET.
- To interpret system level security issues including intruders, viruses and firewalls.

Course Outcomes:

- Ability to analyze and determine for any organization the security requirements and appropriate solutions.
- Ability to protect system from different types of threats, malicious software's, vulnerabilities, and attacks.
- Ability to describe symmetric and public key encryption algorithms like DES , AES, RSA etc
- Ability to demonstrate various network security tools and applications.
- Ability to identify ethical, professional responsibilities, risks and liabilities in computer and network environment, and best practices to write a security policy.
- Ability to distinguish and analyze available network security technologies and protocols such as SSL, IPSec, TLS, etc.
- Ability to narrate the Authentication protocols and importance of digital certificates.
- Ability to differentiate MAC and hashing techniques needed for authentication.

UNIT-I (17 periods)

Introduction: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

Classical Encryption Techiniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

Block Ciphers and the Data Encryption Standards: Block Cipher Principles, The Data Encryption Standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Multiple Encryption and Triple DES, Block Cipher modes of Operation

Advanced Encryption Standard: Evaluation criteria for AES, The AES cipher.

UNIT-II (15 periods)

Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithm.

Public Key and RSA: Principles of Public –Key Cryptosystems, The RSA algorithm.

Key Management: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

Message Authentication And Hash Function: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security Hash Functions, and MACs.

UNIT-III **(14 periods)**

Hash Algorithms: Secure Hash Algorithm, HMAC.

Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

Authentication Applications: Kerberos, X-509 Authentication Service.

Electronic Mail Security: Pretty Good Privacy (PGP).

UNIT-IV **(14 periods)**

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Pay Load, Combining Security Associations, Key Management.

Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

Intruders: Intruders, Intrusion Detection, Password Management.

Firewalls: Firewall Design Principles, Trusted Systems.

Malicious Software: Viruses and Related Threats, Virus Countermeasures

TEXT BOOK:

1. William Stallings "Cryptography And Network Security" 4th Edition, (Pearson Education/PHI).

REFERENCE BOOKS:

1. Behrouz A.Forouzen, Debdeep Mukhopadhyay, "Cryptography & Network Security", 2nd Edition, TMH.
2. Chalie Kaufman, Radia Perlman, Mike Speciner, "Network Security", 2nd Edition, (PHI / Eastern Economy Edition)
3. Wade Trappe & Lawrence C.Washington, "Introduction to Cryptography with Coding Theory", 2/e, Pearson.

WEB REFERENCES:

- ftp://ftp.prenhall.com/pub/esm/computer_science.s-041/stallings/Slides/NSE_slides/ Power Point presentations of 4th edition
- http://csrc.nist.gov/publications/fips/fips46-3/fips46-3.pdf Data Encryption Standard- Federal information processing standards publication 46-3
- http://www.itl.nist.gov/fipspubs/fip180-1.htmSecure Hash Standard-Federal InformationProcessing Standards Publication 180-1 ftp://ftp.prenhall.com/pub/esm/computer_science.s-
- 041/stallings/Slides/Crypto3e_PPT_Slides/Power point presentations of 3rd edition
- http://williamstallings.com/Extras/Security-Notes/CryptLect.html Lectures Notes

IV/IV Year B.Tech. - Seventh Semester

CS/IT 412 **DISTRIBUTED SYSTEMS**

Lectures	:	4 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**4**

Course Objectives:

- To learn the principles underlying the functioning of distributed systems
- To understand the major technical challenges in distributed systems design and implementation
- To get exposure to current technology and the software used in distributed systems
- To understand the implementation of typical algorithms used in distributed systems
- To know the research issues in the field of distributed systems.

Course Outcomes:

- Ability to list the principles involved in distributed systems
- Knowledge of the technical challenges in distributed systems design and implementation
- Knowledge of current techniques used to solve the technical challenges
- Ability to design algorithms for various concepts of distributed systems
- Ability to do research in distributed systems
- Ability to develop simple distributed applications.

UNIT- I **(12 periods)**

Introduction: Definition of a Distributed System, Goals, Hardware Concepts, Software Concepts, The Client-Server Model.
Communication: Remote Procedure Call- Basic RPC Operation, Parameter Passing, Extended RPC Models, Remote Object Invocation - Distributed Objects, Binding a Client to an Object, Static versus Dynamic Remote Method Invocations, Parameter Passing.
Message-Oriented Communication:-Persistence and Synchronicity in Communication, Message Oriented Transient and Persistent Communication.

UNIT- II **(18 periods)**

Processes:- Threads, Clients, Servers, Code Migration, Software Agents
Naming: Naming Entities -Names, Identifiers and Addresses, Name Resolution, The Implementation of a Name Space. Locating Mobile Entities, Removing Unreferenced Entities

UNIT- III **(18 periods)**

Synchronization: Clock Synchronization. Logical Clocks, Election Algorithms, Mutual Exclusion. Distributed Transactions
Consistency and Replication: Introduction, Data- Centric Consistency Models, Client –Centric Consistency Models, Distribution Protocols, Consistency Protocols.

UNIT- IV: **(12 periods)**

Fault tolerance:-Introduction to Fault Tolerance, Process Resilence, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

Distributed OBJECTS-BASED SYSTEMS: CORBA
Distributed File Systems:-Sun Network File System

TEXT BOOK:

1. Andrew S.Tanenbaum, Maarten Van Steen "Distributed Systems: Principles and Paradigms", 2002, Pearson Education/PHI.

REFERENCE BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg,"Distributed Systems-Concepts and Design" 3rd edition, Pearson Education.
2. Mukesh Singhal & Niranjan G.Shivaratri, "Advanced Concepts in Operating Systems", TMH.
3. Pradeep Kumar Sinha, "Distributed Operating System – Concepts and Design", PHI.

IV/IV Year B.Tech. - Seventh Semester

CS/IT 413 **DATA ENGINEERING**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Know the evolutionary path of database technology which led up to the need for data mining, and the importance of its application potential
- Be able to define the specification of a data mining task
- Develop and gain an understanding of the principles, concepts, functions and uses of data warehouses, data modelling and data mining
- Understand how these concepts are engineered to use some of the basic data mining tools
- Have the knowledge of basic data warehousing and data mining concepts and applications that can enable them to model an industrial data warehousing and data mining system.

Course Outcomes:

- Ability to do Conceptual, and Logical design of Data Warehouses
- Familiarity with Requirements Engineering for Data Warehouses
- Capability to demonstrate concepts of OLAP and applications
- A good knowledge of the fundamental concepts that provide the foundation of data mining
- Sound knowledge on broad classes of data mining technologies
- Ability to select the techniques for preprocessing the data prior to mining
- Skills of using recent data mining software for solving practical problems
- Ability of doing independent study and research.

UNIT– I **(15 Periods)**

Data Warehouse: Data Warehouse: Basic Concepts, Data Warehouse Modelling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation.

Getting to know Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity.

Data Mining: What is Data Mining, Kinds of Data, Kinds of Patterns, Technologies Used, Major Issues in Data Mining.

UNIT– II **(15 Periods)**

Data Preprocessing: Data cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Frequent Item set Mining Methods.

Advanced Pattern Mining: Mining Multilevel Associations, Mining Multidimensional Associations, Mining Quantitative Association Rules.

UNIT– III **(15 Periods)**

Cluster Analysis: Introduction to cluster analysis, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING.

Outlier Detection: Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Proximity-Based Approaches.

UNIT– IV **(15 Periods)**

Classification: Basic Concepts: Basic Concepts, Decision tree induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy.

Classification: Advanced Methods: Bayesian Belief Networks, Classification by Backpropagation, Support Vector Machines, Lazy Learners, Other Classification Methods.

TEXT BOOK:

1. Data Mining Concepts & Techniques, Jiawei Han, Micheline Kamber, and Jian Pei, 3/e, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, and Vipin Kumar, Addison Wesley.
2. Data Warehouse Toolkit, Ralph Kimball, John Wiley Publishers.
3. Data Mining (Introductory and Advanced Topics), Margaret H.Dunham, Pearson Education.
4. Introduction to Data Mining with case studies",G.K.Gupta, PHI Publications, 2006.
5. Data Mining – Vikram Pudi, P.Radhakrishna, Oxford University Press, 2009.

WEB REFERENCES:

1. http://cs.illinois.edu/%18hanj/bk2
2. https://www.mkp.com/datamining3e

IV/IV Year B.Tech. - Seventh Semester

CS 414 **ADVANCED COMPUTER ARCHITECTURE**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To provide students with a sound foundation in parallel computer architectures, analyzing the performance of parallel algorithms with scheduling on sequential computer and parallel computers.
- To focus on the design and development of computer and computer-integrated systems, with due consideration to such engineering factors such as function, performance, and cost.
- Design and build parallel systems to meet application requirements with attention to the hardware-software interaction.
- Will have sound knowledge on Flynn's classification of parallel computers to parallel algorithm development; from systems architecture to computer design; from interface electronics to software development, especially real-time applications.
- Be able to apply knowledge to problem formulation, interpretation and problem solving in parallel programming environment using parallelizing compiler approach.
- Exploit their awareness to understand the professional workforce typically by applying their knowledge in various areas of computer engineering related to Artificial intelligence expert systems, Long range whether forecasting and Visual image modeling.
- Be able to enhance their skills in parallel programming style by analyzing the program for dependency analysis, allocating the decomposed programs to multiprocessor computing and to design new algorithms.

Course Outcomes:

- Ability to define the meaning of Parallel processing, Degree of parallelism, Batch processing, Multi processing and Multi programming.
- Ability to exploiting instruction level parallelism in fine-grain, medium-grain and course-grain parallelism.
- Ability to demonstrate mastery of various parallel architectures and techniques used for building high performance scalable multithreaded and multiprocessor systems, Dataflow computer architectures and Hybrid architectures.
- Ability to apply the learned knowledge to conduct computer architecture research using performance simulators.
- Ability to understand issues related to modern processor technology - instruction-set architectures including CISC and RISC, Architectures of typical superscalar, VLIW, super pipelined, vector processors and Symbolic processors.
- Ability to understand the linear andd nonlinear pipelined processors performance.
- Ability to participate in competitive examinations.

UNIT– I **(15 periods)**

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers PRAM and VLSI Models.

Program and network properties: Conditions of parallelism, Data and resource Dependences, Hardware and Software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks.

UNIT– II (18 periods)

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws – Amdahl's Law for Fixed work load, Gustafson's law for scaled problems, Memory Bounded speedup model.

Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer Arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

UNIT– III (12 periods)

MULTI Processors: Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network, Cache Coherence and Synchronization Mechanisms, Message-passing Mechanism.

UNIT– IV (10 periods)

Scalable, Multi-Threaded and Dataflow Architectures: Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures, Dataflow and Hybrid Architectures.

TEXT BOOK:

1. Kai Hwang, "Advanced Computer Architecture"; TMH.

REFERENCE BOOKS:

1. D.A.Patterson and J.L.Hennessey, "Computer organization and Design", Morgan Kaufmann, 2nd Edition.
2. V.Rajaram & C.S.R.Murthy, "Parallel Computer", PHI.

WEB REFERENCES:

1. www.eecg.toronto.edu/~moshovos/ACA05
2. www.csee.umbc.edu/~olano/611s06
3. www.eecg.toronto.edu/~moshovos/ACA06
4. www.csee.umbc.edu/~olano/611f03

IV/IV Year B.Tech. - Seventh Semester

CS 415 (A) JAVA PROGRAMMING (Elective - II)
(Open Elective - offered to other branches)

Lectures	:	3 periods/week	Internal Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives:

- Understand the syntax of the java and Write simple Java applications using control statements like if, if-else etc..
- Understand Object oriented Programming Principles like encapsulation, inheritance, and polymorphism in java.
- Understand how to use classes, methods and objects.
- Learn inheritance, Interfaces and packages.
- Manipulate the String & StringBuffer, Date, Collection, Enumeration, and Wrapper classes.
- Understand the exception handling mechanism in java.
- Understand the Threading mechanism in java and creating multiple threads, demonstrate the deadlock situation and inter thread communication.
- Under stands the I/O streams in java and use the classes Streams, Byte streams, Character streams, File class, File stream.
- Understand and implement Applets and use Graphics class.
- Understand the event handling mechanism & difference between AWT and Swing components.
- Understand the concept of database connectivity and write database applications with java.
- Understand the concept of java basic networking principles.

Course Outcomes:

- Familiar the syntaxes and semantics of java programming language.
- Understanding the concepts of OOPs; create new classes, methods, objects.
- Study the predefined packages, and define user defined packages and Interfaces.
- Implement the String and String Buffer, Date, Enumerations, and wrapper classes.
- Define own exception classes that may be needed in the application development.
- Write multitasking applications with threads and able to detect deadlock situations.
- Develop applets for internet applications
- Develop applications that are based on event driven programming.
- Design more efficient GUI applications with java.awt.
- Develop GUI applications with javax.swing. Packages.
- Ability to develop the Database Applications with java.sql.
- Design Networking applications such TCP and UDP with java.net.

UNIT-I (16 periods)

Introduction: Introduction to java, java buzzword, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals.

Classes and Objects : Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes.

Inheritance: Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, Object class.

UNIT-II **(14 periods)**

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.

Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.

UNIT-III **(15 periods)**

Strings: Exploring the String class, String buffer class, Command-line arguments.

Library: Date class, Wrapper classes.

Multithreading : Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks.

I/O Streams: Streams, Byte streams, Character streams, File class, File streams.

UNIT-IV **(15 periods)**

Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.

AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.

TEXT BOOK:

1. The Complete Reference Java J2SE 7th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.

REFERENCE BOOKS :

1. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons,Pearson Edu.(UNIT–IV)
2. Beginning in Java 2, Iver Horton, Wrox Publications.
3. Java, Somasundaram, Jaico.
4. Introduction to Java programming, By Y.Daniel Liang,Pearson Publication

IV/IV Year B.Tech. - Seventh Semester

CS 415 (B) DATABASE MANAGEMENT SYSTEMS (Elective-II)
(Open Elective - offered to other branches)

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of Databases.
- To understand the structural constraints of relationships
- To understand the types of integrity constraints in a relational database system.
- To understand the concepts provided by Relational Algebra, Relational Calculus and SQL and able to specify queries on any database using them.
- To recognize the importance of data base analysis and design in the implementation of any database application.
- To understand how to perform the normalization process of relations before implementation.
- To understand the primary file organizations and index structures used by different database systems.
- To describe the role of transaction processing in a database system
- To understand various concurrency control mechanisms for a database system
- To describe the roles of recovery and security in a database system.

Course Outcomes:

- An understanding of basic concepts and current trends of different database systems
- An understanding of various database system architectures
- An ability to enforce various integrity constraints
- An ability to write relational algebra and Relational calculus expressions
- An ability to use Standard Query Language and its various versions.
- An ability to design and develop a database that is in specified normal form.
- An understanding of the Importance of transaction processing
- An ability to use different concurrency control techniques while implementing real time applications
- An understanding of the importance of backup and recovery techniques.
- An ability to build Database systems that can handle real world problems.

UNIT-I **(15 Periods)**

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach

Database System Concepts and Architecture: Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces

Data Modeling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types

UNIT-II **(15 Periods)**

The Relational Data Model and Relational Database Constraints: Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations - Relational Database Design Using ER-to-Relational Mapping

SQL-99: Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types - Specifying Constraints in SQL - Schema Change Statements in SQL - Basic Queries in SQL - More Complex SQL Queries - INSERT, DELETE, and UPDATE Statements in SQL - Views (Virtual Tables) in SQL

UNIT-III **(15 Periods)**

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form

Database Security: Introduction to Database Security Issues - Discretionary Access Control Based on Granting and Revoking Privileges - Mandatory Access Control.

UNIT-IV **(15 Periods)**

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering

Database Recovery Techniques: Recovery Concepts - Recovery Techniques Based on Deferred Update - Recovery Techniques Based on Immediate Update - Shadow Paging

TEXT BOOK:

1. Fundamentals of Database Systems, Ramez Elmasri and Navate, Pearson Education, 5th edition.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date, Pearson Education.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
3. Data base System Concepts, Silberschatz, Korth, McGraw hill, 5th edition.

IV/IV Year B.Tech. - Seventh Semester

CS 415 (C) **DESIGN THINKING** (Elective-II)
(Open Elective - offered to other branches)

Lectures	:	3 periods/week	Internal Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives: At the end of the course students will be able to:

- Expose to the design process as a tool for innovation
- learn to build empathy for target audiences from different "cultures"
- to develop and test innovative ideas through a rapid iteration cycle
- get demonstration capabilities to develop teamwork and leadership skills

Course Outcomes: After completing the course, the students will have the knowledge of:

- how the design process can be applied in varieties of business settings.
- the unique needs of the company around a specific challenge and develop and test innovative ideas through iteration cycle
- design and innovate beyond the design and development of new products to other fundamental sources of value creation.
- to analyze the problem and develop the willingness to take a risk and the ability to deal with minimizing the failure

UNIT-I **(12 Periods)**

Introduction to Design Thinking
The Role of Research in Design Thinking

UNIT - II **(15 Periods)**

Designing a Business Strategy
Designing Live Customer Experiences
Designing Digital Customer Experiences

UNIT- III **(10 Periods)**

Designing Services and Service Delivery
Designing Marketing

UNIT- IV **(13 Periods)**

Designing for Change
Designing for Growth

Learning Recourse:

Text Book:

1. "Design Thinking for Entrepreneurs and Small Businesses" by Beverly Rudkin Ingle, Apress

Reference Books

1. "Design Thinking" by Christoph Meinel and Larry Leifer, Springer publications, ISBN 978-3-642-13756-3.
2. "Design Thinking - Business Innovation" by Maurício José, Vianna e Silva, Ysmar Vianna e Silva Filho, Isabel Krumholz Adler, Brenda de Figueiredo Lucena, Beatriz Russo, MJV Press
3. "Design Thinking- Understanding How Designers Think and Work" by Nigel Cross, Berg publishers.

IV/IV Year B.Tech. - Seventh Semester

CS/IT416(A) .NET TECHNOLOGIES (Elective-III)

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- Learn the C# language and the core features of the .NET Framework, such as object-oriented programming, collections, generics, and other basics such as Debugging and Error Handling.
- Learn to work on Microsoft Visual Studio Development Environment.
- Create and deploy Windows Forms applications with rich, highly responsive user interfaces.
- Learn how to create web applications and Services using ASP.NET.
- How to process Extensible Markup Language (XML).
- Learn to use Language Integrated Query (LINQ) forsolving the problem of dealing with very large collections of data.

Course Outcomes:

- Basic foundation that is needed in order to continue learning about C#.
- Knowledge of using generics to maximize performance and code reuse.
- Basic concepts of event-based programming.
- Concepts involved in building powerful, interactive, and appealing user interfaces.
- Concepts creating powerful web applications using ASP.NET.
- Knowledge to create web service applications.
- Skills to manipulate XML documents using C#.
- Knowledge to create data-driven applications.

UNIT I (15 periods)

Introducing C#, Writing a C# Program, Variables and Expressions, Flow Control, More About Variables, Functions, Debugging and Error Handling.

UNIT II (19 periods)

Introduction to Object-Oriented Programming, Defining Classes, Defining Class Members,Collections, Comparisons and Conversions, Generics, Additional OOP Techniques,C# Language Enhancements.

UNIT III (17 periods)

Basic Windows Programming, Advanced Windows Forms Features,Deploying Windows Applications, ASP.NET Web Programming, and Web Services.

UNIT IV (18 periods)

Deploying Web Applications, File System Data, XML, **Introduction** to LINQ, Applying LINQ.

LEARNING RESOURCES:

TEXT BOOK:

1. "BEGINNING VISUAL C# 2010" by Karli Watson, Christian Nagel, Jacob Hammer Pedersen, Jon Reid, and Morgan Skinner, Wiley Publishing, Inc**.**

REFERENCE BOOKS:

1. "Core C# and .NET", Stephen C. Perry, Pearson Education, 2006.
2. "C#: The Complete Reference", Herbert Scheldt, TATA McGraw Hill Publishing.
3. Andrew Troelsen, "Pro C# and the .NET Platform", A! Press.
4. Kevin Hoffman, *Microsoft Visual C# 2005 Unleashed.* Sams Pearson India.

IV/IV Year B.Tech. - Seventh Semester

CS/IT416(B) **OPEN SOURCE SYSTEMS** (Elective-III)

Lectures	:	3 periods/week	Internal Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives:

- Learn the PHP language and its core features, such as object-oriented programming.
- Learn touse PHP for developing web applications.
- Learn the PHP Browser Handling Power.
- Learn to access web form data at the server
- Learn how to create database driven web applications.
- Learn to use Ajax for partial rendering.
- Learn to use XML and RSS with PHP.

Course outcomes:

- Basic foundation that is needed to develop web applications using Apache, PHP, and MySQL.
- Familiarity with the OOP concepts.
- Capability to create database driven web applications.
- Concepts for creating powerful web applications using Ajax.
- Knowledge to create images at the web server.
- Skills to manipulate XML documents using PHP.
- Knowledge to create RSS.

UNIT-I **(15 periods)**

Essential PHP, Operators and Flow Control, String Arrays, Creating Functions

UNIT-II **(17 periods)**

Reading Data in Web Pages, PHP Browser- HANDLING Power, Object Oriented Programming, Advanced Object Oriented Programming

UNIT-III **(15 periods)**

File Handling, Working with Databases, Sessions, Cookies, and FTP, Ajax

UNIT-IV **(13 periods)**

Advanced Ajax, Drawing Images on the Server, XML and RSS

LEARNING RESOURCES:

TEXT BOOK:

1. PHP: The Complete Reference By Steven Holzner, TATA McGraw Hill.

REFERENCE BOOKS:

1. Beginning PHP and MySQL: From Novice to Professional, By by W. Jason Gilmore, Apress.
2. PHP 6 and MySQL 6 Bible, By Steve Suehring, Tim Converse, Joyce Park, Wiley Publishing, Inc.

IV/IV Year B.Tech. - Seventh Semester

CS/IT416(C) **MOBILE COMPUTING** (Elective-III)

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- To learn the communication foundations of the wireless networks.
- To know the predominant wireless telecommunications standards such as GSM, GPRS, WAP and UMTS.
- To provide insights into the technological challenges of high-speed and QoS-aware wireless networks.
- To learn the high-speed wireless data network standards such as Wi-Fi, HIPERLAN.

Course Outcomes:

- An ability to articulate the details of the wireless technology standards right from the electromagnetic stage to the application stage.
- An ability to design a cellular architecture using SDM given the wireless spectrum specifications and number of users.
- Becomes aware of the widely used wireless technology standards such as WAP, GPRS and MMS.
- Clearly chooses a technology standard given the technical requirements such as Data Rate, Customer Use Cases, QoS requirements and total cost.
- Understands the design requirements of the new technology standards and with expert supervision can engineer the protocol stacks to meet the design requirements.

UNIT– I (**15 periods**)

Introduction: History of Cellular Systems, Characteristics of Cellular Systems, Cellular System Infrastructure, Satellite Systems, Network Protocols, AdHoc and Sensor Networks, Wireless MANs, LANs and PANs.

Mobile Radio Propagation: Introduction, Types of Radiowaves, Propagation Mechanisms, Free Space Propagation, Land Propagation, Path Loss, Slow Fading, Fast Fading, Doppler Effect, Inter symbol Interference, Coherence Bandwidth, Cochannel Interference.

Channel Coding and Error Control – Introduction, Linear Block Codes, Cyclic Codes, CRC, Convolutional Codes, Interleaver, Turbo Codes.

UNIT– II (**15 periods**)

Cellular Concept: Introduction, Cell Area, Signal Strength and Cell Parameters, Capacity of a Cell, Frequency Reuse, How to Form a Cluster?, Cochannel Interference, Cell Splitting, Cell Sectoring.

Multiple Radio Access: Introduction, Multiple Radio Access Protocols, Contention-Based Protocols.

Multiple Division Techniques: Introduction, Concepts and Models for Multiple Divisions, Modulation Techniques.

Channel Allocation: Introduction, Static Allocation versus Dynamic Allocation, Fixed Channel Allocation, Allocation in Specialized System Structure, System Modeling.

UNIT– III (**15 periods**)

Telecommunication Systems: GSM, UMTS and IMT-2000.

Wireless LAN – Infrared vs Radio Transmission, Infrastructure and Ad-hoc Network, IEEE 802.11, Bluetooth.

UNIT– IV (**15 periods**)

Mobile Network Layer: Mobile IP, DHCP, Mobile Ad-hoc Networks.

Mobile Transport Layer: Traditional TCP, Classical TCP Improvements, TCP over 2.5G/3G Wireless Networks

WAP: Architecture, Wireless Application Environment, WML, Wireless Telephony Application, Push/Pull Services, WAP 2.0.

TEXT BOOKS:

1. Dharma Prakash Agarwal, Qing-An Zend, Introduction to Wireless and Mobile Systems, 2nd Edition, Cengage Learning, 2006. (UNITS- I, II).
2. Jochen Schiller, Mobile Communications, 2nd Edition, Pearson Education, 2009. (UNITS – III, IV).

REFERENCE BOOKS:

1. Yi-Bang Lin, Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley & Sons, 2001.
2. Kavel Pahlavan and Prashant Krishnamurthy, Principles of Wireless Networks: A Unified Approach, Pearson Education, 2002.
3. Vijay K. Garg, Wireless Communications and Networking, Elsevier Inc, 2008.
4. Raj Kamal, Mobile computing, 2nd edition, OXFORD University Press.

WEB REFERENCES:

- http://www.wireshark.org/ % Wireshark Packet Analyzer
- http://www.cisco.com/en/US/docs/wireless/antenna/installation/guide/ant2506.html#wp44332 % Air-Ant 2506 Omni Directional Antenna
- http://www.cisco.com/en/US/docs/wireless/antenna/installation/guide/ant2460.html#wp43294 % Air-Ant2460P-R Patch Antenna
- http://www.cisco.com/en/US/docs/wireless/antenna/installation/guide/ant545r.html#wp43294 % Air-Ant5145V-R Omnidirectional Antenna
- http://getitnew.com/air-lap1242ag-a-k9ciscoaironet1242agwirelessaccesspoint.aspx % AIR-AP 1242AG-A-K9 Wi-Fi Access Point
- http://www.wlanmall.com/aironet-1131-80211ag-lwapp-access-point-integrated-antennas-cnfg-p-509.html % AIR-LAP1131AG-A-K9 Wi-Fi Lightweight Access Point
- http://grouper.ieee.org/groups/802/11/Reports/802.11_Timelines.htm % IEEE 802.11 Working Group Timeline
- http://www.etsi.org/WebSite/homepage.aspx % European Telecommunications Standard Institute (ETSI)

IV/IV Year B.Tech. - Seventh Semester

CS/IT416(D) SOFTWARE TESTING METHODOLOGIES(Elective-III)

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

- Illustrate the importance, objectives, principles, and limitations of software testing.
- Discusses the need for test case design, two broad approaches for it, and the commonly used white-box and black-box techniques for designing test cases.
- Evaluates the aspects involved in planning for software testing and in selecting the test strategy for a software project.
- Understands the testing process, driven either by legal or financial requirements, can be expensive and may thwart the planned deployment of the application.

Course Outcomes:

- Appreciate the fundamentals of software testing and its application through the software life cycle.
- Appreciate the role of software testing in systems development, deployment and maintenance.
- Demonstrate a given software product matching its requirement specifications.
- Validate the quality of software testing using the minimum cost and efforts.
- Able to apply various software metrics and how they relate to testing.
- Able to write and validate test plans and test procedures.
- Be able to write a test plan based on the requirements document.

UNIT- I (16 Periods)

Principles of Testing; Software Development Life Cycle Models – Phases of Software Project – Quality, Quality Assurance and Quality Control - Testing, Verification and Validation – Process Model to Represent Different Phases
White Box Testing: Static Testing – Structural Testing – Challenges
Black Box Testing: What, Why, When, How.

UNIT- II (16 Periods)

Integration Testing: Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.
System and Acceptance Testing: Overview – Functional Versus Non-Functional – Functional System Testing & Non-Functional – Acceptance Testing.
Performance Testing: Introduction – Factors, Methodology, Tools & Process.
Regression Testing: Introduction –Types – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT- III **(16 Periods)**

Ad hoc Testing: Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative – Agile and Extreme Testing – Defect Seeding.

Usability and Accessibility Testing: Approach to Usability – When to do Usability – How to achieve Usability – Quality Factors for Usability – Aesthetics Testing – Accessibility Testing – Tools for Usability – Usability Lab Setup – Test Roles for Usability.

Common People Issues: Perceptions and Misconceptions About Testing – Comparison between Testing and Development Functions – Providing Career Paths for Testing Professionals – Role of the Ecosystem and a Call for Action.

Organization Structures for Testing Teams: Dimensions of Organization Structures – Structures in Single-Product Companies, Multi-product Companies – Effects of Globalization and Geographically Distributed Teams on Product Testing – Testing Services Organizations – Success Factors for Testing Organizations.

UNIT- IV **(16 Periods)**

Test Planning, Management, Execution and Reporting: Introduction – Planning – Management – Process – Reporting – Best Practices.

Software Test Automation: Terms used in Automation – Skills needed for Automation – What to Automate, Scope of Automation – Design and Architecture for Automation – Generic Requirements for Test Tools – Process Model for Automation – Selecting a Test Tool – Automation for Extreme Programming Model – Challenges.

Test Metrics and Measurements: Metrics & Measurements – Types – Project – Progress – Productivity – Release.

TEXT BOOK:

1. Srinivasa Desikan & Gopalaswamy Ramesh, "***Software Testing – Principles and Practices***", Pearson Education, 2007.

REFERENCE BOOKS:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. The craft of software testing - Brian Marick, Pearson Education.
3. Software Testing Techniques – SPD(Oreille)
4. Software Testing – Effective Methods, Tools and Techniques – Renu Rajani, Pradeep Oak, TMK.
5. Effective methods of Software Testing, William.E.Perry, John Wiley.

IV/IV Year B.Tech. - Seventh Semester

CS/IT 416(E) **SECURITY ANALYST** (Elective-III)

Lectures	: 3 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **3**

Course Objectives:

The course content enables students to:

1. To introduce the fundamental Information security concepts & Threats.
2. Learn the security standards and policies to be maintained by the organizations.
3. Understand various Security Performance Metrics & Configuration reviews.
4. Understand Vulnerability Assessments and tools.
5. Understand the Security Auditing

Course Outcomes:

At the end of the course students are able to:

1. Analyze the Information Security Assets and Threats.
2. Identify the various security standards and policies to be maintained by the organizations.
3. Design and Implement Security Performance Metrics & Configuration reviews.
4. Use the Vulnerability Assessment tools and apply the Security Audit process.

UNIT I **(16 Hours)**

Information Security Assets & Threats: Introduction-Information Security, Information Assets & Threats, Virus, Worms, Trojans, Other Threats, types of Network Attacks, Spear Phishing Attack, Types of viruses, Types of worms, types of Trojans Watering Hole Attack, DoS (denial-of-service) attack, Bluetooth related attacks, Common Vulnerabilities and Exposures (CVE),Risk Analysis.

Fundamentals of Information Security: Elements of information security, Principles and concepts - data security, Basic information security concepts, Types of controls, Discretionary Access Control (DAC), Role-Based Access Control RBAC).

Roles and Responsibilities: Information and Data Security Team, CEO or Executive Management, Security Engineer, Systems Administrator, Security Steering Committee, Security Incident Response Team.

UNIT II **(14 Hours)**

Data Leakage: Introduction - Data Leakage, Organizational Data Classification, SQL Injection, Application security(OWASP), Location and Pathways, Content Awareness, Content Analysis Techniques, Data Protection, DLP Limitations, DRM-DLP Conundrum

Information Security Policies, Procedures, Standards and Guidelines: Information Security Policies, Key Elements of a Security Policy, Security Policy implementation, Security Standards, COSO, COBIT, ITIL, ISO27001, NIST, SANS, Guidelines and Frameworks, Laws, Regulations and Guidelines.

UNIT III **(12 Hours)**

Information Security Performance Metrics: Introduction –Security Metrics, Types of Security Metrics, Using Security Metrics, Developing the Metrics Process, Metrics and Reporting, Designing Information Security Measuring Systems.

Configuration review: Configuration Management, Organisational SecCM Policy, Identify CM Tools, Implementing Secure Configurations , Unauthorised Access to Configuration Stores.

UNIT IV **(12 Hours)**

Vulnerability Analysis : What Is Vulnerability Assessment,Why to carry out Vulnerability Assessment, Vulnerability Classification,Types of Vulnerability Assessment ,How to Conduct a Vulnerability Assessment ,Vulnerability Analysis Tools.

Information Security Audit: Information Systems Audit versus Information Security Audit, What is an Information Security Audit, Scope of the Audit, Types of Security Audits, Phases of Information Security Audit, Information Security Audit Methodology, Role of an Auditor, Hiring an Information Security Auditor, Penetration testing stages.

Text Books	**:**	NASSCOM Study Material
Reference Books	**:**	NASSCOM Study Material

IV/IV Year B.Tech. - Seventh Semester

CS/IT 416(F) DATA ANALYTICS (Elective-III)

Lectures	:	3 periods/week	Internal Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives

- Identify the field of data analytics-background and key concepts
- Know the basics of R programming
- Develop and gain an understanding of probability distributions and liner models in R programming
- Have the knowledge of cluster & classification techniques used in R language

Course Outcomes

- Able to recognize the use of R interactive environment.
- Able to memorize the packages available and basics of R programming
- Able to dramatize the data management and graphical representation in R programming
- Able to use statistical models like probability distributions and liner models on data using R programming.
- Able to assess the data using cluster analysis and classification models using R programming.

UNIT – I **(12 Periods)**

Introduction to R- Why use R? Obtaining and installing R

The R Environment- Command line interface, RStudio.

R Packages- Installing packages, loading packages.

Basics of R- basic Math, variables, Data types, vectors, calling function, function documentation, missing data.

Advanced Data Structures- data.frames, Lists, Matrices, Arrays.

Reading Data into R-Reading CSVs, Excel data, reading from databases, data from other statistical tools.

UNIT – II(12 Periods)

Basic Data Management- A working example, creating new variables, recoding variables, renaming variables, missing values, date values, type conversion, sorting data, merging data set, Subsetting datasets, Using SQL statement to manipulate data**.**

Advanced Data Management- A data management challenge, Numerical and character functions, a solution for data management challenge, control flow, User Written functions, Aggregate and reshaping.

Basic graphs- Bar plot, pie chart, Histograms, Kernel Density plots, Box plots, dot plots

UNIT – III **(18 Periods)**

Basic statistics-summary statistics, correlation and covariance, T-test, ANOVA

Manipulating Strings- paste, sprintf, extracting text, regular expression.

Linear Models and its Diagnostic: Simple linear regression, multiple linear regressions, Residuals, comparing models, cross-validation, bootstrap, stepwise variable selection.

Time Series Analysis: Components of time series, ARMA models and ARIMA models.

UNIT-IV **(18 Periods)**

Cluster Analysis: Cluster Analysis-common steps in cluster analysis, calculating distances, Hierarchical cluster analysis, Partitioning cluster analysis, avoiding nonexistence clusters.

Classifications- Preparing the data, logistic regression, decision trees, random forests, support vector machines, choosing a best predictive solution, using the rattle package for data mining.

Text Book:

1. R for Every One, Advanced analytics and graphics by Jared P Lander, Addison Wisley Data and analytics series. **(UNIT-I,UNIT-III)**
2. R in Action, Data Analysis and graphics with R,Robert L Kabacoff, Manning Publisher **(UNIT-II,IV)**
3. Time series Analysis and Applications by Robert H.Shumway, David S.Stoffer, EZ Edition **(UNIT-III)**

Reference Books:

1. Beginning R by Dr. Mark Gardener, Wrox publisher.
2. Associate Analytics Facilitator Guide provided by NASSCOM. **http://183.82.43.252/~gopam/html/NASSCOM**

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CS/IT 416(G) **CYBER SECURITY** (Elective-III)

Lectures	:	3 periods/week	Internal Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives:

- To introduce the fundamental Information security concepts & Threats.
- Learn the security standards and policies to be maintained by the organizations.
- Describe various Security Performance Metrics & Configuration reviews.
- Discuss the different log management and backup procedures.
- Use the Vulnerability analysis tools and perform auditing.

Course Outcomes:

- Analyze the Information Security Assets and Threats.
- Identify the various security standards and policies to be maintained by the organizations.
- Design and Implement Security Performance Metrics & Configuration reviews.
- Analyze log management functions and data backup procedures
- Apply the Security Audit process using Vulnerability analysis tools.

UNIT I (16 Hours)

Information Security Assets & Threats: Introduction, Threats, Virus, Worms, Trojans, Other Threats, types of Network Attacks, types of Phishing Attack, Types of viruses, Types of worms, types of Trojans. DoS (denial-of-service) attack, Bluetooth related attacks.

Fundamentals of Information Security: Elements of information security, Principles and concepts - data security, Types of controls, Discretionary Access Control (DAC), Role-Based Access Control (RBAC).

Roles and Responsibilities: Information and Data Security Team, CEO or Executive Management, Security Engineer, Systems Administrator, Security Steering Committee, Security Incident Response Team.

UNIT II (14 Hours)

Data Leakage: Introduction - Data Leakage, Organizational Data Classification, SQL Injection, Application security(OWASP),Content Awareness, Content Analysis Techniques, case studies.

Information Security Policies, Procedures, Standards and Guidelines: Information Security Policies, Key Elements of a Security Policy, Security Policy implementation, Security Standards, COSO, COBIT,ISO27001,SANS.

Information Security Performance Metrics: Introduction –Security Metrics, Types of Security Metrics, Using Security Metrics, Developing the Metrics Process, Metrics and Reporting.

UNIT III **(14 Hours)**

Configuration review: Configuration Management, Organizational SecCM Policy, Identify CM Tools, Implementing Secure Configurations, case studies.

Log Correlation and Management: Event Log Concepts, Log Management Infrastructure and functions, Log Management - Using Log watch.

Vulnerability Analysis: What Is Vulnerability Assessment, Vulnerability Classification, Types of Vulnerability Assessment, Vulnerability Analysis Tools. Case studies.

UNIT IV(12 Hours)

Data Backup: Types of Backup, Backup Procedures, Types of Storage, Features of a Good Backup Strategy.

Information Security Audit: Information Systems Audit versus Information Security Audit, What is an Information Security Audit, Scope of the Audit, Types of Security Audits, Phases of Information Security Audit, Information Security Audit Methodology, Role of an Auditor, Penetration testing stages.

Text Books	**:**	NASSCOM Study Material
Reference Books	**:**	NASSCOM Study Material

IV/IV Year B.Tech. - Seventh Semester

CS/IT 451 **TERM PAPER**

Practical	: 4 periods/week	Internal Marks	:	100
		Semester End Exam Marks	:	--
Sem End Exam Duration	: --	Credits	:	**2**

Course Objectives:

- To build Confidence in understanding the current state of the art technology.
- Identification of the field of interest
- To develop the ability to select a research paper from International Journals.
- To identifying the technology used andto extend the work in various applications.
- Develop presentation skills.

Course Outcomes:

- Submit a report in IEEE format.
- Gain more knowledge in the relevant subject.
- Improved Preparation skills.
- Understand latest technologies.

It is aimed as a precursor to the project work done in the second semester of the final year B.Tech. It should help the students to identify their research area / topic and should form the groundwork and preliminary research required for the project work.

The batches formed for pursuing the Project Work in the Final Year shall select some research article published in the latest journals of IEEE, ACM and other referred journals. The batch must gain an understanding of the research tools used and the related material, available both in printed and digital formats. Each individual of the project batch must make the presentation for two rounds on the same research article about their understanding, conclusion and if possible propose the extensions for the work.

At the end of the Semester, the batch must submit a report in IEEE format, on the work they have pursued throughout the Semester containing

The aim and objective of the study.
The Rationale behind the study.
The work already done in the field and identified.
Hypothesis, experimentation and discussion.
Conclusion and further work possible.
Appendices consisting of Illustrations, Tables, Graphs etc.,

Evaluation is to be done for the two presentations made and the report submitted.

IV/IV Year B.Tech. - Seventh Semester

CS/IT452 DATA ENGINEERING LAB
(USING ORACLE 9i, INFOSPHERE, AND WEKA Tools)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- Gain an understanding of basic data warehousing applications and techniques, and how data warehousing enables business intelligence capabilities that are used across many industries.
- Learn how to combine and consolidate data from the various databases scattered throughout a company into a data warehouse.
- Learn how data inside a data warehouse is organized into a "data cube".
- Explore how to use the "data cube" to do business analytics and reporting.
- Acquire hands-on experience with key components of an integrated data warehousing and business intelligence system using a leading industry commercial application package.
- Understand the integral relationship between data mining and data warehousing.

Course Outcomes:

- Understand the data warehousing and Online Analytical Processing
- Learn about key requirements for business analytics solutions
- Use software packages (e.g., Oracle 9i/Oracle 10g) to achieve practical exercises and projects in BI
- Develop and configure working solutions
- Work in a group in order to implement to apply a B.I. practice
- Learn the application of mining techniques on information repositories.

I. Analyzing data with ROLLUP and CUBE operators.
II. Cube slicing – come up with 2-D view of data.
III. Drill-down going from summary to more detailed data.
IV. Roll up – summarize data along a dimension hierarchy.
V. Dicing – projecting 2-D view of data.
VI. Creating Star Schema/snowflake Schema.
VII. Create and populate FACT table.
VIII. Building dimensions.
IX. C programs for Data Pre-processing.
X. Creating input files (ARFF, CSV etc.) and applying various classification and clustering techniques.
XI. Using a Regression model for predicting the value of a numeric attribute.
XII. Identifying frequent patterns and forming strong association rules.

TEXT BOOK:

1. Oracle 10G & 9i Oracle Press Manual.

CS/IT 453(A) .NET TECHNOLOGIES LAB
(ELECTIVE-III Lab)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To learn the the OOPS concepts in C#
- To learn exceptional handling C#
- To learn the concepts of events and deligates in C#
- To learn the multithreaded programming in C#
- To write a Windows Forms application
- To create a Web Service with ASP.NET
- To create data base driven windows & web applications

Course Outcomes:

- Knowledge to use OOPS concepts in C#
- Knowledge to use exception handling in C#
- Able to use events & deligates in C#
- Knowledge to use multithreaded programming in C# applications
- Knowledge to create data-driven applications.
- Knowledge to create a Web Service with ASP.NET.
- Knowledge to use windows forms control

1. Write a program to demonstrate OOPs concepts in C#.
2. Write a program to demonstrate Exception handling in C#.
3. Write a program to illustrate the concepts of events & delegates in C#.
4. Write a program to demonstrate multi-threaded programming in C#.
5. Write a program to demonstrate generics.
6. Write a program to demonstrate StreamWriters and StreamReaders.
7. Write a program to demonstrate Building and consuming a multi file assembly.
8. Write a program to demonstrate DML and DDL Commands using ADO.NET.
9. Write a program to build a data driven ASP.NET Web application.
10. Write a program to demonstrate ASP.NET controls.
11. Write a program to demonstrate Windows Forms Controls.
12. Write a program to demonstrate the building of a simple Windows Forms Application.

CS/IT 453(B) OPEN SOURCE SYSTEMS LAB
(ELECTIVE-III Lab)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- Learn to configure Apache, PHP, MySQL
- Learn to use Regular Expressions to validate user input
- Learn the PHP language and its core features, such as object-oriented programming.
- Learn to use PHP for developing web applications.
- Learn to access web form data at the server
- Learn how to create database driven web applications.
- Learn to use Ajax for partial rendering.
- Learn to use XML and RSS with PHP.

Course outcomes:

- Basic foundation that is needed to develop web applications using Apache, PHP, and MySQL.
- Familiarity with the OOP concepts.
- Capability to use PHP in Dynamic Web Applications.
- Capability to create database driven web applications.
- Concepts for creating powerful web applications using Ajax.
- Knowledge to create images at the web server.
- Skills to manipulate XML documents using PHP.
- Knowledge to create RSS.

1. Demonstrate the configuration of Apache, MySQL and PHP.
2. Write PHP Script to demonstrate String processing and regular Expressions in PHP.
3. Program to demonstrate Object Oriented features of PHP.
4. Write Script that takes user input data and validates it and write the data into the database.
5. Program to demonstrate DML commands in MySQL.
6. Program to demonstrate exception handling in PHP.
7. Program to demonstrate Passing of Information between Web pages.
8. Program to demonstrate the use of Cookies.
9. Program to demonstrate user management and authentication.
10. Program to demonstrate file Uploading.
11. Program to demonstrate source code control and Testing.

CS/IT 453(C) MOBILE COMPUTING LAB
(ELECTIVE-III Lab)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To learn the communication foundations of the wireless networks.
- To become familiar with wireless network components.
- To provide insights into the technological challenges of high-speed and QoS-aware wireless MAC protocols.
- To know the predominant MANET routing protocols such as AODV,DSR,DV.
- To learn the high-speed wireless data network standards such as Wi-Fi.

Course Outcomes:

- An ability to creatively analyze mobile and wireless networks
- An ability to select components and networks for particular application
- An ability to apply advanced data communicating methods and networking protocols for wireless and mobile environments.
- An ability to apply suitable routing protocols for given application.
- An ability to calculate interference between devices with multiple standards.
- An ability to utilize and employ application frameworks for developing mobile applications.

Experiments to be performed using hardware devices if the setup is available or the networksimulation software.

1. Study of wireless channel characteristics.
2. Overlapping wireless networks for enhanced throughput.
3. Demonstration of interference between devices with multiple standards operating in the same area.
4. Assessment of MACAW protocol.
5. Impact of node mobility on data transfers.
6. Demonstration of Dynamic Source Routing (DSR) protocol.
7. Demonstration of Ad-hoc On-demand Distance Vector (AODV) routing protocol.
8. Comparison of AODV vs DV protocols on a MANET.
9. Performance of traditional TCP over wireless network.
10. Performance of snoop TCP over wireless network.
11. Performance of Indirect TCP over wireless network.
12. Demonstration of energy saving protocol stack for wireless mobile environments.

CS/IT-453(D) SOFTWARE TESTING METHODOLOGIES LAB
(ELECTIVE-III Lab)

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- Illustrate the importance, objectives, principles, and limitations of software testing.
- Discusses the need for test case design, two broad approaches for it, and the commonly used white-box and black-box techniques for designing test cases.
- Evaluates the aspects involved in planning for software testing and in selecting the test strategy for a software project.
- The testing process, driven either by legal or financial requirements, can be expensive and may thwart the planned deployment of the application.

Course Outcomes:

- Appreciate the fundamentals of software testing and its application through the software life cycle.
- Understand and appreciate the role of software testing in systems development, deployment and maintenance.
- Uncover as many as errors (or bugs) possible in a given timeline.
- Demonstrate a given software product matching its requirement specifications.
- Validate the quality of software testing using the minimum cost and efforts.
- Understand software metrics and how they relate to testing Know how to write and understand test plans and test procedures.
- Be able to write a test plan based on the requirements document.

Functional Test Automation with QTP 10.0

Create and run the following tests using any GUI application:

1. Record and Playback
2. Working with test objects and object repositories
3. Object Identification
4. Synchronization
5. Transactions
6. Checkpoints
7. Output Values
8. Working with actions
9. Virtual Objects
10. Parameterization
11. Data Driven Test
12. Working with data tables

13. Regular Expressions
14. Debugging
15. Recovery scenarios
16. Descriptive programming
17. WorkingwithWebApplicationobjects
18. Working with File Systems
19. Working with Database
20. Working with Utility object

TEXT BOOKS:

1. Siva Koti Reddy, Shalini Reddy “QTP for Professionals”, SPD The X TEAM.
2. Tarun Lalwani, “QuickTest Professional Unplugged”, SPD.

IV/IV Year B.Tech. - Eighth Semester

CS/IT 421 INDUSTRIAL ENGINEERING & MANAGEMENT

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- Provides the students with a foundation of knowledge in management of today's organizations.
- Gives an idea about which form of business organization is suitable for today's business environment and their impact towards society.
- Alerts the students to understand the time value of money for evaluation of several project alternatives.
- Guides the students for accounting the depreciation and providing the funds for replacement of necessary and depreciated machinery and equipment.
- Sensitize the students to the changing environment and its implication for managing the human resources to achieve the corporate excellence in a changing environment.
- Provides knowledge to the students for avoiding any delays in production processes due to non availability of material by effectively managing the function of management.
- Provides a business organization which produces a very good quality products but it must satisfy the needs, wants and desires of the consumer.

Course Outcomes:

- To become aware of the inference of organization structure and performance of people working in organizations
- To develop themselves as individual entrepreneurs forthe society.
- To get awareness about the optimum organization of funds and its mobilization.
- To linkage corporate vision, mission, strategies, and policies to human resource management to acquire competitive advantage.
- To use right sort of material for delivering the right product.
- To understand the customer perception, making him to buy the products and retaining the customer in a business.

UNIT-I (15 periods)

General Management: Principles of Scientific Management; Brief Treatment of Managerial Functions.

FORMS OF BUSINESS ORGANISATION: Salient features of sole proprietorship, Partnership, Joint Stock Company – Private limited and public limited companies.

UNIT-II **(17 periods)**

Financial Management: Concept of interest, Compound interest, Equivalent cash flow diagram.
ECONOMIC EVALUATION OF ALTERNATIVES: The annual equivalent method, Present value method, Future value method.
DEPRECIATION: purpose, Types of Depreciation; Common methods of Depreciation; The Straight Line Method, Declining balance Method, the Sum of the Years Digits Method.

UNIT-III **(15 periods)**

Personnel Management: Functions of personal Management: Human Resources Planning, Recruitment, Selection, Placement, Induction Training and Development, Career Development and Performance Appraisal.
Job Analysis: Job Description and Job specification. Motivational Theories, Leadership Styles & Stress Management.

UNIT-IV **(18 periods)**

Material Management: Introduction
Purchasing: objectives, Source of selection, vendor rating, procurement methods.
Inventory Management: Objectives, Economic Order Quantity, Economic Production Quantity and ABC Analysis.
Marketing Management: Functions of Marketing, Product Life Cycle, Channels of Distribution, Advertising & Sales Promotion, Market Research.

TEXT BOOKS:

1. K.K.Ahuja, 'Industrial Management' Vol. I & II,
2. E.Paul Degarmo, John R.Chanda, William G.Sullivan, 'Engineering Economy'.

REFERENCE BOOKS:

1. Philip Kotler, 'Principles of Marketing Management' PHI
2. Gopalkrishna, 'Materials Management' PHI
3. Harold Koontz &Heinz Weirich, 'Management' TMH

IV/IV Year B.Tech. - Eighth Semester

CS 422 CLOUD COMPUTING

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: --	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To understand basic knowledge required to run applications on latest platforms like Google, Microsoft, Amazon and Salesforce.
- To understand and use of Cloud computing technologies and Cloud Storage Systems.
- To develop skills required to make use of Cloud Computing at Work.
- To develop the skills and collaborative tools required in cloud computing and other development and manufacturing departments.

Course Outcomes:

- Able To understand and use platforms like Google, Microsoft, Amazon and Salesforce.
- Able to apply techniques of using Cloud computing technologies and Cloud Storage Systems.
- Can develop skills required to make use of Cloud Computing at Work.
- Can apply collaborative technology at workplace.

UNIT-I (16 periods)

Cloud Computing Basics: Overview, Applications, Intranet and the Cloud, First Movers in the Cloud.

Your Organization and Cloud Computing: When you can use Cloud Computing, Benefits, Limitations and Security Concerns.

Cloud Computing With the Titans: Google, EMC, NetApp, **Microsoft**, **Amazon**, **Salesforce**.com, IBM.

The Business Case for going to Cloud: Cloud Computing Services, How those applications help your business?

UNIT-II (16 periods)

Hardware and Infrastructure: Clients, Security, Network & Services.

Accessing the Cloud: Platforms, **Web applications** (framework), **Web API's**, Web Browsers.

Cloud Storage: Overview, Storage Providers, **Standards**

UNIT-III (17 periods)

Software as a Service: Overview, Driving Forces, Company offerings, Industries.

Software plus Services: Overview, Mobile Device Integration, Providers.

Developing Applications: Google, Microsoft.

Local Clouds and Thin Clients: Virtualization, Server Solutions, Thin Clients.

Migrating to the Cloud: Cloud Services for the individuals, Cloud Services for the mid market, Enterprise class Cloud Offerings.

UNIT-IV **(16 periods)**

Cloud Computing for Every One: Cloud computing for the Corporation.

Using Cloud Services: Collaboration on Project Management, Collaboration on Word Processing, Storing and Sharing Files and Other Online Content.

Out Side the Cloud: Other ways to Collaborate Online : Collaborating via Web-Based Communication Tools, Collaborating via Social Networks and Group ware,
Collaborating via Blogs and Wikis.

TEXT BOOKS:

1. Cloud Computing – "A Practical Approach" by Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, McGrah Hill Publications, 2010.(UNITI, II & III)
2. Cloud Computing - Web-based Applications that change the way you work and collaborate online, by Michael Miller, QUE.(UNITIV)

REFERENCE BOOKS:

1. **Cloud Application Architectures** by George Reese,Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA,2009.
2. **Cloud Computing and SOA Convergence in Your Enterprise -** *A Step-by-Step Guide,* David S. Linthicum, Addision Wesley Information Technology Series, 2010.

IV/IV Year B.Tech. - Eighth Semester

CS/IT 423 **J2EE WEB SERVICES**

Lectures	: 4 periods/week	Internal Marks	: 40
Tutorials	: 1 period/week	Semester End Exam Marks	: 60
Sem End Exam Duration	: 3 hours	Credits	: **4**

Course Objectives:

- To know multi-Tier Architecture and its key features
- To learn and design the use of best practices used in the development of enterprise applications
- To write web applications using Java Servlets and Java Server Pages
- To use Enterprise Java Beans in the development of enterprise applications
- Understand the use of Java Interface Definition Language and CORBA to establish Communication between remote objects.
- To develop web service applications using UDDI, EBXML, JAXR, and WSDL.

Course Outcomes:

- An ability to develop multi-tier applications
- An ability to develop distributed applications using J2EE.
- Can write web applications using Java Servlets and Java Server Pages
- An ability to parse XML documents using DOM and SAX parsers.
- An ability to develop server side applications.
- An ability to develop electronic mail applications.
- An ability to develop Message oriented applications.
- An ability to develop Remote System applications.
- An ability to write XML documents for various web services.

UNIT-I **(16 periods)**

Multi-Tier Architecture
Java Server Pages
JSP Scripting Elements and Directives
JSP implicit OBjects
Using Java Beans
Using JSP Tag Extensions

UNIT-II **(15 periods)**

Java and XML: Generating an XML document, passing XML, DOM Parser and SAX Reviser.
Enterprise JavaBeans: Entity Beans, Session Beans, Message Driven Beans.

UNIT-III **(18 periods)**

Java Mail API
Java Interface Definition Language and CORBA
Java Remote Method Invocation

UNIT-IV **(15 periods)**

Web Services
SOAP
Universal Description, Discovery
Web Services Description Language (WSDL)

TEXT BOOKS:

1. James McGovern & Rahim Aditya "J2EE 1.4 Bible" Wiley publications.
2. Jim Keogh "The complete Reference J2EE" Tata McGraw Hill.

REFERENCE BOOKS:

1. Subrahmanyam Allamraju et.al "Professional Java Server Programming" SPD/a! Press.
2. Stephanie Bodoff, Eric Armstrong, Jennifer Ball, Debbie Bode Carson, Lan Evans, Dale Green, Kim Haase, Eric Jendrock, "The J2EE Tutorial" Pearson Education.
3. Dreamtech Softwre Team "Java Server Programming" Dreamtech Press.
4. James McGovern, et.al "J2EE Bible".
5. B.V.Kumar, S.Sangeetha, S.V.Subrahmanya "J2EE Architecture" Tata McGraw Hill.

WEB REFERENCES:

1. http://www.roseindia.net/ejb/introduction/j2eeintroduction.shtml
2. http://www.oracle.com/technetwork/java/javaee/tech/index.html
3. http://www.oracle.com/technetwork/articles/javaee/j2ee-ws-140408.html
4. http://www.theserverside.com/news/1365614/Part-4-Web-Services-and-J2EE

IV/IV Year B.Tech. - Eighth Semester

INDUSTRY RELATED PAPER

CS/IT 424(A)	**BIG DATA ANALYTICS**	**ELECTIVE IV**

Lectures	:	4 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**4**

Course Objectives:

1. Understand the Big Data Platform and its Use cases
2. Provide an overview of Apache Hadoop
3. Provide HDFS Concepts and Interfacing with HDFS
4. Understand Map Reduce Jobs
5. Provide hands on Hodoop Eco System.

Course Outcomes:

CO 1. To Know Applications And Characteristics of Big Data
CO 2. To Understand Various Components of Hadoop Eco System
CO 3. To Understand components and working of Map Reduce.
CO 4. To Know HDFS and No SQL Databases In Big data
CO 5: To Acquire knowledge on tools Analysis, Visualization of Big Data

UNIT – I **(10 Periods)**

Overview of Big Data: What is Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics

Understanding Big Data Technology Foundations: Exploring the Big Data Stack, Virtualization and Big Data, Virtualization approaches

Exploring the use of Big Data in Business Context: Use of Big Data in social Networking, use of Big Data in preventing Fraudulent Activities, use of Big Data in detecting Fraudulent Activities Insurance sector, use of Big Data in Retail Industry.

UNIT-II **(14 Periods)**

Introducing Technologies for Handling Big Data: Distributed and Parallel Computing for Big Data, Introducing Hadoop, In-Memory Computing Technology for Big Data

Understanding hadoop Ecosystem: Hadoop Ecosystem, Hadoop Distributed File System, MapReduce, Hadoop YARN, HBase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie

Understanding MapReduce Fundamentals and HBase: MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce, Characteristics of HBase.

UNIT-III **(14 Hours)**

Storing Data in Databases and Data Warehouses: RDMS andBig Data, Non-Relational Database, Polyglot Persistence, Integrating Big Data with traditional Data Warehouses, Big Data Analysis and Data Warehouses, Changing deployment in Big Data Era.

Storing Data in Hadoop: Introducing HDFS, Introducing HBase, Combining HBase and HDFS, Selecting the suitable Hadoop Data organization for Applications

NoSQL Data Management: Introduction to NoSQL, Aggregate Data Models, Key Value Data Models, Document Databases, Relationships, Graph Databases, Schema-Less Databases, Materialized Views, Distribution Models, Sharding, Map Reduce Partioning and Combining, Composing Map Reduce Calculations .

UNIT-IV **(12 Periods)**

Understanding Analytics and Big Data: Comparing Reporting and Analysis, The Analytic Process, Types of Analytics

Analytical Approaches and Tools to Analyze Data: Analytical Approaches, History of Analytical Tools, Introducing Popular Analytical Tools, Comparing various Analytical Tools

Data Visualization: Introducing Data Visualization, Techniques used for Visual Data Representation, Application of Data Visualization**,** Visualizing Big Data, Tools used in Data Visualization

Social Media Analytics and Text Mining: Introducing Social Media, Introducing Key Elements of Social Media, Introducing Text Mining, Understanding Text Mining Process, Sentiment Analysis.

Text Book:

1. BIG DATA Black Book , Dreamtech Press, 2015 Edition.

Reference Books:

1. Hadoop: The Definitive Guide, Tom White, 3rd Edition (2012), O'Reilly(SPD).
2. Hadoop Essentials: A Quantitative Approach, Henry H. Liu, 1st Edition (2012), PerfMath Publishers.
3. Bill Franks, Taming The Big Data Tidal Wave, 1st Edition, Wiley, 2012.
4. Frank J. Ohlhorst, Big Data Analytics,1st Edition, Wiley, 2012.

IV/IV Year B.Tech. - Eighth Semester

INDUSTRY RELATED PAPER

CS/IT 424(B) INFORMATION STORAGE AND MANAGEMENTELECTIVE IV

Lectures	:	4 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**4**

Course Objectives:

- To bridge the gap between industry and the academic institute.

Course Outcomes:

- Will have exposure to industrial atmosphere.
- Will prepare engineering students for jobs in multinational companies, by exposing them to newer technologies and engineering methodologies.

UNIT-I (**10 Periods**)

Introduction to storage Technology: Data creation and the value of data to a business, information lifecycle, challenges in data storage and data management, solutions available for data storage, core elements of a data center infrastructure, role of each element in supporting business activities.

UNIT-II (**15 Periods**)

Storage Systems Architecture: Hardware and software components of the host environment, key protocols and concepts used by each component, physical and logical components of a connectivity environment, major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance implications, concept of RAID and its components, different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5,RAID 0+1, RAID 1+0, RAID 6, integrated and modular storage systems, high-level architecture and working of an intelligent storage system.

UNIT – III (**15 Periods**)

Information availability, monitoring & managing data center: Reasons for planned/unplanned outages and the impact of downtime, impact of downtime. Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, identification of single points of failure in a storage infrastructure and solutions to mitigate these failures, architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and

business continuity, remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Key areas to monitor in a data center, industry standards for data center monitoring and management, key metrics to monitor storage infrastructure.

UNIT – IV (**10 Periods**)

Securing storage and storage virtualization: Information security, critical security attributes for information systems, storage security domains, analyze the common threats in each domain. Storage Virtualization: Forms, configurations and challenges. Types of storage virtualization: Block-level and File-level.

Text Book:

1. G.Somasundaram, Alok Shrivastava, EMC Education Series, "Information Storage and Management", Wiley, publishing Inc., 2011.

Reference Books:

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata Mc Graw Hill, Osborne, 2003.
2. Marc Farley, "building Storage Networks", TataMcGraw Hill, Osborne, 2001.
3. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

IV/IV Year B.Tech. - Eighth Semester

INDUSTRY RELATED PAPER

CS424(C) PROGRAMMING and PROBLEM SOLVING WITH PYTHONELECTIVE IV

Lectures	:	4 periods/week	Sessional Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem. End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives:

At the end of the course the students will understand

- Data types and control structures
- Procedural programming features of python
- file handling power of python
- object oriented programming in python

Course Outcomes

At the end of the course the students will be able to

- manipulate various types of data in python
- apply procedure oriented features of python
- develop applications for manipulating files
- apply Object oriented programming features of python

(15 Periods)

UNIT – I

Data and Expressions- Literals, Variables and Identifiers, Operators, Expressions and Data Types.

Control Structures - What Is a Control Structure? Boolean Expressions (Conditions), Selection Control, Iterative Control.

(15 Periods)

UNIT – II

Lists- List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python, More on Python Lists.

Functions- Program Routines, More on Functions.

Objects and Their Use - Software Objects, Turtle Graphics,

(15 Periods)

UNIT – III

Modular Design – Modules, Top-Down Design, Python Modules.

Text Files - What Is a Text File? Using Text Files, String Processing, Exception Handling.

Dictionaries and Sets - Dictionary Type in Python, Set Data Type.

UNIT – IV **(15 Periods)**

Object-Oriented Programming - What Is Object-Oriented Programming? Encapsulation, Inheritance, Polymorphism

Recursion - Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion.

Learning Resources:

Text Book:

1. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus by Charles Dierbach, Wiley.

Reference Books:

- Beginning python from novice to professional by Magnus Lie Hedland, 2nd Edition, Apress
- Learning Python by Mark Lutz, 5th Edition, O'reilly
- Programming Python by Mark Lutz, 4th Edition, O'reilly

IV/IV Year B.Tech. - Eighth Semester

INDUSTRY RELATED PAPER

CS424 (D) BIG DATA ESSENTIALSELECTIVE IV

Lectures	:	4 periods/week	Sessional Marks	:	40
Tutorials	:	1 period/week	Semester End Exam Marks	:	60
Sem. End Exam Duration	:	3 hours	Credits	:	**3**

Course Objectives:

- To provide an overview of Characteristics and features of Big Data.
- To explore the types and formats of Map-Reduce for processing Big Data.
- To familiarize architectures of Hadoop 1.0 and 2.0.
- To explore usage of components Sqoop, Hive, Pig.

Course Outcomes:

- Identify the fundamentals of Big Data.
- Analyse distributed storage and distributed computation capabilities of Hadoop distributed file system.
- Ability to process Big Data using Map Reduce jobs.
- Recognize the usage of components Hive, Hbase, Sqoop and Pig for data processing in HDFS.

UNIT-I

Understanding Big Data: What is Big data- Data!, Data Storage Analysis, comparison with other systems, Rational Database Management system, Grid Computing , Volunteer Computing, Brief history of Hadoop, Hadoop Ecosystem. **(Chapter-1)**

The Hadoop Distributed Filesytem: The design of HDFS , HDFS concepts, The command-Line interface, Hadoop File sytems, The Java Interface, Data Flow, Parallel Copying with distcp. **(Chapter-3)**

UNIT-II

MapReduce: A whether Dataset, Analyzing the Data with UNIX Tools, Analyzing the data with Hadoop, scaling out. **(Chapter-2)**

Developing a MapReduce Application: The configuration API, Setting up the Development environment, Writing a Unit Test with MRUnit, Running locally on test data, The MapReduce Web UI. **(Chapter-5)**

UNIT-III

How MapReduce Works: Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and sort. **(Chapter-6)**

MapReduce Types and Formats: MapReduce Types. Input Formats, Output Format. **(Chapter-6)**

MapReduce Features: Counters, Sorting, Joins **(Chapter-8)**

Pig: Installing and Running Pig, Pig latin, User-Defined functions, Data processing operators **(Chapter-11)**

UNIT-IV

Sqoop: Getting Sqoop, Sqoo Connectors, A sample Import, Generating Code, Imports: A Deep Look, Working with Imported Data, Importing Large Objects , Performing an Export, Exports: A Deeper Look. **(Chapter-15)**

Hive: Installing Hive, running Hive, tables, Querying Data **(Chapter-12)**

HBase: Basics, HBase Vs RDBMS **(Chapter-13)**

TextBook:

1. Hadoop: The Definite Guide" by Tom White, 3rd Edition, O'Reilly 2012.

IV/IV Year B.Tech. - Eighth Semester

CS/IT-461 **J2EE WEBSERVICES LAB**

Practical	:	3 periods/week	Internal Marks	:	40
Tutorials	:	--	Semester End Exam Marks	:	60
Sem End Exam Duration	:	3 hours	Credits	:	**2**

Course Objectives:

- To learn and design the use of best practices used in the development of enterprise applications
- To learn how to process XML documents using Java
- To write web applications using Java Servlets and Java Server Pages
- To use Enterprise Java Beans in the development of enterprise applications
- To create mail applications using Java Mail API
- Understand the use of Java Interface Definition Language and CORBA to establish Communication between remote objects
- To develop web service applications using UDDI, EBXML, JAXR, and WSDL.

Course Outcomes:

- An ability to develop multi-tier applications
- An ability to develop Distributed applications using J2EE.
- An ability to parse XML documents using DOM and SAX parsers.
- An ability to develop server side applications.
- An ability to develop electronic mail applications.
- An ability to develop Message oriented applications.
- An ability to develop Distributed Remote method Invocation (RMI).
- An ability to write valid/well – formed XML documents for various web services

1. Write a program to Integrate JSP & Servlets
2. Write an application using JSP Technology.
3. Write a program to demonstrate Java Bean using JSP Implicit objects.
4. Write a program to demonstrate cookie & Sessions using JSP.
5. Write a program to demonstrate Stateful/Stateless Session Bean.
6. Write a program to demonstrate XML SAX Parser.
7. Write a program to demonstrate XML DOM Parser.
8. Write a program to demonstrate Java Mail.
9. Write a program to demonstrate Remote Method Invocation.
10. Write a program to demonstrate CORBA using Java IDL
11. Develop an application for Client Request / Responses using SOAP.
12. Demonstrate how to describe web services

IV/IV Year B.Tech. - Eighth Semester

CS/IT 462 **PROJECT WORK**

Practical	:	9 periods/week	Internal Marks	:	80
Tutorials	:	--	Semester End Exam Marks	:	120
Sem End Exam Duration	:	3 hours	Credits	:	**10**

Course Objectives:

- To bring up the opportunity to the students to understand the importance of grooming up of their Personality (in Communication and Soft Skills) towards the Industrial Standards.
- To bring out the efficiency in his/her set of courses and play a vital role in the HR interviews and Technical Interviews.
- To help students learn to work on live customer projects.
- To help the students test their theoretical and practical skills on various subjects by working on real-time projects.
- Helps the students to know how the software Engineering concepts helped in their project completion.
- To have awareness about the technology updates to beat the present hectic competition.

Course Outcomes:

- Ability to apply Software Engineering concepts and tools to develop a project.
- Develop his personal skills as per the industrial norms.
- Develop the customer or client interaction, negotiation and presentation skills.
- Understands the importance and implement the coding standards.
- Would rise on his knowledge on Estimation, cost effectiveness tools in order to complete the project.
- Would rise on his knowledge on testing methodology and its tools like test cases and test plan.
- Learn how to meet the dead lines in hectic situations.
- Also will be in a position to gain the knowledge on change management

The Project work shall be carried out by a batch consisting not more than four students for one semester. It should help the students to comprehend and apply different theories and technologies that they have learnt through and are learning. It should lead to a substantial result as a comparative study, a new application of the technologies available or some extension to the works carried out by some researcher and published in referred journals. Each batch must carry out the analysis, design, implementation and testing of the entire project basing on the Software Engineering principles. There shall be a total of four reviews made by the batch regarding:

1.	0^{th} review	:	The idea/concept which forms the basis for their project shall be presented to the guide and concerned in-charge and shall get the approval for continuation.
2.	1st review	:	The analysis and design carried out.
3.	2nd review	:	The implementation and the testing done.
4.	3rd review	:	Over all presentation of the work carried out and the results found out for the valuation under the internal assessment.

A comprehensive report on the lines of IEEE Format is to be submitted at the end of the semester, which is certified by the concerned guide and the HOD.

There shall be an external guide to make an assessment and to carryout the Viva-Voce examination.