



**ACHARYA NAGARJUNA UNIVERSITY**

4-year B.Tech. Degree Course  
(Semester System)

**COMPUTER SCIENCE &  
ENGINEERING**

**SYLLABUS**

**W.E.F. 2011 – 2012**  
(from the batch admitted in the year 2011)

**FOUR - YEAR B.TECH. DEGREE COURSE**  
**(CREDIT BASED SYSTEM)**

**(Effective for the batch of students admitted into first year B.Tech. from the academic year 2011-2012).**

**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 at one or more of the affiliated colleges:

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

**2.2** The first year of study is common to all branches of Engineering except for Chemical Engineering and Biotechnology.

- 2.3** 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 where as annual pattern is followed for first 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 B.Tech. is three academic years consisting of two semesters in each academic year. The medium of instruction and examination is English.

**4.0. MINIMUM INSTRUCTION DAYS:**

The first year shall consist of a minimum number of 180 instruction days and each semester of 2nd, 3rd and 4th years shall consist 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 year/ semester shall be evaluated subject wise

- 5.1.** The distribution of marks between sessional work (based on internal assessment) and University Examination will be as follows:

Nature of the subject	Sessional Marks	University Exam. Marks
Theory subjects	30	70
Design and / or Drawing	30	70
Practicals	30	70
MiniProject/Seminar	100	--
Project work	50	150 (Viva voce)

- 5.2.** In the First Year, there shall be three Mid Term Examinations and three Assignment Tests in theory subjects, conducted at approximate equal intervals in the academic year. Assignment questions shall be given at least one week in advance and the students shall answer the question(s) specified by the concerned teacher just before the commencement of the Assignment Test. A maximum of 18 Sessional marks (75% approx) shall be awarded based on the best two performances out of the three Mid Term Exams and a maximum of 7 (25% approx) marks for the best two Assignment Tests out of the three Assignment Tests conducted.

For Drawing subject (Engineering Graphics), 7 marks shall be awarded based on day-to-day class work and the remaining 18 marks based on the best two

performances in the three Mid Term Exams. No separate Assignment Tests will be held for this subject.

The remaining 5 marks out of the 30 marks earmarked for the internal sessional marks are allotted for attendance in the respective theory and drawing subjects in a graded manner as indicated in **clause 7.2** from I year to IV year.

In each of the Semesters of 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> years, 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 14 marks out of 18 marks (75% approx) to that midterm examination in which the student scores more marks and the remaining 4 marks (25% approx.) for other midterm examination in which the student scores less marks. Similarly a weightage of 5 marks (75% approx) out of 7 marks earmarked for assignment tests shall be given for the assignment in which the student scores more marks and remaining 2 marks (25% approx) shall be given for the assignment test in which the student scores less marks.

For Drawing subjects, there shall be only two Mid Term examinations in each semester with no Assignment Tests. In case of such subjects a maximum of seven marks shall be given for day-to-day class work and the remaining maximum 18 marks shall be awarded to the Mid Term examinations taking into account the performance of both the Mid Term examinations giving weightage of 14 marks for the Mid Term Examination in which the student scores more marks and the remaining 4 marks for the other midterm examination. A weightage of 5 marks will be given in the total sessional marks of 30 for attendance in all theory and drawing subjects as indicated in **clause 7.2**.

- 5.3.** The evaluation for Laboratory class work consists of weightage of **20** marks for day to day laboratory work including record work and 10 marks for internal laboratory examination including Viva-voce examination.

In the case of Project work, the sessional marks shall be awarded based on the weekly progress and based on the performance in a minimum of two Seminars and the Project Report submitted at the end of the semester. The allotment of sessional marks for Seminars and for day-to-day class work shall be **20 and 30**.

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 year-end / semester-end University examination and shall have to repeat that year/ semester.

**6.0. LABORATORY / PRACTICAL CLASSES:**

In any year/semester, a minimum of 90 percent experiments / exercises specified in the syllabi for laboratory course shall be conducted by the students, who shall complete these in all respects and get the Record certified by the concerned Head of the Department for the student to be eligible to face the University 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 upto a maximum of 5 marks out of 30 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%	- 3 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 and 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 year / semester, is not eligible to appear for the year end or semester end examinations and shall have to repeat that year/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 year / semester as the case may be subsequently and satisfy the above requirements afresh to become eligible to appear for the year-end / semester-end University examination.

## **9.0. UNIVERSITY EXAMINATION:**

**9.1.** For each theory, design and/or drawing subject, there shall be a comprehensive University Examination of three hours duration at the end of First year / each Semester of 2nd, 3rd and 4th years, except where 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 University examination shall be conducted by one internal and one external examiner appointed by the Principal of the concerned college and the University respectively, 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 to be appointed by the University.

## 10.0 AWARD OF CREDITS

Credits are awarded for each Theory/Practical Subjects. Each theory subject is awarded 4 credits and each practical subject is awarded 2 credits. Project work is awarded 10 credits. However for some important theory subjects more than 4 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.

## 10.1 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

- 10.2 A Student securing 'F' grade in any subject there by securing 0 grade points has to reappear and secure at least 'E' grade at the subsequent examinations in that subject.
- 10.3 After 1st year/each semester, Grade sheet will be issued which will contain the following details:
- The list of subjects for the 1st year/each semester and corresponding credits and Grades obtained
  - The Grade Point Average(GPA) for the 1st year/ each semester and
  - The Cumulative Grade Point Average(CGPA) of all subjects put together up to that semester from first year onwards

GPA is calculated based on the following formula:

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

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

## 11.0 CONDITIONS FOR PROMOTION

- 11.1. A student shall be eligible for promotion to II 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 B.Tech.
- 11.2. A student shall be eligible for promotion to III B.Tech. Course if he / she **secures a minimum of 70% of the total number of credits from one regular and one supplementary examinations of I B.Tech.**, (including practical subject) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in II/IV B.Tech.
- 11.3. A student shall be eligible for promotion to IV B.Tech. course if he/she **secures a minimum of 70% of the total number of credits from two regular & two supplementary examinations of I B.Tech. and two regular & one supplementary examinations of II B.Tech. 1<sup>st</sup> semester and one regular & one supplementary examinations of II B.Tech. 2<sup>nd</sup> semester** (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III B.Tech.
- 11.4. **A student (Diploma Holder) admitted under lateral entry into II B.Tech. shall be eligible for promotion to 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 B.Tech. 1<sup>st</sup> semester and one regular & one supplementary examinations of II B.Tech. 2<sup>nd</sup> semester (including practical subjects) in addition to satisfying the minimum requirements of attendance and sessional marks stipulated in *Clauses 5 and 7* in III B.Tech.**

## 12.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE

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

- 12.1 The candidate must have satisfied the conditions for pass in all the subjects of all the years as stipulated in *clause 10*.
- 12.2. **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.**
- 12.3 **A student (Diploma Holder) admitted under lateral entry into II 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.**

### 13.0 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
4	Pass Class	4.5 or more but less than 5.0

### 14.0. IMPROVEMENT OF CLASS

- 14.1. A candidate, after becoming eligible for the award of the Degree, may reappear for the University 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.

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

- 14.2. A single **Grade sheet** shall be issued to the candidate after incorporating the **Credits and Grades** secured in subsequent improvements.
- 14.3. 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.

### 15. AWARD OF RANK

The rank shall be awarded based on the following:

- 15.1. Ranks shall be awarded in each branch of study for the top ten percent of the students appearing for the Regular University Examinations or the top ten students whichever is lower.
- 15.2. Only such candidates who pass the Final year examination at the end of the fourth academic year after admission as regular final year students along with the others in their batch and become eligible for the award of the Degree shall be eligible for the award of rank. The University Rank will be awarded only to those candidates who complete their degree within four academic years.
- 15.3. 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.
- 15.4. 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.



## 16.0 SUPPLEMENTARY EXAMINATIONS

In addition to the Regular University Examinations held at the end of 1<sup>st</sup> year / each semester, Supplementary University Examinations will be conducted during the academic year. Such of the candidates taking the Regular / Supplementary University examinations as Supplementary candidates may have to take more than one University Examination per day.

## 17.0 TRANSITORY REGULATIONS

- 17.1. Candidates who studied the four-year B.Tech. Degree Course under Revised Regulations (RR)/ **Credit based Regulations(CR)** but who got detained in any year for want of attendance / minimum aggregate sessional marks may join the appropriate year / semester in the Semester system applicable for the batch and be governed by the Regulations of that batch from then on.
- 17.2. University Examinations according to **RR / CR** shall be conducted in subjects of each year five times after the conduct of the last set of regular examinations under those Regulations.
- 17.3. Candidates who have gone through the entire course of four academic years and have satisfied the attendance and minimum aggregate sessional marks **in 1st year/each semester under RR/CR**, but who are yet to pass some subjects even after the five chances stated in *Clause 17.2*, shall appear for the equivalent subjects in the Semester system, specified by the University / Board of Studies concerned.

## 18.0 AMENDMENTS TO REGULATIONS

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

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ACHARYA NAGARJUNA UNIVERSITY  
SCHEME OF INSTRUCTION AND EXAMINATION  
w.e.f. 2011-2012(semester System)  
I/IV B.Tech. (All Branches) ANNUAL PATTERN (for I B.Tech. only)  
(Except Chemical Engg. And Bio-Technology)

Sl. No.	Course Details		Scheme of Instruction		Scheme of Examination			Credits
	Code No.	Subject Name	Periods per week		Maximum Marks		Total Marks	
			Lecture + Tutorial	Drawing / Practical	Sessional	University		
1.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 101	Mathematics-I	3	--	30	70	100	4
2.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 102	Mathematics-II	3	--	30	70	100	4
3.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 103	Engineering Physics	3	--	30	70	100	4
4.	CE/CSE/ECE/EEE/EI/IT/ME – 104	Engineering Chemistry	3	--	30	70	100	4
5.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 105	Professional Communication Skills	3	--	30	70	100	4
6.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 106	C Programming and Numerical Methods	3	--	30	70	100	4
7.	CE/CSE/ECE/EEE/EI/IT/ME – 107	Engineering Mechanics	3+1	--	30	70	100	4
8.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 108	Engineering Graphics*	2+4	--	30	70	100	4
9.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 151	Physics Lab	--	3	30	70	100	2
10.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 152	Chemistry Lab	--	3	30	70	100	2
11.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 153	Workshop Practice	--	3	30	70	100	2
12.	BT/CE/ChE/CSE/ECE/EEE/EI/IT/ME – 154	Fundamentals of H/W & S/W and C-Programming Lab	--	3	30	70	100	2
	TOTAL		23+5	12	360	840	1200	40

\* Two different question papers will be set for the University Examination. One question paper for CE,ME,EEE,Ch.E and BT branches and the University Examination will be conducted in Morning Session. The second question paper will be set for ECE,EI,CSE & IT branches and the University exam will be conducted in Evening Session

ACHARYA NAGARJUNA UNIVERSITY  
SCHEME OF INSTRUCTION AND EXAMINATION  
w.e.f. 2011-2012(semester System)  
**II / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)**  
**(SEMESTER – I)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE/IT 211	Mathematics III	4	-	4
CSE/IT212	Discrete Mathematical Structures	4	-	4
CSE/IT213	Basic Electrical & Electronics Engineering	4+1	-	4
CSE/IT214	Digital Logic Design	4	-	4
CSE/IT215	Operating Systems	4+1	-	4
CSE/IT216	Data Structures using C	4+1	-	4
CSE/IT251	Data Structures Lab	-	3	2
CSE/IT252	BEE Lab	-	3	2
CSE/IT253	Communication Skills	-	3	2
<b>Total</b>		<b>27</b>	<b>9</b>	<b>30</b>

**II / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)**  
**(SEMESTER – II)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE/IT221	Probability & Statistics	4	-	4
CSE/IT222	Environmental Science	4	-	4
CSE/IT223	Computer Organization	4	-	4
CSE/IT224	DBMS	4+1	-	4
CSE/IT225	Object Oriented Programming	4+1	-	4
CSE/IT226	UNIX Programming	4+1	-	4
CSE/IT261	DBMS Lab		3	2
CSE/IT262	EDP Lab		3	2
CSE/IT263	OS Lab (UNIX based)		3	2
<b>Total</b>		<b>27</b>	<b>9</b>	<b>30</b>

**III / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)  
(SEMESTER – I)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE 311	Microprocessors & Microcontrollers	4+1	-	4
CSE/IT312	Computer Networks	4	-	4
CSE/IT313	Automata Theory & Formal Languages	4+1	-	4
CSE/IT314	Advanced Java Programming	4+1	-	4
CSE/IT 315	Design Analysis of Algorithms	4	-	4
CSE/IT316	Software Engineering	4	-	4
CSE/IT351	Advanced Java Programming Lab	-	3	2
CSE352	Microprocessors Lab	-	3	2
CSE/IT353	Computer Networks Lab	-	3	2
<b>Total</b>		<b>27</b>	<b>9</b>	<b>30</b>

**III / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)  
(SEMESTER – II)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE/IT321	Network Security	4	-	4
CSE322	Compiler Design	4+1	-	4
CSE/IT323	OOAD	4	-	4
CSE/IT324	Artificial Intelligence	4	-	4
CSE/IT325	Elective - I	4+1	-	4
CSE/IT326	Computer Vision	4+1	-	4
CSE/IT361	Mini Project	-	3	2
CSE362	Compiler Design Lab	-	3	2
CSE/IT363	Computer Vision Lab	-	3	2
<b>Total</b>		<b>27</b>	<b>9</b>	<b>30</b>

**ELECTIVE-I:**

**CSE 325(A) – Gaming Engineering**

**CSE 325(B) – Embedded & Real Time Systems**

**CSE 325(C) – Multimedia Systems**

**CSE 325(D) – Software Testing Methodologies**

**IV / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)  
(SEMESTER – I)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE/IT 411	Mobile Computing	4+1	-	4
CSE412	Advanced Computer Architecture	4	-	4
CSE/IT413	Distributed Systems	4+1	-	4
CSE414	Web Technologies	4+1	-	4
CSE/IT415	Elective-II(Open)	4	-	4
CSE/IT416	Professional Ethics & human Values	4	-	4
CSE/IT451	Mobile Computing Lab	-	3	2
CSE452	Web Technologies Lab	-	3	2
CSE/IT453	Soft Skills Lab	-	3	2
<b>Total</b>		<b>27</b>	<b>9</b>	<b>30</b>

**IV / IV B.Tech., (COMPUTER SCIENCE & ENGINEERING)  
(SEMESTER – II)**

<b>Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE/IT421	Industrial Engineering & Management	4	-	4
CSE/IT422	Machine Learning	4	-	4
CSE/IT423	Data Engineering	4+1	-	4
CSE/IT424	Elective -II	4+1	-	4
CSE/IT425	Elective - III	4+1	-	4
CSE/IT461	Data Engineering Lab	-	3	2
CSE/IT462	Project	-	3	10
<b>Total</b>		<b>23</b>	<b>6</b>	<b>30</b>

**Elective – II**

- CSE 424(A) Parallel Algorithms**
- CSE424(B) Natural Language Processing**
- CSE424(C) Cyber Crimes & Laws**
- CSE424(D) Multicore Technologies**

**Elective III**

- CSE 425 (A) Bio Informatics**
- CSE 425 (B) Enterprise Programming**
- CSE 425 (C) Cloud Computing**
- CSE 425 (D) Image & Speech Processing**

**Unit-I**

Differential Calculus:

Rolle's Theorem( without proof), Lagrange's Mean value theorem ( without proof), Taylor's theorem (without proof), Maclaurin's series, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

**Unit-II**

Multiple Integrals :

Double integrals, Change of order of integration , Double integrals in polar coordinates, Area enclosed by plane curves, Triple integrals, Volume of solids, Change of variables.

Ordinary differential equations (first order): Introduction, Linear and Bernoulli's equations, Exact equations, equations reducible to exact equations, Orthogonal trajectories, Newton's law of cooling, Heat flow, Rate of Decay of Radio-Active Materials

**Unit-III**

Ordinary differential equations (higher order):

Linear Differential equations: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, Working procedure to solve the equation, Linear dependence of solutions, Method of variation of parameters, Equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation, Simultaneous linear equations with constant coefficients.

**Unit-IV**

Fourier Series: Introduction and Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, Half range series Typical wave forms and Parseval's formulae, Complex form of the Fourier series Practical harmonic analysis.

Text Book: [1]. Higher Engineering Mathematics by B.S. Grewal,  
Khanna publishers, 40<sup>th</sup> edition.

Reference Books: [1]. Advanced Engineering Mathematics by kreyszig.  
[2]. Engineering Mathematics by Babu Ram

**Unit-I**

**Matrices:**

Rank of a matrix, vectors, Consistency of linear system of equations, Linear transformations, Characteristic equations, Properties of eigen values, Cayley-Hamilton theorem (without proof), Reduction to diagonal form reduction of Quadratic forms to canonical form, Nature of a quadratic form, Complex matrices.

**Unit-II**

Beta Gamma functions, error function.

Statistics: Method of least squares, Correlation, co-efficient of correlation (direct method only), lines of regression.

**Vector Calculus:**

Scalar and vector point functions, Del applied to scalar point functions. Gradient

**Unit-III**

**Vector Calculus:**

Del applied to vector point functions, Physical interpretation of divergence, Del applied twice to point functions, Del applied to products of point functions, Integration of vectors, Line integral, Surfaces, Green's theorem in the plane (without proof), Stoke' s theorem (without proof), Volume integral, Gauss divergence Theorem (without proof), Cylindrical Coordinates, Spherical polar coordinates.

**Unit-IV**

Laplace Transforms : Introduction, Transforms of elementary functions, Properties of Laplace Transforms, existence conditions, Transforms of derivatives, Integrals, multiplication by  $t^n$ , division by  $t$ , Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, Application to Differential equations with constant coefficients, transforms of unit step function, unit impulse function, periodic function.

Text Book: [1] Higher Engineering Mathematics by B.S.Grewal  
Khanna publishers, 40<sup>th</sup> edition.

Reference Books:

- [1] Engineering Mathematics by Babu Ram
- [2] Advanced Engineering Mathematics by Erwin Keyszing John willy and sons.

**CE/CSE/ECE  
/EEE/EI/IT/  
ME 103**

**ENGINEERING PHYSICS**

**L T P M**

**3 0 0 100**

**UNIT-I**

**Ultrasonics**

**20 Periods**

Production of Ultrasonics by Piezo electric oscillator method, Detection by Acoustic grating method, Applications - Pulse echo technique, ultrasonic imaging and some general applications.

**Applied Optics**

**Interference:** Stokes principle (Phase change on reflection), Interference in thin films due to reflected light (Cosine law), (uses of air films in wedge method and Newton's rings experiments - qualitative treatments only) Michelson's interferometer: Principle, construction working and applications (Determination of wavelength of monochromatic source & for resolution of two closely lying wavelengths).

**Lasers:** Laser characteristics, Spontaneous and Stimulated emissions, Basic requirements of a laser, Population inversion – Solid state laser (Ruby laser), Gas (He-Ne) laser, Semiconductor (GaAs) laser, Applications of lasers.

**Holography:** Principle, recording, reproduction and applications.

**Fiber optics:** Structure of optical fiber, Types of optical fibers, Numerical aperture, Fiber optics in communications and advantages.

**UNIT –II**

**15 Periods**

**Electromagnetism**

Gauss's law in electricity (statement & proof), Coulomb's law from Gauss law, Circulating charges and Cyclotron principle & working, Hall effect and its uses, Gauss law for magnetism, Faraday's law of electromagnetic induction, Lenz's law, induced electric fields, Inductance, energy stored in a magnetic field, Displacement current, Maxwell's equations (qualitative treatment), electromagnetic wave equation and Velocity, Electromagnetic oscillations(qualitative treatment),

**Electron Theory of Solids**

Failure of classical free electron theory, quantum free electron theory, Fermi- dirac (analytical) distribution function and its temperature dependence, Fermi energy.

**UNIT-III**

**20 Periods**

**Principles of Quantum Mechanics**

Dual nature of light, Matter waves & properties, de Broglie's concept of matter waves, Davisson and Germer experiment, Heisenberg's uncertainty principle and applications (non-existence of electron in nucleus, finite width of spectral lines). One dimensional time independent Schrodinger's wave equation, Physical significance of the wave function, Particle in a box (one dimensional).

**Band theory of Solids**



Bloch theorem, Kronig-Penny model (Qualitative treatment), Origin of energy band formation in solids, effective mass of electron, concept of hole.

### **Dielectric and Magnetic Materials**

Electric dipole moment, polarization, dielectric constant, polarizability, types of polarizations, internal fields (qualitative), Clausius-Mossotti equation, Frequency dependence of polarization, Ferroelectrics and their applications.

Origin of magnetic moment of an atom, 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.

### **UNIT –IV**

#### **Advanced Materials of Physics**

**15 Periods**

**Optoelectronic devices:** Qualitative treatments of Photo diode, LED and LCD; Solar cell and its characteristics. Electro-optic and Magneto-optic effects (Kerr and Faraday effects).

**Superconductivity:** First experiment, critical parameters ( $T_c$ ,  $H_c$ ,  $I_c$ ), Meissner effect, types of superconductors, BCS Theory (in brief) and Applications of superconductors.

**NanoTechnology** : Introduction to nano materials, nano scale, surface to volume ratio, fabrication of nanomaterials, sol-gel and chemical vapour deposition methods, Carbon nano tubes-preparation and properties (thermal, electrical and mechanical - in brief), some applications of nanomaterials.

### **TEXT BOOKS**

1. Engineering Physics – M.R.Srinivasan, New Age International.
2. Physics Part I and II – Halliday and Resnick, John Wiley & sons (Asia).

### **REFERENCE BOOKS**

1. Concepts of Modern Physics – Arthur Beiser (TMG)
2. Engineering Physics – Gaur & Gupta, Dhanpati Rai Publications, New Delhi.
3. Modern Engineering Physics – A.S.Vasudeva, S.Chand & Co., New Delhi
4. Materials science – M.Vijaya and G.Rangarajan, TMH, New Delhi

CE/CSE/ECE  
/EEE/EI/IT/  
ME 104

## ENGINEERING CHEMISTRY

L T P M

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### UNIT-I

(18 periods)

**WATER TECHNOLOGY:** Various impurities of Water, WHO guidelines, Hardness units and determination by EDTA method (simple problems), water treatment for drinking purpose-sedimentation, coagulation, filtration (slow sand filter), various methods of chlorination, breakpoint chlorination.

Water treatment 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.

**GREEN CHEMISTRY:** Introduction, Principles and applications.

### UNIT-II

(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:** Polyacetylene, mechanism of conduction, examples and applications.

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

**NANOMATERIALS:** Introduction to nanochemistry, preparation of nanomaterials- carbon nanotubes and fullerenes and their engineering applications.

### UNIT-III

(18 periods)

**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).

**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<sub>2</sub>, Lithium organic electrolyte) and their advantages.

**Corrosion and its control:** Introduction, electrochemical theory of corrosion, dry corrosion, corrosion due to differential aeration, Types of corrosion-galvanic

corrosion (galvanic series), Pitting, Stress and microbiological corrosion, Factors affecting corrosion-oxidizers, pH, over voltage and temperature.

Protection methods: Cathodic protection, (Impressed current and sacrificial anode) anodic protection, corrosion inhibitors- types and mechanism of inhibition, metallic coatings-Galvanisation.

#### **UNIT-IV**

**(18 periods)**

**Fuels:** Classification of fuels, calorific value-units and determination (Bomb calorimeter). Coal- Ranking and analysis, carbonization of coal (using Beehive oven) Petroleum based: Fractional distillation, cracking, reforming, composition and uses of petrol, diesel, CNG and LPG.

**Composites:** Introduction, Constituents of Composites, Types –Fibre reinforced, Particulate and layered composites and their applications.

**Lubricants:** Classification –liquid lubricants-Viscosity index, Flash point, Fire point, Cloud point, Pour point, oiliness. Solid lubricants –Graphite and Molybdenum sulphide, Additives.

**Liquid crystals:** Structure of liquid crystal forming compounds, Classification and applications.

#### **Text Book recommended:**

1. Engineering Chemistry, P.C. Jain and Monika Jain, Dhanpat Rai and Co., New Delhi

#### **Reference Books :**

1. A Text Book of Engineering Chemistry, S.S. Dara, 10<sup>th</sup> Edition, S.Chand and Co.
2. Principles of Polymer Science, P.Bahadur and N.V. Sastry, Narora Publishing House
3. A Text Book of Engineering Chemistry, Shashi Chawla, Dhanpat Rai and Co.

#### **UNIT-1: SPEECH BUILDING**

This arena refreshes the students in the usage of grammar and basics of communication in English. It also helps them start building up their vocabulary.

1. Speaking about oneself.
2. Sentence and its types
3. Positive, Negative and Interrogative Sentences, Speaking in formal and informal contexts, Asking for opinion, Asking for information, Requesting and Seeking permission; Emphasising a point
4. A list of 100 Basic Words
5. One word substitutes

#### **UNIT- II: BASIC LANGUAGE SKILLS**

The emphasis is on Grammar and development of written and oral communication skills among students and equip them with the skills to overcome the cut throat competition in formal and informal situations in the present world.

1. Parts of speech
2. Tenses
3. Letter writing (Personal and Business)
4. Situational Dialogues
5. A list of 100 Basic Words

#### **III UNIT: ADVANCED LANGUAGE SKILLS**

To develop two specific skills i.e. speaking and writing, using correct and good vocabulary to improve the communicative competence of learners in their discipline with glamour.

1. Antonyms
2. Paragraph Writing
3. Technical terms
4. Reading Comprehension
5. Correction of Sentences

#### IV UNIT: PROFESSIONAL COMMUNICATION SKILLS

Professional communication skills aim at making students familiar with various aspects of corporate world and the importance of verbal communication. It also provides intensive instruction in the practice of professional writing.

1. Essay writing
2. Corporate Information
3. Idioms
4. E-mail etiquette

#### **Prescribed Textbook:**

- Communication Skills for Engineers, K. R. Lakminarayana and T. Murugavel, Scitech Publications.

#### **Reference Books:**

- Effective Technical Communication, M.Ashraf Rizvi, Tata Mc Graw Hill.
- Communication Skills for Professionals, Nira Konar, PHI Publication.
- Competitive English for Professional Courses, J.K.Gangal, S.Chand Publication.
- English for Technical Communication: Volume 1&2 by K.R. Lakminarayana , Scitech Publications.
- Advanced Technical Communication, Kavita Tyagi, Padma Misra, PHI Publication.
- Word Power Made Handy, Dr. Shalini Verma, S.Chand Publication.
- Communication Skills For Engineers, K.R. Lakminarayana and T. Murugavel, Scitech Publications.

**UNIT-1**

**(16 Periods)**

Computer Basics: The Computer System, Generations of Computer, Classification of Computer, Block diagram of digital Computer, Inside the Computer-Processor, Memory, External Ports, PCI Card, Formatting Hard disk, Understanding BIOS, BIOS Commands, Networking Basics, Internet Basics, Basics of S/W-OS fundamentals, Algorithm, Flowchart, Programming Paradigms.

C-Basics: C-character set, Data types, Constants, Expressions, Structure of C program, Operators and their precedence & associativity, Basic input and out put statements, Control Structures, Simple programs in C using all the operators and control structures.

**UNIT-II**

**(16 Periods)**

Functions: Concept of a function, passing the parameters, automatic variables, scope and extent of variables, storage classes, recursion, iteration vs recursion, types of recursion, Simple recursive and non recursive programs, Towers of Hanoi problem.

Arrays: Single and multidimensional Arrays, Character array as a string, string functions, Programs using arrays and string manipulation.

**UNIT-III**

**(16 Periods)**

Pointers: Pointers declarations, Pointer expressions, Pointer parameters to functions. Pointers, Pointers and array, Pointer arithmetic.

Structures: Declaring and using structures, operations on structures, structures and arrays, user defined data types,, pointers to structures.

Files: Introduction, file structure, file handling functions, file types, file error handling, Programs using file functions.

**UNIT-IV**

**(16 Periods)**

Numerical Methods: Types of Errors, General formula, numerical method for finding roots of an algebraic equation of one variable, successive bisection method, false position method, Newton Raphson method, secant method. Guass elimination method, Guass siedal method, Lagrange interpolation.

General Quadrature formula, Simpsons rule, Euler's method, general method for deriving differentiation formula, differentiation of Lagrange's polynomial, differentiation of Newton polynomial, Taylors Series, Ranga Kutta Method.

**Text Books:**

1. C Programming and Numerical Methods - Ajay Mithal - Pearson
2. Computer Oriented Numerical Methods -V.Raja Raman - PHI

**References :**

1. Programming with C-Gottfried-Schaums Outline Series-TMH
2. C Programming- Behrouz A forouzan – CENGAGE Learning
3. Computer Programming – Kanthane –Pearson Education

4. Elementary Numerical Methods - C.D. Conte
5. Introduction to Numerical Methods - S.S.Sastry

**UNIT – I**

**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.

**Parallel Forces In A Plane**

Couple ; general case of parallel forces in a plane ; center of parallel forces and centre of gravity ; Centroids of composite plane figures and curves; Centre of gravity of three-dimensional bodies.

**UNIT – II**

**General Case Of Forces In A Plane**

Composition of forces in a plane ; Equilibrium of forces in a plane ; Plane trusses – method of joints , Method of sections

**Friction**

Static and kinetic friction, Laws of friction; Applications of static friction.

**Principle Of Virtual Work**

Equilibrium of Ideal systems

**UNIT – III**

**Rectilinear Translation**

Kinematics of rectilinear motion ; Principles of dynamics ; Differential equation of rectilinear motion ; Motion of a particle acted upon by a constant force ; D'Alemberts principle ; Momentum and impulse ; Work and energy ; Ideal systems – conservation of energy ; direct central impact

**Moments Of Inertia Of Plane Figures**

Moment of inertia of a plane figure with respect to an axis in its plane ; Moment of Inertia with respect to an axis perpendicular to the plane of the figure ; Parallel axis theorem.

**UNIT – IV**

**Curvilinear Translation**

Kinematics of curvilinear motion ; Differential equations of curvilinear motion ; D'Alembert's principle in curvilinear motion ; Work and Energy.

**Moments 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.

**Rotation Of A Rigid Body About A Fixed Axis**



Kinematics of rotation ; Equation of motion for a rigid body rotating about a fixed axis;  
Work and energy

**NOTE**

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

**TEXT BOOK**

1. Engineering mechanics by S. Timoshenko , D. H. Young and J. Rao , Tata McGraw-Hill Publishing Company Ltd.

**REFERENCE BOOKS**

1. Engineering mechanics by J. L. Meriam and L. Kraige , John Wiley & Sons
2. Vector mechanics for engineers by Beer and Johnston, Tata McGraw-Hill Publishing Company Ltd.
3. Engineering Mechanics by Hibbler and Gupta , Pearson Education

CE/CSE/ECE  
/EEE/EI/IT/  
ME 108

**ENGINEERING GRAPHICS**

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**NOTE : 1) Unit VI not to be included in the university theory examination. This unit is only for internal assessment**

**2) University Examination Question paper consists of FIVE questions, TWO questions from each unit with internal choice.**

**(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.

(3+9)

**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 Archimedean spiral.

(9+15)

**UNIT II**

**METHOD OF PROJECTIONS:** Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

(6+12)

**PROJECTIONS OF PLANES :** Projections of planes, projections on auxiliary planes.

(4+8)

**UNIT III**

**PROJECTIONS OF SOLIDS :** Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.

(4+8)

**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).

(6+12)

#### **UNIT IV**

**DEVELOPMENT OF SURFACES:** Lateral development of cut sections of Cubes,Prisms,Pyramids,Cylinders and Cones.

(4+8)

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

(4+8)

#### **UNIT V**

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

(6+12)

#### **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.

(4+8)

#### **TEXT BOOK:**

- Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand).

- AutoCAD 14 for Engineering Drawing Made Easy(Features AutoCAD 200) by P.Nageswara Rao

**REFERENCE BOOK:**

- Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah.
- Engineering Graphics with AutoCAD 2002 by James D. Bethune

**Any 15 experiments from the following list**

**LIST OF EXPERIMENTS**

1. Compound pendulum –Determination of acceleration due to gravity (g)
2. Interference fringes - measurement of thickness of a foil / diameter of Wire using wedge method.
3. Sensitive galvanometer - Determination of figure of merit
4. Newton's rings – Measurement of radius of curvature of plano convex lens
5. Lissajous' figures –Calibration of an audio oscillator
6. Photo cell – I-V Characteristic curves and determination of stopping potential
7. Diffraction grating – Measurement of wavelengths
8. Torsional pendulum- Determination of rigidity modulus of the wire material.
9. Carey- Foster's bridge: Determination of specific resistance/Temperature coefficient of resistance.
10. Photo voltaic cell - Determination of **fill-factor**
11. Variation of magnetic field along the axis of a current carrying circular coil.
12. Series LCR resonance circuit - Determination of "Q" factor.
13. Thomson's method - determination of **e/m** of an electron.
14. Determination of a.c. Frequency – Sonometer.
15. Prism/Grating - Determination of dispersive power.
16. To determine the wavelength of Laser source.
17. Hall effect – Determination of Hall coefficient.
18. Determination of energy band gap.
19. Determination of Numerical Aperture of an optical fiber.
20. Determination of Amplitude and Frequency of an AC signal using a CRO.

Note: Minimum of twelve experiments have to be conducted out of the list of experiments given below.

**List of Experiments:**

- Estimation of total alkalinity of water sample
- Standardization of HCl solution b. Estimation of alkalinity
- Determination of purity of washing soda
- Estimation of Chlorides in water sample
- Standardization of  $\text{AgNO}_3$  solution b) Estimation of Chlorides
- Determination of Total Hardness of water sample:
- Standardization of EDTA solution b) Determination of Total Hardness
- Estimation of Magnesium
- a) Standardization of EDTA solution b) Estimation of Magnesium
- Estimation of Mohr's salt-permanganometry
- Standardization of  $\text{KMnO}_4$  solution b) Estimation of Mohr's salt
- Estimation of Mohr's salt –Dichrometry
- Standardization of  $\text{K}_2\text{Cr}_2\text{O}_7$  solution b) Estimation of Mohr's salt
- Analysis of soil sample:
- Estimation of Ca and Mg b) Estimation of Organic matter
- Determination of available chlorine in bleaching powder-Iodometry
- Standardization of Hypo solution b) Determination of Available chlorine
- Determination of Iodine in Iodized salt
- Determination of Iron (Ferrous and Ferric) in an iron ore by Permanganometry
- Determination of Zn using Potassium ferrocyanide
- Conductometric titration of an acid vs. base
- pH metric titrations of an acid vs. base

**Demonstration Experiments:**

- Potentiometric titrations: Ferrous vs. Dichromate

16.Spectrophotometry: Estimation of Mn/Fe

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) Gross-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) Preparation of edges like Saw edge, wired edge, lap seam, grooved seam
- b) Funnel
- c) Rectangular Tray
- d) Pipe joint
- e) Electronic Component joining Techniques like use of crimping tool, soldering of Electronic components, strain guage, thermo couples, use of computer networking tools..

**4. House wiring**

- a) One lamp by one switch
- b) Two lamps by one switch
- c) Wiring of Tube light
- d) Stair case wiring AND e) Go-down wiring

**CYCLE-I Basics of Hardware and Software Exercises:**

1. Explore Mother Board components and Layouts, identifying external ports and interfacing, identifying PCI cards and interfacing.
2. Partitioning and formatting Hard disks.
3. Install and Uninstall system and application software.
4. Understand BIOS configuration.
5. Connect computers in a network.
6. Assemble a Computer and troubleshoot a Computer.
7. Operating system commands
  - a. Directory Related Utilities.
  - b. File and Text Processing Utilities.
  - c. Disk, Compress and Backup Utilities.
  - d. Networking Utilities and
  - e. Vi editor

**CYCLE-II Programming Exercises:**

1. Write a program to read x, y coordinates for 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?
2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (eg. For, while, and do while).
3. Write a set of string manipulation functions e.g. for getting a sub-string from a given position. Copying one string to another, reversing a string, adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stored in different data types of like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.
6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their means and standard deviation.
8. Write a program for implementing students management system(attendance, marks and fees reports) using structures and pointers.



9. Implement bisection method to find the square root of a given number to a given accuracy.
10. Implement Newton Raphson method to determine a root of polynomial equation.
11. Given a table of  $x$  and corresponding  $f(x)$  values, write a program which will determine  $f(x)$  value at an intermediate  $x$  value using Lagrange's interpolation.

## Unit-I

## Partial Differential Equations :

Introduction, Formation of Partial Differential Equations, Solutions of a Partial Differential Equations, 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.

## Integral Transforms:

Introduction, Definition, Fourier Integral Theorem (without proof), Fourier sine and cosine integrals, Complex form of the Fourier Integral, Fourier Transforms, Properties of Fourier Transforms, Finite Fourier sine and cosine transforms, Convolution theorem (without proof), Parseval's Identity for Fourier Transforms (without proof).

Solution of Algebraic and Transcendental Equations : Introduction, Bisection method, Newton- Raphson Method, Solutions of Simultaneous Linear Equations: Direct Methods of Solution- factorization method (LU – decomposition method), Iterative Methods of Solution - Gauss-Seidel Iteration Method.

## Unit-III

Finite Differences and Difference Equations: Introduction, Finite Difference operators, Symbolic relations, Differences of a polynomial, factorial notation, Newton's forward and backward difference interpolation Formulae, Central Difference Interpolation Formulae: Gauss's Forward and Stirling's formulae, Interpolation with Unequal Intervals: Lagrange's Interpolation , inverse interpolation. Difference Equations: Introduction, Formation, Linear difference equations - Rules for Finding the Complementary Function, Rules for Finding the Particular Integral.

## Unit-IV

Numerical Differentiation: Finding First and Second order Differentials using Newton's formulae , Numerical Integration : Trapezoidal rule , Simpson's one-third rule, Numerical Solutions of Ordinary Differential Equations (first order): Euler's Method, Picard'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** : Higher Engineering Mathematics, B.S.Grewal, 40<sup>th</sup> edition, Khanna publishers

**Reference Books:**

- [1] A textbook of Engineering Mathematics by N.P. Bali
- [2] Advanced Engineering Mathematics by Erwin Kreyszig John willy and sons.

**UNIT – I (16 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, Disjunction normal forms, Conjunction normal forms, Principal disjunctive Normal Forms, Principal Conjunctive normal forms, 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 Permutation 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, Special properties of binary relations, Equivalence relations. Operations on relation.

**UNIT – IV (16 Periods)**

Ordering relations, Lattices and Enumerations, Paths and Closures, Directed Graphs and Adjacency Matrices, Application : Topological Sorting.

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. Toe L.Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI 2<sup>nd</sup> edition, 2008.
2. J.P. Trembly and R. Manohar- Discrete Mathematics for Computer Scientists & Mathematicians, PHI Ltd., New Delhi, 2<sup>nd</sup> Edition, 2008

**REFERENCE BOOKS:**

1. T. Sengadir- Discrete Mathematics-Pearson Education
2. C.L. Liu and D.P. Mohapatra-Elements of Discrete Mathematics, Tata McGraw-Hill ,3<sup>rd</sup> Edition, 2008.
3. Seymour Lipschutz, Lipson-Discrete Mathematics-Scaums outlines-TMH.
4. Santha-Discrete Mathematics-Cengage Learning
5. Kenneth H Rosen-Discrete Mathematics & its Applications , TMH, 6th Edition, 2009

**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, Reciprocity, compensation, Maximum power, Tellegen and Application of theorems to DC & AC circuits.

**ALTERNATIVE PERIODIC WAVEFORMS:** Instantaneous current, voltage and power, peak, effective and average voltage and current, crest factor and form factor, phase difference.

**RESONANCE:** Series and Parallel resonance, selectivity, bandwidth and Q of tuned circuits. Time constant.

**UNIT - III****(16 Periods)**

**SEMICONDUCTOR DIODES:** Semiconductor diode, Zener diode, Load line analysis, Half-Wave Rectifier, Full-Wave rectification, Clippers and Clampers.

**BIPOLAR JUNCTION TRANSISTOR:** Transistor operation, Common base configuration, Transistor amplifying action, Common emitter configuration, Common collector configuration, Operating point, Fixed bias circuit, Emitter stabilized bias circuit, Voltage divider bias, Transistor h-parameter model, Analysis of transistor amplifier using h-parameters. Principal and characteristics of JFET.

**UNIT – IV****(15 Periods)**

**AMPLIFIERS:** Need of biasing, Thermal runaway, Types of biasing-fixed bias, collectorbase bias, self bias, CE amplifier, frequency response.

**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. B.L.Therja-Textbook of Electrical technology-S.Chand & Co.
- 2.. Robert Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", 6th Edition, PHI.

**REFERENCE BOOKS:**

1. A. Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 3rd Edition, TMH, 2006.
2. Mahmood Nahvi and Joseph Edminister, Electric Circuits, 4th Edition, Schaum's outline series, TMH, 2004.
3. Milliman & Halkias, "Integrated Electronics", Tata McGrawHill Publishers.
4. S.Salivahanan, Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill Publishers
5. N.Bhargava&Kulasresta, "Basic Electronics", Tata McGrawHill Publishers.

**UNIT-I****(14 Periods)**

Review of Number systems & codes, Representation of integers and Floating point numbers, Accuracy. Introduction to integer arithmetic operations.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Other operations, Digital Logic Gates.

SIMPLIFICATION OF BOOLEAN FUNCTIONS: The Map Method, Two and three variable Maps, Four-variable Map, Five and six-variable Maps, Product of Sums Simplification, NAND and NOR implementation, other two-level implementations, Don't-Care conditions, The Tabulation Method, Determination of Prime Implicants, Selection of Prime-Implicants.

**UNIT – II****(14 Periods)**

COMBINATIONAL LOGIC: Design Procedure, Adders, Subtractors, Code conversion, Analysis procedure.

COMBINATIONAL LOGIC WITH MSI AND LSI: Binary parallel adder, Decimal adder, Magnitude comparator, Decoders, Multiplexers.

**UNIT –III****(18 Periods)**

SEQUENTIAL LOGIC: Flip Flops, Triggering of Flip-Flops, Synthesis and Analysis of Clocked Sequential Circuits, State tables and State diagrams. State Reduction and assignment, Flip-Flop Excitation tables, Design Procedure, Design of counters, Design with state equations.

**UNIT –IV****(18 Periods)**

REGISTERS, COUNTERS: Registers, Shift registers, Ripple counters, Synchronous counters, Timing sequences.

MEMORIES: Classification of ROMs, EPROMs, EEPROMs, RAMs  
PROGRAMMABLE LOGIC: Read only memory (ROM), Programmable logic device (PLD), Programmable logic array (PLA), Programmable array logic (PAL).

**Text Book:**

1. Mano and Clietty- Digital Design- Pearson Education

**Reference Books:**

1. Morris Mano- Computer Engineering Hardware Design- PHI.
2. R.P.Jain- Modern digital electronics, 3<sup>rd</sup> edition- TMH.
3. Donald e Givone- Digital Principles and Design- TMH.

**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.

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

**UNIT-IV****(16 Periods)**

**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.

**I/O Systems**: Overview – I/O Hardware – Application I/O Interface – Kernel I/O Interface – Transforming I/O requests to Hardware Operations – Streams – Performance.

**TEXT BOOKS:**

1. Silberschatz & Galvin, 'Operating System Concepts', 5<sup>th</sup> edition, John Wiley & Sons (Asia) Pvt.Ltd.

**REFERENCE BOOKS :**

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

**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 and Queues: The Stack ADT and its applications such as Infix to Postfix expression conversions, Evaluation of Postfix expressions, Delimiter Matching. The Queue ADT, The Circular Queue ADT.

Sorting Preliminaries - Shellsort - Mergesort - Quicksort

**UNIT - III:****(15 Periods)**

Preliminaries - Binary Trees - Implementation, Expression trees. The Search Tree ADT - Binary Search Trees, Implementation. AVL Trees - Single Rotations, Double rotations.

**UNIT - IV:****(15 Periods)**

Hashing - General Idea - Hash Function - Separate Chaining - Open Addressing - Linear Probing - Priority Queues (Heaps) - Model - Simple implementations - Binary Heap - Heap Sort.

Graphs: Definitions, representations, graph traversals.

**TEXT BOOK:**

1. KRUSE, Data Structures and Programming Design-PHI
2. 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.
2. Richard F.Gilberg, Behrouz A. Forouzan, "Data Structures - A Pseudocode Approach with C", Thomson Brooks / COLE.
3. Aho, J.E. Hopcroft and J.D. Ullman, "Data Structures and Algorithms", Pearson Education Asia, 1983.
4. Samantha, Classical Data Structures-PHI



1. Code the following list ADT operations using array, single linked list, double linked list.
  - (a) void is\_emptyList(List 1)
  - (b) List makeNullList(size n)
  - (c) Position firstPost(List 1)
  - (d) Position endPost(List 1)
  - (e) Position nextPost(List 1, Position p)
  - (f) Position prevPos(List 1, position p)
  - (g) Position find(List 1, Element x)
  - (h) Position findKth(List 1, int k)
  - (i) void insert(List 1, Position p)
  - (j) void delete(List 1, Position p)
  - (k) void append(List 1, Element x)
  - (l) int cmp(List 1, Position p1, Position p2)
  - (m) int cmp2(List11, List12, Position p1, Position p2)
  - (n) void swap(List 1, Position p1, Position p2)
  - (o) Element retrieveElement(List 1, Position p)
  - (p) void print element(List 1, Position p)
2. Using the above List ADT operations, Write a menu driven program to support following higher level list operations:
  - (a) Create null list
  - (b) Read a list of elements into the list.
  - (c) Insert an element in the  $K^{\text{th}}$  position of the list
  - (d) Delete an element in the  $K^{\text{th}}$  position of the list
  - (e) Delete a given element from the list
  - (f) Find whether given element is present in the list
  - (g) Display the elements of the list
3. Write a program that reads two lists of elements, prints them, reverses them, prints the reverse list, sort the lists, print the sorted lists, merges the list, prints merge list.
4. Implement a polynomial ADT and write a program to read two polynomials and print them, adds the polynomials, prints the sum, multiply the polynomials and print the product.
5. Implement stack ADT and write a program that reads an infix arithmetic expression of variables, constants, operators (+, -, \*, /) and converts it into the corresponding postfix form. Extend the program to handle parenthesized expression also.
6. Implement Queue ADT and write a program that performs Radix sort on a given set of elements.
7. Implement the following sorting operations:-
  - (a) Shell Sort, (b) Heap Sort (c) Merge Sort (d) Quick Sort
8. Implement Binary Tree ADT and write a program that reads postfix Arithmetic expression form, builds the expression tree and performs tree Traversal on it.
9. Implement Binary search Tree ADT and write a program that interactively allows
  - (a) Insertion (b) Deletion (c) Find\_min (d) Find\_max (e) Find operations
10. Implement AVL Tree ADT and Write a program that interactively allows
  - (a) Insertion (b) Deletion (c) Find\_min (d) Find\_max

1. KVL & KCL LAWS
2. Thevenins and Nortons Theorems
3. Characteristics of Silicon, Germanium diodes.
4. Characteristics of Zener diode.
5. Half Wave/Full Wave Rectifier.
6. Transistor Characteristics in CE configuration.
7. Self Bias circuit
8. Wein Bridge Oscillator
9. Colpitts Oscillator
10. Logic Gates using Discrete Components and using Universal Gates
11. Combinational Circuits(Full Adder, Subtractor, Multiplexer, Demultiplexer)
12. Sequential Circuits(Flip Flops, Registers, Counters)

## Module-1: Phonetics

- a) Introduction to vowels and consonants
- b) Introduction to Accent, Intonation and Rhythm

## Module-2: Reading skills

- a) Reading for main idea.
- b) Scanning and skimming the text
- c) Inference of lexical and contextual meaning

## Module-3: Presentation Skills

- a) Debate
- b) Paper Presentation:
  - i) Identification of source material
  - ii) Arrangement of Collected Data
- c) Extempore

## Module-4: Employability Skills

- a) Resume Preparation
  - i) Identification of information
  - ii) Arrangement of collected data
- b) Group Discussions
- c) Interview Skills
  - i) Dress code
  - ii) Behavioral Skills

## Module-5: Telephonic Skills

- a) Formal & Informal interaction
- b) Receiving Messages & Complaints
- c) Tone modulation

**NOTE:** 12 Lab Activities are minimum in a Record (125 pages single side book) with contents: Name of the Activity, Source, Skill Improved.

**Minimum Requirements:**

The Communication Skills Lab shall need two labs. One is Communication Skills Lab with LAN facilitated 60 multimedia systems and English language software suggested by the concern faculty. The other, Conversational Skills Lab with 6 to 10 round tables, 60 movable chairs and audio-visual Devices with LCD Projector.

**Suggested Software:**

- Cambridge Advanced Learners' English Dictionary with CD.
- Clarity Pronunciation Power
- The Rosetta Stone English Library
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- English in Mind Series : Starter and 1 to 5 work books, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
- Language in Use, Foundation Books Pvt. Ltd with CD.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Telephoning in English
- Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition
- Communicate to Conquer: A Handbook of Group Discussions and Job Interviews

**Reference Books:** Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems) :

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
5. A Practical Course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
6. A Text book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)
7. English Skills for Technical Students, WBSCTE with British Council, OL.

**UNIT-I:**

**Probability Densities:** Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Other Probability Densities, Uniform Distribution, Log-Normal Distribution, Gamma Distribution, Beta Distribution, Weibull Distribution, Joint Distributions, Discrete and Continuous.

**Sampling Distribution:** Populations and Samples, Sampling Distribution of the Mean ( $\sigma$  known), Sampling Distribution of the Mean ( $\sigma$  Unknown), Sampling Distribution of the Variance.

**UNIT-II:**

**Inferences Concerning Means:** Point Estimation, Interval Estimation, Tests of Hypotheses, Null Hypotheses and tests of hypotheses, Hypotheses Concerning one Mean, Relation between tests and Confidence Intervals, Operating Characteristic Curves, Inferences Concerning Two Means.

**Inferences Concerning Variances:** Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.

**UNIT-III:**

**Inferences Concerning Proportions:** Estimation of Proportions, Hypotheses Concerning One Proportion, Hypotheses Concerning Several Proportions, Analysis of  $r \times c$  Tables, Goodness of Fit.

**Analysis of Variance:** General Principles, Completely Randomized Designs, Randomized –Block Designs, Multiple Comparisons.

**UNIT-IV:**

**Statistical Content of Quality-Improvement Programs:** Quality-Improvement Programs, Starting a Quality Improvement Program, Experimental Designs of Quality-Improvement, Quality Control, Control Charts of Measurements, Control Charts for Attributes, Tolerance Limits, Acceptance Sampling.

**Applications to Reliability and Life Testing:** Reliability, Failure-Time Distributions, Exponential Model in Reliability, Exponential Model in Life Testing.

**TEXT BOOK:**

1. Miller & Freund's "Probability and Statistics for Engineers", 6<sup>th</sup> Edition, PHI by Richard A. Johnson.

**REFERENCE BOOK:**

2. S.C. Gupta & V.K. Kapoor, "Fundamentals of Mathematical Statistics", S.C. Chand & Co.,

**UNIT-I**

**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, Aquatic ecosystem.

**UNIT-II**

**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**

**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**

**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 Books**

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

**Reference Books**

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

**UNIT - I****(20 Periods)**

**REGISTER TRANSFER AND MICRO-OPERATIONS:** Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

**BASIC COMPUTER ORGANIZATION AND DESIGN:** Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instruction, Input-Output and Interrupt, Design of Basic Computer, Design of Accumulator Logic.

**UNIT-II****(20 Periods)**

**MICRO PROGRAMMED CONTROL:** Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

**CENTRAL PROCESSING UNIT:** General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

**UNIT -III****(15 periods)**

**COMPUTER ARITHMETIC:** Addition and Subtraction, Multiplication Algorithms, Division Algorithms Floating-point Arithmetic operations.

**MEMORY ORGANIZATION:** Memory Hierarchy, Main Memory, Auxiliary memory, Associative Men Cache Memory, Virtual Memory, Memory Management hardware

**UNIT-IV****(15 periods)**

**INPUT-OUTPUT ORGANIZATION:** Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor, Serial Communication.

**Textbook:**

1. Morris M. Mano, 'Computer Systems Architecture', 3<sup>rd</sup> edition-Pearson Education

**Reference Books:**

1. John P Hayes, 'Computer Architecture and Organization', 2nd edition.
2. V.Carl Hamacher et.al, 'Computer Organization' 2<sup>nd</sup> edition.
3. Tanenbaum: Structured Computer Organization, Pearson Education
4. William Stallings: Computer Organization and Architecture, PHI



**UNIT – I****(18 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 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 - Refining the ER Design for the COMPANY Database - ER Diagrams, Naming Conventions, and Design Issues

**UNIT – II****(20 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****(18 Periods)**

**Disk Storage, Basic File Structures:** Introduction - Secondary Storage Devices - Buffering of Blocks - Placing File Records on Disk - Operations on Files - Files of Unordered Records (Heap Files) - Files of Ordered Records (Sorted Files) - Types of Single-Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes Using B-Trees and B+-Trees - Indexes on Multiple Keys

**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**

**(18 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 BOOKS:**

1. Fundamentals of Database Systems, Ramez Elmasri and Navate Pearson Education, 5<sup>th</sup> edition.

### **REFERENCES:**

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, 5<sup>th</sup> edition.

**UNIT-I**

(16 PERIODS)

INTRODUCTION :- Need for object oriented programming paradigm, Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling.

**UNIT-II**

Function Over Loading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes

**UNIT-III**

Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups

**UNIT-IV**

Java Basics - History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

**TEXT BOOKS**

1. STROUTSTRUP-C++ PROGRAMMING-PEARSON EDUCATION
2. Java - The complete reference, 7th edition, Herbert schildt, TMH.

**REFERENCE BOOKS**

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A.Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.

**UNIT I****(18 hours)****Introduction to unix** : Unix architecture , Features of Unix, Vi editor.**Directory Related utilities**- pwd, mkdir, ls, cd , rmdir.**File Handling and Text Processing utilities**- cp, mv, rm, ln, unlink, lp, cat, more, pg , head, tail, sort ,nl, grep, egrep, fgrep, cut, paste, join, tee, w ,chgrp, chmod, chown, find, cmp, diff, uniq, tr.**Disk utilities,Backup and other utilities**- du, df, mount, unmount, umask, ulimit, tar, cpio, dump , who, mail, compress, uncompress, gzip, gunzip, crypt, sed, tty,**Networking utilities** – finger, telnet, rlogin, ftp, rcp, write, talk, wall.**Programmable text processing: awk** - awk programs, accessing individual fields, Begin and end, operators, variables, control structures, extended regular expressions, condition Ranges, field separators, Build – in functions.**UNIT-II****(20 hours)****Bourne Shell programming:** Shell, functions of the shell , Meta characters, Input redirection, Output redirection, pipes, shell as programming language, shell variables, predefined local variables, predefined environment variables, Arithmetic, conditional expressions, control structures, positional parameters, passing command line arguments, Built – in Shell commands and shell programs.**Unix Internals:** Kernel Basics, File System, Process Management.**UNIT-III****(18 hours)****File management system calls** : 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:** Creating a new process – fork( ),orphan processes, terminating a process – exit( ), zombie processes, waiting for child – wait( ), Differentiating a process – exec( ), changing directories – chdir( ), changing priorities- nice( ), Accessing user and Group ID's , file locking – deadlocks.**UNIT IV****(18 hours)****Signals:** The defined signals, A list f signals, terminal signals, Requesting on 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.**Inter process communication:** Pipes, Sockets, shared memory, semaphores.**Text Book:**

- 1 “**Unix for programmers and users**” 3<sup>rd</sup> edition by Graham Glass, King Ables, Pearson Education .

**Reference Books:**

1. “**Advanced programming in the unix environment**” w- Richard Stevens 2<sup>nd</sup> Edition Pearson education
2. “**Unix programming environment**”, Kernighan and pike, Pearson education.
3. “**Your unix the ultimate guide**” Sumitabha Das, TMH 2<sup>nd</sup> edition.
4. “**Advanced unix programming**” by Marc J. Rochkind, 2<sup>nd</sup> edition Pearson Education.

- I. Simple queries: selection, projection, sorting on a simple table**
  - i. Small-large number of attributes
  - ii. Distinct output values
  - iii. Renaming attributes
  - iv. Computed attributes
  - v. Simple-complex conditions (AND, OR, NOT)
  - vi. Partial Matching operators (LIKE, %, \_, \*, ?)
  - vii. ASC-DESC ordering combinations
  - viii. Checking for Nulls
- II. Multi-table queries(JOIN OPERATIONS)**
  - i. Simple joins (no INNER JOIN)
  - ii. Aliasing tables – Full/Partial name qualification
  - iii. Inner-joins (two and more (different) tables)
  - iv. Inner-recursive-joins (joining to itself)
  - v. Outer-joins (restrictions as part of the WHERE and ON clauses)
  - vi. Using where & having clauses
- III. Nested queries**
  - i. In, Not In
  - ii. Exists, Not Exists
  - iii. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)
- IV. Set Oriented Operations**
  - i. Union
  - ii. Difference
  - iii. Intersection
  - iv. Division
- V. DDL & TCL Commands.**
  - i. Creating objects: tables, views, users, sequences, Collections etc.
  - ii. Privilege management through the Grant/Revoke commands
  - iii. Transaction processing using Commit/Rollback
  - iv. Save points.
- VI. PL/SQL Programming I**
  - i. Programs using named and unnamed blocks
  - ii. Programs using Cursors, Cursor loops and records
- VII. PL/SQL Programming II**
  - i. Creating stored procedures, functions and packages
  - ii. Error handling and Exception
  - iii. Triggers and auditing triggers
- VIII. User Defined Types**
  - i. Creating Objects
  - ii. Creating User Defined Operators
- IX. Forms designing**
- X. Generating Reports**
- XI. Data base creation using schema builder**
- XII. Query execution using query builder**

**CYCLE-I C++ Programming**

- 1.Program that implements stack operations using classes and objects.
- 2.Program performing complex number addition using friend functions.
- 3.Program for complex number addition using operator overloading.
- 4.Program to perform string operations by overloading operators.
- 5.Program on hierarchical inheritance showing public,private and protected inheritances.
- 6.Program for computation of students result using hybrid inheritance.
- 7.Program implementing bubble-sort using templates.
- 8.Program on virtual functions.
- 9.Program for handling PushOnFull and PopOnEmpty Exceptions for a Stack.
- 10.Program for copying one file to another file using streams.
- 11..Program for writing and reading a class object to a file.

**CYCLE –II JAVA PROGRAMMING**

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.

**LABCYCLE I : ( Working with Commands and Shell Programming )**

- Working with different Unix commands, Pipes, I/O redirection.
- Write Shell Programs for the following
  - Display all the words which are entered as command line arguments.
  - Changes Permissions of files in PWD as rwx for users.
  - To print the list of all sub directories in the current directory.
  - 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.
  - Program which takes two file names as arguments, if their contents are same then delete the second file.
- Write shell scripts for the following
  - To print the given number in the reversed order.
  - To print first 25 Fibonacci numbers.
  - To print the Prime numbers between the specified range.
  - To print the first 50 Prime numbers.
- Write shell scripts for the following
  - To delete all lines containing the word 'unix' in the files supplied as arguments.
  - Menu driven program which has the following options.
    - contents of /etc/passwd
    - list of users who have currently logged in.
    - present working directory.
    - exit.
  - For sorting, searching and insertion, deletion of elements in the list
- Program to transfer the data from one file to another file by using un-buffered I/O.
- 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 (Hint: use fork ( ) ).
- Program to create to process 'i' and sends data to process 'j', prints the same after receiving it. ( Hint: use vfork( ) ).
- Program to demonstrates orphan process .
- Program which demonstrates how to avoid Zombie using wait( ) .

**LABCYCLE II : ( Working with Programs using System Calls)**

- Simulate the following CPU scheduling algorithms-
  - Round Robin
  - SJF
  - FCFS
  - Priority
- Simulate all file allocation strategies
  - Sequential
  - Indexed
  - Linked
- Simulate MVT and MFT
- Simulate all File Organization Techniques
  - Single level directory
  - Two level
  - Hierarchical
  - DAG
- Simulate Bankers Algorithm for Dead Lock Avoidance
- Simulate Bankers Algorithm for Dead Lock Prevention
- Simulate all page replacement algorithms
  - FIFO
  - LRU
  - LFU Etc. ...
- Simulate Paging Technique of memory managementProgram which demonstrates deadlock between two processes.
- Programs on Inter process communication using pipes and shared memory.
- Create a semaphore operation on a shared file for write but not read.
- Client/Server Socket Programming.

**(18 Periods)**

## UNIT-II

**(16 Periods)**

8255 PPI – various modes of operation and interfacing to 8086. Interfacing Keyboard, Displays, 8279 Stepper Motor and actuators. D/A and A/D converter interfacing.

**(16 Periods)**

Serial data transfer schemes. Asynchronous and Synchronous data transfer schemes. 8251 USART architecture and interfacing. TTL to RS 232C and RS232C to TTL conversion. Sample program of serial data transfer. Introduction to High-speed serial communications standards, USB.

**(18 Periods)**

8051 Microcontroller Architecture, Register set of 8051, Modes of timer operation, Serial port operation, Interrupt structure of 8051, Memory and I/O interfacing of 8051.

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Controllers – Deshmukh, Tata McGraw Hill Edition.
3. “Bahadur”, Microprocessors – Prentice Hall of India
4. “Krishna Kant”, Microprocessor and Microcontrollers-PHI

1. Micro Processors & Interfacing – Douglas U. Hall, 2007.
- 1) The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003.
- 2) Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson,
- 3) Yu-cheng Liu, Glenn A. Gibson, “Microcomputer systems: The 8086 /8088 Family architecture, Programming and Design”, Second edition, Prentice Hall of India, 2003.
- 4) 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.
- 5) 8051 Micro Controller Architecture, Programming and Applications by Kenneth J.Ayala.



**UNIT – I****(16 Periods)**

**Introduction:** Uses of Computer Networks, Network Hardware, Network Software, Reference Models, Example Networks.

**The Physical Layer:** The Theoretical Basis for Data Communication, Guided Transmission Media, Wireless transmission, the public switched telephone network

**The Data Link Layer:** Data Link Layer Design Issues, Error Detection and Correction, Sliding Window Protocols.

**UNIT – II**

**The Medium Access Control Sub-layer:** The channel allocation problem, **Multiple Access Protocols, Ethernet**, Data Link Layer Switching.

**UNIT – III**

**The Network Layer:** Network Layer Design Issues, Routing Algorithms, Congestion control algorithms, Quality of Service.

Internet Working, The Network Layer in the Internet

**The Transport Layer:** The Transport Service, Elements of Transport Protocols, Congestion Control Algorithms, The Internet Transport Protocols, The Internet Transport Protocols: TCP, Delay Tolerant Networks.

**UNIT – IV:**

**The Application Layer:** DNS – The Domain Name System, Electronic Mail, The World Wide Web, Real Time Audio & Video, Content Delivery & Peer-to-Peer.

**Prescribed Book:**

1. Andrew S. Tanenbaum, “Computer Networks”, Fifth Edition, Pearson Education.

**Reference Books:**

1. James F.Kurose, Keith W.Ross, “Computer Networking”, Third Edition, Pearson Education
2. Behrouz A Forouzan, “Data Communications and Networking”, Fourth Edition, TMH (2007).
3. Kurose & Ross, “**COMPUTER NETWORKS**” – A Top-down approach featuring the Internet”, Pearson Education – Alberto Leon – Garciak.

**cSE/IT 313      AUTOMATA THEORY & FORMAL  
LANGUAGES**

**L   T   P   M**

**4   1   0   100**

**UNIT – I**

**(18 Hours)**

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

**UNIT – II**

**(15 Hours)**

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**

**(18 Hours)**

*(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 Hours)**

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. Cohen, 'Computer Theory',

2. KLP Mishra & N.Chandrasekharan, 'Theory of Computation', PHI.
3. H.R.Lewis, C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education, 2003.
4. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata McGraw Hill, 2003.
5. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
6. Ragade, "Automata and Theoretical Computer Science", First Edition, Pearson Education, 2004.
7. John E Hopcroft & Jeffery D Ullman' 'Introduction to Automata Theory & Languages and Computation', Narosa Publishing House.

**UNIT - I**

Core Java Overview: Object oriented concepts, Exception Handling, Multi Threading  
Introduction to JDBC : Overview of JDBC API, The Java.sql package, JDBC Drivers,  
Executing SQL commands using JDBC Drivers, static and dynamic Execution of  
SQL statements, Execution of Stored Procedures using JDBC. Introduction to  
Transactions and Transaction Methods.

Introduction to JNDI, Introduction to Data Source and Connection pooling,  
Introduction to Web Applications, Web Servers Overview of J2EE Technologies.

**UNIT - II**

Introduction to Java Servlets, Static and Dynamic contents, Servlet life Cycle and  
Life cycle methods, Servlet Request and Response Model, Deploying a Servlet,  
Servlet State Transitions, Servlet Configuration and Servlet Context, Servlet  
Redirection and Request Dispatch, Servlet Synchronization and Thread Model.  
Maintaining Client State: Cookies, URL rewriting, Hidden form fields, Session  
Tracking.

**UNIT -III**

Introduction to JSP : JSP & Servlet as Web Components, Servlets vs. JSP, JSP  
Lifecycle, JSP Page Lifecycle Phases, General Rules of Syntax, JSP syntactic  
elements, JSP element syntax, Template content. JSP  
elements-directives, declarations, expressions, scriptlets, actions. JSP  
Standard  
Actions: jsp:useBean, jsp:get Property, jsp:set Property, jsp:include, jsp:forward,  
jsp:plugin, jsp:param, java Server Pages Standard Tag Library(JSTL).

**UNIT - IV**

AJAX :Ajax Fundamentals ,JavaScript Libraries, The Prototype Library ,The Fade  
Anything Technique Library ,Form Completion. Realtime Validation, Propagating  
Client-Side View State Direct Web Remoting, Ajax Components, Hybrid  
Components, Keeping JavaScript Out of Renderers, Transmitting JSP Tag Attributes  
to JavaScript Code, Ajax4jsf, Implementing Form Completion with  
Ajax4jsf, Implementing Realtime Validation with Ajax4jsf. Introduction to Java Web  
Services, Future Trends in Web Technology WEB 2.0 and Beyond- Flex.

**Text Books:**

1. Subrahmanyam Allamaraju and Cedric Buest, 'Professional Java Server Programming: J2EE1.3 Edition, Apress publication, 2007.
2. David Geary, Cay Horstmann, 'Core Java Server Faces' 2nd Ed., Prentice Hall-2007

**References:**

1. Dustin R Callaway, 'Inside Servlets: A Server Side Programming for the Java platform', Pearson Education, 2005.
2. Vivek Chopra, Jon Eaves, Rubert jones, Sing Li, John T.Bell, 'Beginning Java Server Pages', Wrox publishers, 2005.
3. 'Beginning J2EE 1.4' With foreword by Ivor Horton, Kevin Mukhar and James L.Weaver, Apress, 2004.

<b>cSE/IT 315</b>	<b>DESIGN ANALYSIS OF ALGORITHMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>100</b>

**UNIT – I (18 Periods)**

**Introduction:** Algorithm Design paradigms – motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations.

**Divide and Conquer:** Structure of divide and conquer algorithms: examples, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

**UNIT – II (18 Periods)**

**Greedy Programming:** Overview of the greedy paradigm examples of exact optimization solution, Approximate solution (Knapsack problem) Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's and Kruskal's algorithms.

**Dynamic Programming:** Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling Salesman Problem, longest Common sequence.

**UNIT – III (16 Periods)**

**Graph Searching and Traversal:** Overview, Traversal methods (depth first and breadth first search), Applications of DFS – connected components, Bi-connected components.

**Back tracking:** Overview, 8-queen problem and Knapsack problem.

**UNIT – IV (16 Periods)**

**Branch and Bound:** LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Travelling Salesman Problem.

**Computational Complexity:** Complexity measures, Polynomial Vs Non-polynomial time complexity; NP-hard and NP-complete classes, examples.

**TEXT BOOK:**

1. E. Horowitz, S. Sahni and S.Rajsekran, "Fundamentals of Computer Algorithms", Galgotia Publication.
2. Design Analysis of Algorithms – Pearson Education

**REFERENCE BOOKS:**

1. T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer Algorithm", PHI.
2. Sara Basse, A.V. Gelder, "Computer Algorithms", Addison Wesley.

**CSE/IT 316**

**SOFTWARE ENGINEERING**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>4</b>	<b>0</b>	<b>0</b>	<b>100</b>

**UNIT-I**

**(18hours)**

INTRODUCTION: 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 MODELS: Prescriptive Models, The Waterfall Model, Incremental Process Models, Evolutionary Models, The Unified Process.

AN AGILE VIEW OF PROCESS: What Is Agility?, What Is an Agile Process?, Agile Process Models.

**UNIT- II**

**(15hours)**

SOFTWARE REQUIREMENTS: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. REQUIREMENTS ENGINEERING PROCESS: Feasibility studies, Requirements Elicitation and analysis, Requirements Validation, Requirements management.

DESIGN ENGINEERING: Design Process, Design Quality, Design Concepts, the Design Model. CREATING AN ARCHITECTURAL DESIGN: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design.

OBJECT ORIENTED DESIGN: Objects and object classes, An Object Oriented design process, Design evolution.

PERFORMING USER INTERFACE DESIGN: The Golden Rules, User Interface Analysis and Design, Interface SYSTEM MODELS: Context Models, Behavioral models, Data models, Object models, structured methods.

**UNIT –III**

**(18hours)**

Analysis, Interface Design Steps, Design Evaluation

#### **UNIT –IV**

**(15hours)**

TESTING STRATEGIES: A Strategic Approach to software testing, Test strategies for Conventional Software, Black-Box and White-Box Testing, White-Box Testing, Validation Testing, System Testing, the art of Debugging.

PRODUCT METRICS: Software Quality, Metrics for the Analysis Model, Metrics for the Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

Test Planning, Management, Execution and Reporting: Introduction – Planning – Management – Process – Reporting – Best Practices.

#### ***Textbooks:***

- 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. Rajib Mall, 'Fundamentals of Software Engineering', Second Edition, PHI.
4. "Pankaj Jalote", An integrated Approach to Software Engineering-Narosa Publications

1. Program on multi-threading showing how CPU time is shared among all the threads.
2. Program for Producer-Consumer problem using threads.
3. Program to send messages across two machines using simple sockets.
4. Write an applet program to demonstrate Graphics class.
5. Write GUI application which uses awt components like label, button, text field, text area, choice, checkbox, checkbox group.
6. Write a program to demonstrate MouseListener, MouseMotionListener, KeyboardListener, ActionListener, ItemListener.
7. Develop swing application which uses JTree, Jtable, JComboBox.
8. Write a JDBC Application to implement DDL and DML commands.
9. Write a program to implement client/server applications using connection oriented & connection less mechanisms.
10. Write *JavaScript* to validate the following fields of the above registration page.
  - Name (Name should contain alphabets and the length should not be less than 6 characters).
  - Password (Password should not be less than 6 characters length).
  - E-mail id (should not contain any invalid and must follow the standard pattern [name@domain.com](mailto:name@domain.com))
  - Phone number (Phone number should contain 10 digits only).
  - Note : You can also validate the login page with these parameters.
11. Install a database (MySQL or Oracle).
  - Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).
  - Practice 'JDBC' connectivity.
  - Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
  - Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page
12. Client server programming using servlets, ASP and JSP on the server side and java script on the client side



**CYCLE-I. Microprocessor 8086 :**

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

**CYCLE-II. Interfacing :**

1. 8259 – Interrupt Controller : Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display : Write a small program to display a string of characters.
3. 8255 – PPI : Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART : Write a program in ALP to establish Communication between two processors.

**CYCLE-III. Microcontroller 8051**

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

**Equipment required for Laboratories:**

1. 8086  $\mu$ P Kits
2. 8051 Micro Controller kits
3. Interfaces/peripheral subsystems
  - i) 8259 PIC
  - ii) 8279-KB/Display
  - iii) 8255 PPI
  - iv) 8251 USART
4. ADC Interface
5. DAC Interface
6. Traffic Controller Interface
7. Elevator Interface

**LAB CYCLE – I**

1. Write a program to:
  - a. Read the dotted decimal IP address and print in the binary format.
  - b. Find the classification of an IP address.
  - c. Read the binary format IP address and print in the dotted decimal format
  - d. Find the network id, host id and the Subnet id of a given IP address.
2. Write a program to implement:
  - a. The Error – Detection Technique: Cyclic – Redundancy - Check.
  - b. Framing Methods: Bit stuffing & Character Stuffing
3. Write a program to implement the following Static - Routing algorithms:
  - a. Shortest – Path Routing (Using Dijkstra's).
  - b. Multicast Routing (Using Minimum Spanning Tree algorithms).
4. Write a program to implement the following Dynamic - Routing algorithm:
  - a. Distance - Vector Routing (Using Fulkerson – Ford or Bell man Ford).

**LAB CYCLE – II:**

To implement the following Client & Server Programs using 'C' Language.

5. Iterative Server (TCP/UDP)
6. Simple Authentication Server (TCP/UDP)
7. Computational Server (TCP/UDP)
8. Concurrent Server (using Child Process/Threads)(TCP/UDP)
9. Simple FTP Server (TCP)
10. Secure Server(TCP)

**LAB CYCLE – III:**

11. Implementation of AES algorithm.
12. Implementation of RSA algorithm.
13. Key Exchange using Diffie-Hellman Approach.
14. Authentication using Digital Signature Algorithm.
15. Implementation of Firewalls.
16. Develop a simple application using any public key cryptosystems.

**UNIT-I****(17 Periods)**

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

CLASSICAL ENCRYPTION TECHNIQUES: 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.

**TEXT BOOK:**

1. William Stallings “**CRYPTOGRAPHY AND NETWORK SECURITY**” 4<sup>th</sup> Edition, (Pearson Education/PHI).

## REFERENCE BOOKS:

1. Behrouz A.Forouzen, "***Cryptography & Network Security***", TMH.
2. Kaufman, Perlman, Speciner, "***NETWORK SECURITY***", 2<sup>nd</sup> Edition, (PHI / Eastern Economy Edition)
3. Trappe & Washington, "***Introduction to Cryptography with Coding Theory***", 2/e, Pearson.

**UNIT I****(16****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****(16 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 Books:**

1. Alfred V.Aho, Ravi Sethi, JD Ullman, 'Compilers Principles, Techniques and Tools', Pearson Education, 2007.

**References:**

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-Cooper & Linda, Elsevier.
5. Compiler Construction, Loudon, Thomson..

**UNIT - I**

Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling : Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling : Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

**UNIT - II**

Class & Object Diagrams : Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-I : Interactions, Interaction diagrams.

**UNIT -III**

Basic Behavioral Modeling-II : Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling : Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

**UNIT-IV**

Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.

Case Study : The Unified Library application.

**TEXT BOOKS :**

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

**REFERENCE BOOKS:**

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TATA McGrawHill
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design

**UNIT-I****(18 periods)****PROBLEMS, PROBLEM SPACES AND SEARCH**

Defining the Problem as a State Space Search - Production Systems - Problem Characteristics - Production System Characteristics - Issues in the Design of Search Programs.

**HEURISTIC SEARCH TECHNIQUES**

Generate-and-Test - Hill Climbing - Best-First Search - Problem Reduction - Constraint Satisfaction - Means-Ends Analysis.

**UNIT-II****(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****(15 Periods)****SLOT – AND – FILLER STRUCTURES**

Semantic Nets - Conceptual Dependency – Scripts.

**PLANNING**

Overview - An Example Domain: The Blocks World - Component of Planning Systems - Goal Stack Planning - Non-linear Planning using constraint posting – Hierarchical planning – Reactive systems.

**UNIT-IV****(13 Periods)****LEARNING**

What is learning? – Rote learning - Learning by taking advice – Learning in problem solving – Learning from example: Induction – Explanation Based Learning.

**EXPERT SYSTEMS**

Representing and using domain knowledge – Expert system shells – Explanation – Knowledge Acquisition.

**Textbooks:**

1. Elaine Rich & Kevin Knight, 'Artificial Intelligence', 2<sup>nd</sup> Edition, (Tata McGraw Hill Edition)

**Reference Books:**

1. Patrick Henry Winston, 'Artificial Intelligence', Pearson Education,
2. Russel and Norvig, 'Artificial Intelligence', Pearson Education/ PHI

**UNIT-I**

Basic Structure of a Game ,Using XNA and working with Xbox 360,,Structure of an XNA application ,Working with XNA's Sprite Manager ,Component programming,C# vs. Java .

**UNIT-II**

**2D** Math: Vectors, matrices, translations & Rotations ,Collisions -- static and dynamic ,Spacial Partitioning Data Structures ,Mastering Menus :Event Driven Programming ,Callbacks: Delegates vs. Interfaces ,Menu Animation

**UNIT-III**

Parallel Programming :Review of parallel fundamentals ,Parallel programming for games ,Working with console hardware ,Tools and Pipelines ,Playing with others: Networking ,Quick review of parallel concepts .

**UNIT-IV**

Memory Management ,C# Garbage Collection , Preallocation: Creating your own (simple!) memory manager .

Basic Artificial Intelligence :State Machines ,Path Finding

**Text Book:**

Jesse Schell "The Art of Game Design: A book of lenses"



**UNIT – I**

**Embedded Computing** : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples.

**The 8051 Architecture** : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. .

**Unit - II**

**Basic Assembly Language Programming Concepts** : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions.

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

**Unit - III**

**Applications** : Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication. .

**Introduction to Real – Time Operating Systems** : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

**Unit - IV**

**Basic Design Using a Real-Time Operating System** : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (OpenSource); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

**TEXT BOOKS :**

1. Computers as Components-principles of Embedded computer system design, Wayne Wolf, Elsevier.
2. The 8051 Microcontroller, Third Edition, Kenneth J. Ayala, Thomson.

**REFERENCES :**

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education

CSE/IT  
325(C)

## MULTIMEDIA SYSTEMS

L T P M

4 1 0 100

### UNIT I

**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

**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

**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

**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

### TEXT BOOKS:

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

### REFERENCES:

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.

**UNIT I :**

**(15 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 :**

**(15 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:**

**(15 Periods)**

Adhoc 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:**

**(15 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 BOOKS :**

1. Srinivasa Desikan & Gopalaswamy Ramesh, “**Software Testing – Principles and Practices**”, Pearson Education, 2007.

**REFERENCES :**

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, Perry, John Wiley.

**UNIT - I**

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, and Matching. Edge detection, Gradient based operators, Morphological operators, Spatial operators for edge detection. Thinning, Region growing, region shrinking, Labeling of connected components.

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchical segmentation, Spatial clustering, Split & merge, Rule-based Segmentation, Motionbased segmentation.

**UNIT - II**

Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform, Line fitting, Curve fitting (Least-square fitting).

Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray-level moments, Boundary analysis: Signature properties, Shape numbers.

**UNIT - III**

Facet Model Recognition: Labeling lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, consisting labeling problem, Back-tracking, Perspective Projective geometry, Inverse perspective Projection, Photogrammetry. From 2D to 3D, Image matching : Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.

Object Models and Matching: 2D representation, Global vs. Local features.

**UNIT - IV**

General Frame Works For Matching: Distance relational approach, Ordered structural matching, View class matching, Models database organization.

General Frame Works: Distance .relational approach, Ordered .Structural matching, View class matching, Models database organization.

Knowledge Based Vision: Knowledge representation, Control-strategies, InformationIntegration.

**Text Books:**

1. David A. Forsyth, Jean Ponce, .*Computer Vision: A Modern Approach*.
2. R. Jain, R. Kasturi, and B. G. Schunk, .*Machine Vision*., McGraw-Hill.

**References:**

1. Milan Sonka, Vaclav Hlavac, Roger Boyle, .*Image Processing, Analysis, and Machine Vision*. Thomson Learning
2. Robert Haralick and Linda Shapiro, .*Computer and Robot Vision*., Vol I, II, Addison-Wesley, 1993.

**CSE/IT 361****MINI PROJECT**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>100</b>

**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.

**cSE 362**

**COMPILER DESIGN LAB**

L	T	P	M
0	0	3	75

1. Design a Lexical analyzer for a language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for a language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser.

**Instructions:**

- Use OpenCV and a webcam to complete this assignment.
- Submit your codes and images or videos.

**Objectives:**

- Learn about camera geometry.
- Learn to calibrate camera using OpenCV functions.
- Learn to obtain and save camera intrinsic and distortion parameters.
- Learn to undistort image from camera.
- Learn to perform pose estimation of a known object.
- You can use either C or C++ version. All functions shown in this document are C++ functions.

**Cycle 1:**

- Download Camera Calibration Images (bitmap or JPEG format) from the class website.
- Write your code to read in one of those calibration images.
- The input image must first be converted to grayscale using `cvtColor()` function (CV\_RGB2GRAY).
- Use OpenCV function `findChessboardCorners()` to find chessboard inner corners.
- Use OpenCV function `cornerSubPix()` to refine corner locations.
- Use OpenCV function `drawChessboardCorners()` to draw corners.
- Save and submit one output image (with corners circled).
- This task is only an intermediate stage of calibration procedure. You don't have to submit your code.

**Cycle 2:**

- Write a program to read in all 40 of the calibration images one at a time in a loop.
- In the loop, find chessboard corners for each input image.
- Arrange corner points in the format for `calibrateCamera()` function. You need to learn how to use vector and vector of vectors if you use C++ (Google or email me if you need help).
- Use OpenCV function `calibrateCamera()` to calculate the intrinsic and distortion parameters.

- Save and submit the intrinsic and distortion parameters.
- Submit your code for this task.

**Cycle 3:** 20 points

- Write **another** program to read in your saved intrinsic and distortion parameters from file(s).
- Download the three test images (Far, Close, Turned).
- Use OpenCV function **undistort()** to correct the distortion of these three images.
- Use OpenCV function **absdiff()** to compute the absolute difference between the original and undistorted images.
- Save and submit the three difference images.
- Submit your code for this task.

**Cycle 4:**

- Download the “Object with Corners” image to see the known object. You don’t have to process this image. Data are provided.
- Download the data file DataPoints.txt that has 20 image points (for x and y in pixels) and 20 object points (for x, y, z in inches).
- Write a program to read in the image and object points.
- Use the C++ version solvePnP() function or C version cvPOSIT() to estimate the object pose (measured by the camera).
- Submit your code and the output rotation and translation matrices.

**Cycle 5:** • Repeat Task 2 (including saving calibration parameters in a file) using your own camera.

- You can use your real-time acquisition code for Assignment 2 to capture images.
- Use the chessboard for Assignment 2 and your code for Task 2 above to calibrate your camera.
- Make sure to change the number of corners entered to the calibration function in your code for Task 2.
- Make sure the chessboard paper is on a planar surface.
- Save and submit the intrinsic and distortion parameters of your camera.
- Submit your code for this task.

**Cycle 6:**

- Repeat Task 3 (including reading calibration parameters from a file) using your own camera.
- Save and submit a video or an image of the absolute difference between the original (captured from your camera) and the undistorted images.
- Submit your code for this task.



**UNIT-I**

**Introduction:** Mobility of Bits and Bytes – Wireless-The Beginning – Mobile Computing – Dialogue Control– Networks – Middleware and Gateways – Application and Services (Contents) – Developing Mobile Computing Application s- Security in Mobile Computing – Standards-Why is it Necessary? – Standard Bodies – Players in the Wireless Space.

**Mobile Computing Architecture:** Internet-The Ubiquitous Network – Architecture for Mobile Computing – Three-Tier Architecture – Design Considerations for Mobile Computing – Mobile Computing through Internet – Making Existing Applications Mobile-Enabled.

**Mobile Computing Through Telephony:** Evolution of Telephony – Multiple Access Procedures – Mobile Computing through Telephone – Developing an IVR Application – Voice XML – Telephony Application Programming Interface (TAPI).

**Emerging Technologies:** Introduction – Bluetooth – Radio Frequency Identification (RFID), WiMAX –Mobile IP – IPv6 – Java Card.

**UNIT-II**

**Global System for Mobile Communications (GSM):** GSM Architecture – Entities – Call Routing in GSM –PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency Allocation –Authentication and Security.

**Short Message Service (SMS):** Mobile Computing over SMS – SMS – Value Added Services through SMS –Accessing the SMS Bearer.

**GPRS:** Packet Data Network – Network Architecture – Network Operations – Data Services in GPRS –Applications for GPRS – Limitations – Billing and Charging.

**Wireless Application Protocol (WAP):** Introduction – WAP – MMS – GPRS Applications.

**UNIT-III**

**CDMA and 3G:** Introduction – Spread-Spectrum Technology – Is-95 – CDMA Vs GSM – Wireless Data – 3GNetworks & Applications

**Wireless LAN:** Introduction – Advantages – IEEE 802.11 Standards – Architecture – Mobility – Deploying –Mobile Ad Hoc Networks and Sensor Networks – Wireless LAN Security – WiFi Vs 3G.

**Internet Networks and Interworking:** Introduction – Fundamentals of Call Processing – Intelligence in the Networks – SS#7 Signaling – IN Conceptual Model – Softswitch – Programmable Networks – Technologies and Interfaces for IN.

**Client Programming:** Introduction – Moving Beyond the Desktop – A Peek under the Hood: Hardware Overview – Mobile Phones – PDA – Design Constraints in Applications for Handheld Devices.

**UNIT-IV (18 periods)**

**Programming for the PALM OS:** Introduction – History of Palm OS – Palm OS Architecture – Application Development – Communication in Palm OS – Multimedia.

**Wireless Devices with SYMBIAN OS:** Introduction – Symbian OS Architecture – Applications for Symbian – Control and Compound Controls – Active Objects – Localization – Security on the Symbian OS.

**J2ME:** JAVA in the Handset – Three-Prong Approach to Java Everywhere, Java 2 Micro Edition (J2ME) – Programming for CLDC – GUI in MIDP – UI Design Issues – Multimedia – Record Management System – Communication in MIDP – Security Considerations in MIDP – Optional Packages

**Wireless Devices with Windows CE:** Introduction – Different Flavors of Windows CE – Windows CE Architecture – Windows CE Development Environment.

**TEXT BOOKS:**

1. Asoke K Talukder & Roopa R.Yavagal, “Mobile Computing – Technology Applications and Service Creation”, TMH 2006.

**REFERENCE BOOKS:**

1. Uwe Hansmann, Lothar Merk, Martin S.Nicklous, Thomas Staber, “*Principles of Computing*”, 2/e, Springer International Edition.

2. J.Schiller, “*Mobile communications*”, Addison-Wesley, 2003

<b>cSE 412</b>	<b>ADVANCED COMPUTER ARCHITECTURE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>100</b>

### **UNIT - I (15 Periods)**

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and Multicomputers, Multivector and SIMD computers. 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, Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multi-port memory, Multistage and combining network.

### **UNIT-II (20 Periods)**

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws - Amdahl's law for fixed 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 (20 Periods)**

MULTI Processors: Multiprocessor System Interconnect, Cache Coherence and Synchronization Mechanisms, Message-passing Mechanism.

Scalable, Multi-Threaded and Dataflow Architectures:

Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures.

### **UNIT-IV (15 Periods)**

Parallel Models, Languages and Compilers:

Parallel Programming Models, Parallel Languages and Compilers, Dependence analysis of Data Arrays, code optimization and Scheduling, Loop parallelization and pipelining.

**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, 2<sup>nd</sup> Edition.
2. V.Rajaram & C.S.R.Murthy, "Parallel Computer", PHI.
3. Barry Wilkinson and Michael Allen, "Parallel Programming" Pearson Education.

**CSE/IT 413**

**DISTRIBUTED SYSTEMS**

L	T	P	M
4	1	0	100

**UNIT- I**

**(12 Hours)**

**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 Hours)**

**Processes:-** Threads, Clients, Servers, Code Migration

**Naming:** Naming Entities -Names, Identifiers and Addresses, Name Resolution, The Implementation of a Name Space. Locating Mobile Entities, Removing Unreferenced Entities

**UNIT- III**

**(18 Hours)**

**Synchronization:** Clock Synchronization. Logical Clocks, Election Algorithms, Mutual Exclusion.

**Consistency and Replication:** Introduction, Data- Centric Consistency Models, Client –Centric Consistency Models, Distribution Protocols, Consistency Protocols.

**UNIT- IV:**

**(12 Hours)**

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

**Distributed File Systems:-**Sun Network File System, The Coda File System.

**Text book:**

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

**Reference books:**

1. Coulouris, Dollimore,Kindberg,“***Distributed Systems-Concepts and Design***” 3<sup>rd</sup> edition, Pearson Education.
2. Mukesh, Singhal & Niranjana G.Shivarathri, “***Advanced Concepts in Operating Systems***”, TMH.
3. Sinha, “***Distributed Operating System – Concepts and Design***”, PHI.

<b>CSE 414</b>	<b>WEB TECHNOLOGIES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
		<b>4</b>	<b>1</b>	<b>0</b>	<b>100</b>

**Unit I (16 Hours)**

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

**Unit II (18 Hours)**

Dynamic HTML: Object Model and Collections  
Dynamic HTML: Event Model  
XML, RSS (Really Simple Syndication)

**Unit III (16 Hours)**

Building Ajax-Enabled Web Applications  
Web Servers (IIS and Apache)  
Ruby and Ruby on Rails

**Unit IV (20 Hours)**

JavaServer Faces Web Applications: Part 1  
JavaServer Faces Web Applications: Part 2  
Web Services

**Text Books:**

Harvey M. Deitel and Paul J. Deitel, “***Internet & World Wide Web How to Program***”, 4/e, Pearson Education.

**References:**

1. Jason Cranford Teague “Visual Quick Start Guide CSS, DHTML & AJAX”, 4e, “Pearson Education.
2. Tom Nerino Doli smith “JavaScript & AJAX for the web” Pearson Education 2007.
3. Joshua Elchorn “Understanding AJAX” Prentice Hall 2006.
4. Hal Fulton “The Ruby Way”, 2e, 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.

**cS/IT 415****OPEN ELECTIVE**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>4</b>	<b>0</b>	<b>0</b>	<b>100</b>

**CSE/IT 416      PROFESSIONAL ETHICS AND HUMAN      L   T   P   M**  
**VALUES**

**4   0   0   100**

**UNIT – I      (18 Periods)**

**Human Values:** 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      (12 Periods)**

**Engineering Ethics:** Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

**UNIT – III      (18 periods)**

**Engineering as Social Experimentation:** Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

**Safety, Responsibility and Rights:** Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and reducing risk.

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      (12 Periods)**

**Global Issues:** 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 electronics and telecommunication engineers (ISTE), India, etc.

**Text Books:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill. New York 1996.
2. Govindarajan. M, Natarajan. S, Senthilkumar. V.S, "Engineering Ethics", Prentice Hall of India, 2004.

**References:**

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Jersey, 2004 (Indian Reprint).
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics Concepts and Cases", 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.

**cSE/IT 451**

**MOBILE COMPUTING LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>75</b>

Experiments to be performed using hardware devices if the setup is available or the network simulation 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.
- Demonstration of energy saving protocol stack for wireless mobile environments



**cSE 452**

**WEB TECHNOLOGIES LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>75</b>

1. Write codes different types of styles in CSS.
2. Write java scripts covering Function, recursive functions, Arrays and Objects.
3. Demonstrate collection objects.
4. Demonstrate event model.
5. Write well-formed and valid XML documents.
6. Write code for displaying XML using XSL.
7. Demonstrate Document Object Model for an XML document.
8. Programs on Ruby & Ruby on Rail.
9. Develop a web application using JSF.

Application on Web Services

**cSE/IT 453**

**SOFT SKILLS LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>75</b>

**Module-1: Non-Verbal Communication Skills**

- a) Body Language – Voluntary and Involuntary
- b) Kinesics
- c) Facial Expressions
- d) Proxemics
- e) Oculistics
- f) Haptics and Chronemics

**Module-2: Cognitive Skills**

- d) Creative Thinking
- e) Lateral Thinking
- f) Critical Thinking

**Module-3: Motivation and Emotional Intelligence**

- d) Motivation
- e) Emotions and Emotional Intelligence

**Module-4: Employability Skills**

- a) Role-Play
- b) Time Management
- c) Interview Techniques
- d) Group Discussion
- e) Team Work

**Module-5: Behaviour Skills**

- a) Attitudes
- b) Aggression

- c) Conflict Management

Module-6: Interpersonal Skills

- a) Stress Management
- b) Perception
- c) Effective Listening

**Suggested Software:**

1. Globereena Software
2. K-Van Solutions Software
3. Centronix Software
4. Train 2 Success- CD Series (Zenith Global Consultancy)

**Reference Books:** Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Soft Skills: Know Yourself & Know the World, Dr.K.Alex, S.Chand Publications.
2. The ACE of Soft Skills: Attitude, communication and Etiquette for Success, by Pearson Publications.
3. Communication Skills, Leena Sen, 2<sup>nd</sup> Edition, PHI, 2007.
4. Organizational Behavior, Stephen P. Robbins and Timothy A. Judge, 13<sup>th</sup> Edition, PHI, 2009.
5. Business Communication, Meenakshi Raman and Prakash Singh, Oxford University Press, 2006.
6. Converstion Developing Soft Skills,4 th Edition,pearson Publication.
7. Manageing Soft Skills, K.R.Lakshminarayanan and T.Murugavel, Scitech Publications.
8. Communicate to Conquer: A Handbook of Group Discussions and Job Interviews with CD, PHI Publications.

<b>cSE/IT 421</b>	<b>INDUSTRIAL ENGINEERING &amp; MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>100</b>

#### **UNIT-I**

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**

FINANCIAL MANAGEMENT: Concept of interest, Compound interest, Equivalent cash flow diagram.

ECONOMIC EVALUATION OF ALTERNATIVES: The annual equivalent method, Present worth method, Future worth 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**

PERSONNEL MANAGEMENT: Functions of personal Management: Human Resources Planning, Recruitment, Selection, Placement, Training and Development, Career development and Performance Appraisal.

JOB ANALYSIS: Job Description and Job specification. Motivational Theories, Leadership Styles & Stress Management.

#### **UNIT-IV**

MATERIAL MANAGEMENT: Introduction

PURCHASING: objectives, source 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.

**Textbooks:**

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. Koontz & Weirich, 'Management' TMH

**UNIT – I****(12 Periods)**

Introduction to machine learning: Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm, remarks on Version Spaces and Candidate-Elimination and inductive bias. Decision Tree Learning: Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

**UNIT – II****(18 Periods)**

Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptrons, Multilayer Networks and the Backpropagation algorithm and remarks on the Backpropagation algorithm. Evaluating Hypotheses: Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing learning algorithms.

**UNIT – III****(18 Periods)**

Bayesian Learning: Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naive Bayes classifier, Bayesian belief networks and EM algorithm. Computational learning theory: Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

**UNIT – IV****(16 Periods)**

Instance Based Learning: Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning. Genetic Algorithms: Introduction, hypothesis space search, Genetic programming and models of evolution and learning.

**TEXT BOOKS:**

1. Tom M. Mitchell, "Machine Learning", Mc. Graw Hill Publishing.

**UNIT – I****(18 Periods)**

**Data Warehouse** – Introduction, A Multi-dimensional data model, Data Warehouse Architecture, Data Warehouse Implementation.

**Data Mining** – Introduction, Data Mining, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major issues in Data Mining.

**UNIT – II****(18 Periods)**

**Data Preprocessing** – Data cleaning, Data Integration & Transformation, Data Reduction, Discretization & Concept Hierarchy Generation, Data Mining Primitives.

**Mining Association roles in large databases** – Association rule mining, mining single-dimensional Boolean Association rules from Transactional Databases, Mining Multi-dimensional Association rules from relational databases & Data Warehouses.

**UNIT – III****(15 Periods)**

**Cluster Analysis** – Introduction, Types of data in Cluster analysis, A categorization of major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

**UNIT – IV****(20 Periods)**

**Classification & Prediction** – Introduction, Classification by Decision tree induction, Bayesian Classification, , Classification by Back propagation, Other Classification Methods, Prediction, Classifier accuracy.

**Mining Complex Type of Data** – Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

**Textbooks:**

1.Data Mining Concepts & Techniques – Jiawei Han Micheline Kamber – Morgan Kaufmann Publishers.

**Reference Books:**

1. Data Warehouse Toolkit – Ralph Kinball – John Wiley Publishers.
2. Data Mining (Introductory and Advanced Topics) – Margaret H.Dunham – Pearson Education.
3. Data Warehousing in the real world – A Practical guide for Building decision support systems – Sam Anahory, Dennis Murray – Pearson Education.
4. Introduction to Data Mining with case studies – G.K.Gupta, PHI Publications, 2006

**cSE/IT  
424(A)**

**PARALLEL ALGORITHMS**

**L T P M**  
**4 1 0 100**

**UNIT I(14 Periods)**

Introduction: Parallel Processing, Background, Parallel Models, Performance of parallel Algorithms, The Work-Time Presentation Framework, The Optimality Notion.

**UNIT II**

Basic Techniques: Balanced Trees, Pointer Jumping, Divide and Conquer, Partitioning, Pipelining, Accelerated Cascading, Symmetry Breaking. Lists and Trees: List Ranking, Euler-Tour Techniques, Tree Contraction, Lowest Common ancestors.

**UNIT III**

Searching, Merging, and Sorting: Searching, Merging, Sorting, Sorting Networks, Selection. (12)

Graphs: Connected Components, Minimum Spanning Trees, Biconnected Components, Ear Decomposition, Directed Graphs. (12)

**UNIT IV**

Realistic Models of Parallel Computation: Bulk Synchronous Parallel (BSP), LogP, Shared-Memory (SMP), Clusters of SMPs, Communication Primitives, Sorting, 2D FFT (12)

**Textbook:**

1. Joseph, "Introduction to Parallel Algorithms", Pearson Edition Wesley.

**Reference Books:**

1. David Culler and J. P. Singh with Anoop Gupta, "Parallel Computer Architecture: A Hardware/Software Approach"; Morgan Kaufmann Publishers.



**cSE/IT  
424(B)**

**NATURAL LANGUAGE PROCESSING**

**L T P M**

**4 1 0 100**

**UNIT - I**

**(10 Periods)**

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

**UNIT-II:**

**(25 Periods)**

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution: Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

**UNIT –III**

**(15 Periods)**

Semantic Interpretation:  
Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

**UNIT-IV**

**(20 Periods)**

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

**TEXT BOOK:**

Natural Language Understanding – James Allen, Second Edition, Pearson Education.

**REFERENCE BOOKS:**

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.
3. Artificial Intelligence, Elaine Rich and Kevin Knight, Second Edition, Tata McGraw Hill.

**cSE/IT  
424(C)**

**CYBER CRIME & LAWS**

**L T P M**

**4 1 0 100**

**UNIT-I**

**(15 periods)**

Introduction to Cyber Crimes, Classification of Cyber Crimes, Computer as an Instrument of crime, Internet Crimes, Web Based Crimes, Computer Containment, Computer Virus. Hacking, Internet Frauds, Pornography , Forgery ,Defamation, Cyber Terrorism, Regulation of Cyber Crimes : Adjudicating Officer, Appointment and Qualification, Powers of Adjudicating Officer ; and Constitution, Powers & Jurisdiction of Cyber Appellate Tribunals.

**UNIT-II**

**(15 periods)**

The Online Landscape: Technological, Social and Legal Issues, Harmonisation of Laws and the Issue of Jurisdiction Over the Internet , The Internet in the Context of International Commerce, Electronic Signature Legislation-a historical perspective, An Overview of Specific Aspects, SEBI Guidelines, The UNCITRAL Model Law and Electronic Equivalents to Traditional Bills of Lading.

The legal framework, Confidential Information, Protection of Confidential Information, Nature of confidential information , Confidence implied in a contract, Confidence implied by circumstances, Identification of confidential information.

**Unit –III**

**(13 periods)**

Essential requirements of breach of confidence, Exceptions to breach of confidence, Remedies for breach of confidence , Employee Privacy Rights , Employer Protection

Intellectual Property on The Internet , Squatting in Cyberspace: A Web of Deception, WIPO Cases Involving Complainants from India, Intellectual Property (Trade Marks), Domain Names: ICANN and New Remedies Against Cybersquatting, Domain names, copyright intellectual Property and the Internet: A case study of the Indian approach to intellectual property and e-commerce, DVD Audio Disc Copy Protection, Systems-on-a-Chip: Intellectual Property and Licensing Issues

**UNIT – IV**

**(17 periods)**

Introduction, Personal Data, Data Subject, Data Processing: Definition and Grounds, Purpose Limitation , Legitimate Purposes, Data Controllers And Data Processors, Establishment, Data - Access and Information, Anonymous and Pseudonymous Data, Freedom of Expression , Free Flow of Data within the Eu, Data Transfer, Data Minimization

Observations on the Preamble, Jurisdictions proposing to adopt provisions of the Model Law, UNCITRAL Model Law on Electronic Commerce Part One. Electronic Commerce In General, Sphere of application, UNCITRAL Model Law , Information Technology Act, 2000: An overview, Existing restrictions on FDI in domestic trading to be applicable to e-commerce as well.

**Text Books:**

1. Suri, R.K. and T.N. Chhabra., "Cyber Crimes," New Delhi Pentagon Press, 2002.
2. Rodney D. Ryder, " Guide to Cyber Laws", Second Edition, Wadhwa and Company, 2007

**Reference Books:**

1. Joga Rao, S.V., "Law of Cyber Crimes and Information Technology Law", Wadhwa and Company, Nagpur, 1st Edition, 2004.
2. Sharma, S.R., "Dimensions of Cyber Crime", Annual Publications Pvt. Ltd., 1st Edition, 2004.
3. Augustine, Paul T., " Cyber Crimes and Legal Issues", Crecent Publishing Corporation, 2007.
4. Vakul Sharma, "Handbook of Cyber laws" Macmillan India Ltd, 2003
5. Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, New Delhi, 2003

**UNIT-I**

**INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY:**Scable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models – Symmetric and distributed shared memory architectures – Performance Issues, Brief introduction to cache hierarchy and communication latency, Shared memory multiprocessors, General architectures and the problem of cache coherence, Synchronization primitives: Atomic primitives; locks: TTS, ticket, array; barriers: central and tree; performance implications in shared memory programs;

**UNIT-II**

Multi-core Architectures - Introduction to multi-core architectures -Software and hardware multithreading – SMT and CMP architectures –Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture., issues involved into writing code for multi-core architectures, development of programs for these architectures, program optimizations techniques, building of some of these techniques in compilers/

**UNIT III**

**PARALLEL PROGRAMMING :**Fundamental concepts – Designing for threads – scheduling - Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading, APIs, OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

Unit-IV: Chip multiprocessors: Why CMP (Moore's law, wire delay); shared L2 vs. tiled CMP; core complexity; power/performance; Snoopy coherence: invalidate vs. update, MSI, MESI, MOESI, MOSI; performance trade-offs; pipelined snoopy bus design; Memory consistency models: SC, PC, TSO, PSO, WO/WC, RC; Chip multiprocessor case studies: Intel Montecito and dual-core, Pentium4, IBM Power4, Sun Niagara

**TEXTBOOKS:**

1. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mc graw Hill, 2003.

**REFERENCES:**

1. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach" , Morgan Kaufmann/Elsevier Publishers, 1999

**UNIT – I**

**(15 Periods)**

**1. Introduction**

Definitions, Sequencing, Molecular Biology and Bioinformatics, Biological sequence/structure, Genomoe Projects, Pattern Recognition and prediction, Folding problem, Sequence Analysis, Homology and Analogy, Bioinformatics Applications, Central Dogma of Molecular Biology

**2. Information Resources**

Biological databases, Primary Sequence databases, Protein sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases DNA sequence databases, specialized genomic resources

**UNIT – II**

**(18 Periods)**

**3. DNA Sequence Analysis**

Importance of DNA analysis, Gene Structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene Hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases, The Human Genome Project

**4. Pair Wise Alignment Techniques**

Database Searching, Alphabets and complexity, algorithm and programs, comparing two sequences, sub-sequences, Identity and similarity, The Dot plot, Local and Global similarity, Different alignment techniques, Scoring Matrices, Dynamic Programming, Pair wise database searching

**UNIT – III**

**(15 Periods)**

**5. Multiple sequence alignment & Phylogenetic Analysis**

Definition and goal, The consensus, Computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments, and searching, Applications of Multiple Sequence alignment, Phylogenetic Analysis, Methods of Phylogenetic Analysis, Tree Evaluation, Problems in Phylogenetic analysis, Tools for Phylogenetic Analysis

**6. Secondary database Searching**

Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

**UNIT – IV**

**(12 Periods)**

**7. Gene Expression and Microarrays**

Introduction, DNA Microarrays, Clustering Gene Expression Profiles, Data Sources and tools, Applications

**8. Analysis Packages**

Analysis Package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

**Text Book:**

1. Introduction to Bioinformatics T K Attwood And D.J. Parry-Smith, Pearson
2. Bioinformatics methods and applications S.C. Rastogi, N. Mendiratta And P.Rastogi., PHI

**Reference Books:**

1. Introduction to Bioinformatics Arthur M. Lesk OXFORD Publishers (Indian Edition)
2. Elementary Bioinformatics, Imtiyaz Alam Khan, Pharma Book Syndicate

**CSE/IT  
425(B)**

**ENTERPRISE PROGRAMMING**

**L T P M**

**4 1 0 100**

**UNIT – I**

**(16 Hours)**

J2EE Overview  
Multi-Tier Architecture  
Best Practices  
Design Patterns and Frame Works  
Java and XML

**UNIT – II**

**(20 Hours)**

Java Servlets  
Java Server Pages  
Enterprise JavaBeans

**UNIT – III**

**(18 Hours)**

Java Mail API  
Java Interface Definition Language and CORBA  
Java Remote Method Invocation  
Java Message Service  
Java Message Service  
Java Naming and Directory Interface API

**UNIT – I V**

**(20**

**Hours)**

SOAP  
Universal Description, Discovery  
Electronic Business XML  
Java API for XML Registries (JAXR)  
Web Services Description Language (WSDL)

**Books:**

1. Jim Keogh "The complete Reference J2EE" Tata McGraw Hill.

**References:**

1. Subrahmanyam Allamaraju 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 Software Team "Java Server Programming" Dreamtech Press.
4. James McGovern, et.al "J2EE Bible".
5. BV Kumar, S Sangeetha, SV Subrahmanya "J2EE Architecture" Tata McGraw Hill.

**cSE/IT  
425(C)**

## **CLOUD COMPUTING**

**L T P M**

**4 1 0 100**

### **UNIT - I**

Cloud Computing Basics - Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud.

Organization and Cloud Computing - When You Can Use Cloud Computing,

Benefits, Limitations, Security Concerns, Regulatory Issues.

Cloud Computing with the Titans – Google, EMC, NetApp, Microsoft, Amazon, Salesforce.com, IBM, Partnerships,

The Business Case for Going to the Cloud - Cloud Computing Services, How Those

Applications Help Your Business, Deleting Your Datacenter, Salesforce.com, Thomson Reuters.

### **UNIT - II**

Hardware and Infrastructure – Clients, Security, Network, Services.

Accessing the Cloud – Platforms, Web Applications, Web APIs, Web Browsers.

Cloud Storage – Overview, Cloud Storage Providers,

Standards – Application, Client, Infrastructure, Service.

### **UNIT - III**

Software as a Service – Overview, Driving Forces, Company Offerings, Industries

Software plus Services – Overview, Mobile Device Integration, Providers, Microsoft Online.

Developing Applications – Google, Microsoft, Intuit QuickBase, Cast Iron Cloud, Bungee Connect, Development, Troubleshooting, Application Management.



## UNIT - IV

Local Clouds and Thin Clients - Virtualization in Your Organization, Server Solutions,

Thin Clients, Case Study: McNeilus Steel.

Migrating to the Cloud - Cloud Services for Individuals, Cloud Services Aimed at the

Mid-Market, Enterprise-Class Cloud Offerings, Migration.

Best Practices and the Future of Cloud Computing- Analyze Your Service, Best

Practices, How Cloud Computing Might Evolve.

### **Text Book:-**

1. Cloud Computing "A Practical Approach" Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGraw-Hill

**cSE/IT  
425(D)**

**DIGITAL IMAGE & SPEECH PROCESSING L T P M**

**4 1 0 100**

### **UNIT-I:**

**(20 Periods)**

Introduction: The Speech Signal, Signal Processing, Digital Signal Processing, Digital Speech Processing.

Fundamentals of Digital speech Processing: Introduction, Discrete time signals and systems, Transform representations of Signals and systems, Z-Transform, Fourier Transform, The Discrete Fourier transform., Fundamentals of Digital Filters, FIR systems, IIR systems, Sampling,

**UNIT-II: (15 Periods)**  
 Digital Models for Speech signals: The process of speech production, the acoustic theory of Speech production, Digital Models for Speech signals.

**UNIT-III (15 Periods)**  
 Introduction: Digital image Processing: Fundamental Steps in Digital image Processing Components of Image Processing.  
 Digital image Fundamentals: Image Sampling and Quantization, Some basic relationship between pixels.  
 Image Enhancement in spatial domain: Some basic gray level Transformations, Histogram processing, Enhancement using Arithmetic and Logic operations: Basics of Spatial Filtering, Smoothing spatial Filters and Sharpening spatial Filters.  
 Enhancement in Frequency domain: Smoothing frequency domain filters, Sharpening frequency domain filters, Homomorphic filters.

**UNIT-IV: (20 Periods)**  
 Image Compression: Fundamentals of image compression Models: Error free compression, lossy compression, Image compression standards.  
 Image segmentation: Detection of discontinuities; Edge linking and Boundary detection, Thresholding, Region Based Segmentation:

**TEXT BOOKS:**

1. Digital Processing of Speech Signals, L.R.Rabiner and R.W.Shafer, PHI publications .
2. Digital Image Processing, R.Gonzalez and R.E. Woods, Pearson Education, Second Edition.

**REFERENCE BOOKS:**

1. Fundamentals of Speech Recognition, L. Rabiner and B.Juang, Pearson Education.
2. A.K. Jain”Fundamentals of Digital Image Processing’, PHI.

**cSE/IT 461**

**DATA ENGINEERING LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>75</b>

- I. Analyzing data with ROLLAP, CUBE.
- II. Cube slicing – come up with 2-D view of data.
- III. Drill-down or Roll-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.** ETL : Extraction Options
  - i. Full extraction
  - ii. Incremental extraction
  - iii. Change Data Capture(CDC)
- X.** ETL: Transformation Options
  - iv. Transformation: during extraction, in staging area, during load, etc.
  - v. Multi-state transformation
  - vi. Pipelined transformation
- XI.** ETL: DW Load options
  - vii. Loader: SQL(DML)
  - viii. Data Pump
- XII.** DW index design options
  - ix. B\*tree index – how they work
  - x. Bitmapped index – how they work
  - xi. NULL value considerations

**CSE/IT 462**

**PROJECT WORK**

<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>200</b>