

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

**For**

**MASTER OF COMPUTER APPLICATIONS**



**JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY KAKINADA  
KAKINADA - 533 003, Andhra Pradesh, India**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY :  
KAKINADA (Established by Andhra Pradesh Act No.30 of 2008)  
Kakinada – 533 003, Andhra Pradesh (India)**

**ACADEMIC REGULATIONS MBA (Regular) 2013-2014**  
(Effective for the students admitted into first year from the  
academic year 2013-2014)

The MBA Degree of the Jawaharlal Nehru Technological University Kakinada shall be conferred on candidates who are admitted to the program and fulfill all the requirements for the award of the Degree:

### **1.0 ELIGIBILITY FOR ADMISSIONS**

Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the University from time to time. Admissions shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or at an Entrance Test conducted by the university subject to reservations prescribed by the university from time to time.

### **2.0 AWARD OF MBA DEGREE**

- 2.1 A Student shall be declared eligible for the award of MBA degree, if he pursues a course of study and completes it successfully for not less than two academic years and not more than four academic years.
- 2.2 A Student, who fails to fulfill all the academic requirements for the award of the degree within **FOUR** academic years from the year of their admission, shall forfeit his/her seat in MBA course.

### **3.0 ATTENDANCE**

- 3.1 A candidate shall be deemed to have eligibility to write end semester examinations if he has put in a minimum of 75% of attendance in aggregate of all the subjects.
- 3.2 Condonation of shortage of attendance up to 10% i.e. 65% and above and below 75% may be given by the College Academic Committee.
- 3.3 Condonation of shortage attendance shall be granted only on genuine and valid reasons on representation by the candidate

with supporting evidence.

- 3.4 Shortage of attendance below 65% shall in no case be condoned.
- 3.5 A candidate shall not be promoted to the next semester unless he fulfills the attendance requirements of the previous semester.

#### **4.0 EVALUATION**

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for practicals, on the basis of the Internal Evaluation and End Examination

- 4.1.1 For the theory subjects 60 marks shall be awarded based on the performance in the End Examination. Remaining 40 Internal marks are divided in Two Mid Examinations and taking average for awarding the Internal Marks.
- 4.1.2 Remaining 40 marks shall be awarded based on Internal Examination. Two Internal Examinations of 40 marks each will be conducted in semester and taking average for awarding the Internal Marks. The Internal Examination will have two components:
  - i) First 20 marks is Mid examination with duration of 120 minutes. The student has to answer four questions out of four questions.
  - ii) Remaining 20 marks is allotted for Mini Report (10marks for preparation of Report and 10 marks for presentation in the class room) in the respective subject.
- 4.2 For practical subjects, 60 marks shall be awarded based on the performance in the End Semester Examinations, 40 marks shall be awarded based on the day-to-day performance as Internal Marks.
- 4.3 A candidate shall be deemed to have secured the minimum academic requirements in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 4.4 A Candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are

less than 50% and he has failed in the end examination. In such case candidate must re-register for the subject(s) and secure required minimum attendance. Attendance in the re-registered subject(s) has to be calculated separately to become eligible to write the end examination in the re-registered subject(s).

The attendance of re-registered subject(s) shall be calculated separately to decided upon the eligibility for writing the end examination in those subject(s). In the event of taking another chance, the internal marks and end examination marks obtained in the previous attempt are nullified. At a given time a candidate is permitted to re-register for a maximum of two subject(s) in addition to the subjects of a regular semester.

- 4.5 A Candidate shall be allowed to submit the project report only after fulfilling the attendance requirements of all the semesters.
- 4.6 The viva-voce examination shall be conducted after completion of the fourth semester end examinations.
- 4.7 Laboratory examination for MBA course must be conducted with two Examiners, one of them being Laboratory Class Teacher and second examiner shall be other than Class Teacher.

## **5.0 EVALUATION OF PROJECT WORKS**

- 5.1 A Project Review Committee (PRC) of the college is to be constituted with Principal/Director as chairperson, heads of the departments, which are offering PG courses, and two other senior faculty members of the department offering MBA.
- 5.2 Registration of Project work: A Candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses) up to II semester.
- 5.3 Every candidate shall work on projects approved by the PRC of the College.
- 5.4 A student has to undergo practical training for a period of 6 weeks in a Corporate Enterprise after the Second Semester/ Summer vacations In training period, the candidates should work on a specific problem related to the elective subject. At the end of practical training, the student should submit a certificate obtained from the organization.

The student should prepare a Project Report under the supervision of

a guide from the faculty of management of the concerned college. However, the students who prepare Project Report in the area of systems can also work under the guidance of Faculty member from Computer Science Department.

- 5.5 Three copies of Project dissertation certified by the Project supervisor shall be submitted to the College/School
- 5.6 The project report shall be adjudicated by one examiner selected by the University.

The College will submit a 5-member panel who are eminent in that field of study.

- 5.7 The viva-voce examination of the project report shall be conducted by a board consisting of the External examiner, the Head of the Department and Supervisor. The Candidate should have to secure **Grade A/Grade B/Grade C** in Project viva-voce.

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce examination.

- 5.8 If the candidate fails to secure **Grade A/Grade B/Grade C** in project viva-voce, the candidate will retake the viva-voce examination after three months. If he fails to get **Grade A/Grade B/Grade C** at the second viva-voce examination, he will not be eligible for the award of the degree, unless the candidate is asked to revise and resubmit. If the candidate fails to secure **Grade A/Grade B/Grade C** again, the project shall be summarily rejected.

**Grade A: Excellent, Grade B: Good, Grade C: Satisfactory, Grade D: Unsatisfactory**

## 6.0 AWARD OF DEGREE AND CLASS

A candidate shall be eligible for the award of MBA degree if he satisfies the minimum academic requirements in every subject and in his project thesis/dissertation and viva-voce.

First class with Distinction:	70% or more
First class	below 70% but not less than 60%
Second class	below 60% but not less than 50%

## **7.0 WITHHOLDING OF RESULTS**

If the candidate has not paid any dues to the university or if any case of indiscipline is pending against him, the result of the candidate will be withheld. The issue of degree is liable to be withheld in such cases.

## **8.0 TRANSITORY REGULATIONS**

Candidates who have discontinued or have been detained for want of attendance or who have failed after having undergone the course are eligible for admission to the same or equivalent subjects as and when subjects are offered, subject to 4.4.

## **9.0 GENERAL**

- 9.1 The academic regulations should be read as a whole for purpose of any interpretation.
- 9.2 In case of any doubt of ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 9.3 The University may change or amend the academic regulations and syllabus at any time and the changes and amendments made shall be applicable to all the students with effect from the date notified by the University.
- 9.4 Wherever the word he, him or his occur, it will also include she, her and hers.
- 9.5 There shall be no transfers within the constituent colleges of Jawaharlal Nehru Technological University Kakinada.

## MALPRACTICES RULES

### DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

	(theory or practical) in which the candidate is appearing.	work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and



	the examination.	shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/ Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	<p>outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</p>	
7.	<p>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
8.	<p>Possess any lethal weapon or firearm in the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining</p>

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

**Malpractices identified by squad or special invigilators**

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1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
  - (i) A show cause notice shall be issued to the college.
  - (ii) Impose a suitable fine on the college.
  - (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

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# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA








KAKINADA-533003, Andhra Pradesh (India)  
For Constituent Colleges and Affiliated Colleges of JNTUK

# Ragging

## Prohibition of ragging in educational institutions Act 26 of 1997

### Salient Features

- ⇒ Ragging within or outside any educational institution is prohibited.
- ⇒ Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	 6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	 1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	 2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	 5 Years	+	Rs.10,000/-
Causing death or abetting suicide	 10 Months	+	Rs. 50,000/-

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE JNTUK RAGGING FREE UNIVERSITY



**JAWAHARLAL NEHRU TECHNOLOGICAL  
UNIVERSITY: KAKINADA**  
KAKINADA-533003, Andhra Pradesh (India)  
For Constituent Colleges and Affiliated Colleges of JNTUK

# Ragging

## ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Card and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.



**Jawaharlal Nehru Technological University Kakinada**  
**For Constituent Colleges and Affiliated Colleges of JNTUK**

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**LET US MAKE JNTUK A RAGGING FREE UNIVERSITY**

## MASTER OF COMPUTER APPLICATION

### I SEMESTER

S.No	Subject	T	P
1	C PROGRAMMING AND DATA STRUCTURES	4	-
2	DIGITAL LOGIC AND COMPUTER ORGANIZATION	4	-
3	DISCRETE MATHEMATICAL STRUCTURES AND GRAPH THEORY	4	-
4	PROBABILITY AND STATISTICAL APPLICATIONS	4	-
5	ACCOUNTING AND FINANCIAL MANAGEMENT	4	-
6	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB		3
7	C PROGRAMMING AND DATA STRUCTURES LAB	-	3
8	DIGITAL LOGIC AND COMPUTER ORGANIZATION LAB	-	3

### II SEMESTER

S.No	Subject	T	P
1	OOPS THROUGH JAVA	4	-
2	OPERATING SYSTEMS	4	-
3	ORGANIZATIONAL STRUCTURES AND HUMAN RESOURCE MANAGEMENT	4	-
4	OPTIMIZATION TECHNIQUES	4	-
5	BUSINESS DATA PROCESSING	4	-
6	OOPS THROUGH JAVA LAB	-	3
7	BUSINESS DATA PROCESSING LAB		3

### III SEMESTER

S.No	Subject	T	P
1	DATA BASE MANAGEMENT SYSTEMS	4	-
2	COMPUTER COMMUNICATION	4	-
3	UNIX PROGRAMMING	4	-
4	MANAGEMENT INFORMATION SYSTEM	4	-
5	DESIGN AND ANALYSIS OF ALGORITHMS	4	-
6	DATA BASE MANAGEMENT SYSTEMS LAB	-	3
7	UNIX PROGRAMMING LAB	-	3

**IV SEMESTER**

S.NO	SUBJECT	T	P
1	SOFTWARE ENGINEERING	4	-
2	ADVANCED JAVA & WEB TECHNOLOGIES	4	-
3	DATA WAREHOUSING AND MINING	4	-
4	ELECTIVE-I	4	-
	MOBILE COMPUTING		
	HUMAN COMPUTER INTERACTION		
	ERP & SUPPLY CHAIN MANAGEMENT		
5	ELECTIVE-II	4	-
	SOFTWARE TESTING METHODOLOGIES		
	ARTIFICIAL INTELLIGENCE		
	COMPUTER GRAPHICS		
6	ADVANCED JAVA & WEB TECHNOLOGIES LAB	-	3
7	DATA WAREHOUSING AND MINING LAB	-	3

**V SEMESTER**

S.NO	SUBJECT	T	P
1	INFORMATION SECURITY	4	-
2	NETWORK PROGRAMMING	4	-
3	OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)	4	-
4	ELECTIVE-III ANIMATION & GAMING COMPUTER FORENSICS E-COMMERCE	4	
5	ELECTIVE-IV MIDDLE WARE TECHNOLOGIES MULTIMEDIA APPLICATION DEVELOPMENT SOFTWARE PROJECT MANAGEMENT	4	-
6	UML LAB	-	3
7	NETWORK PROGRAMMING LAB	-	3

**VI SEMESTER**

S.NO	SUBJECT		
1	PROJECT SEMINAR		
2	DISSERTATION/ THESIS EXCELLENT / GOOD / SATISFACTORY/ NOT SATISFACTORY		



## SYLLABUS

I	L	P	Credits
	4	-	-
<b>C PROGRAMMING AND DATA STRUCTURES</b>			

### UNIT-I

Introduction to Computers, HW and SW concepts, Algorithm, pseudo code, flowchart, program development steps, Introduction to various IDE's and their use in C program development, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, goto, labels, and switch statements.

### UNIT-II

Loops- while, do-while and for statements, break, continue, Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays other than strings, 2-D character arrays – 2-D arrays other than character arrays – Multidimensional arrays.

### UNIT-III

**Functions:** basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C pre-processor. Passing 1-D arrays, 2-D arrays , and functions.

**Pointers:** concepts, initialization of pointer variables, pointers and function arguments, passing by address –dangling memory, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments.

**UNIT-IV**

**Derived types:** structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations

**Data Structures:** Introduction to Data Structures – Time Complexity – Space Complexity – Pattern matching – naive method – Robin Karp Algorithm - Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

**UNIT-V**

Single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary trees, terminology, representation, traversals, Graphs - terminology, representation, graph traversals (dfs & bfs) – Warshalls – Dijkstra – Kruskal – Prims Algorithms. Only Algorithms

**Text Books:**

1. C and Data Structures: A snapshot oriented treatise using live engineering examples, N B Venkateswarlu, E. V Prasad, S Chand & Co.
2. Computer science, A structured programming approach using C, B.A. Forouzan and R.F.Gilberg, Third edition, Thomson.

**REFERENCES:**

1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson-Freed, 2<sup>nd</sup>ed, Universities Press,2008.
2. Classic Data Structures, Samanta,2<sup>nd</sup> ed, PHI, 2009.
3. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.
4. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press

5. Data Structures Using C , A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/ Pearson.
6. Programming in C , Stephen G. Kochan, III Edition, Pearson .
7. Data Structures and Program Design in C, R.Kruse,, Tondo, Leung, Shashi M, 2nd Edition, Pearson.
8. Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson , 2006
9. C and Data Structures, Ashok N.Kamthane, Pearson.
10. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

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I	L	P	Credits
	4	-	-
<b>DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION</b>			

**UNIT I:**

**Digital Components and Data Representation:** Introduction, Numbering Systems, Decimal to Binary Conversion, Binary Coded Decimal Numbers, Weighted Codes, Self-Complementing Codes, Cyclic Codes, Error Detecting Codes, Error Correcting Codes, Hamming Code for Error Correction, Alphanumeric Codes, ASCII Code

**Boolean Algebra and Logic Gates:** Introduction, Postulates of Boolean Algebra, Basic Theorems of Boolean Algebra, Duality Principle, Theorems, Precedence of operators, Venn Diagram, Boolean Functions and Truth Tables, Canonical Forms for Boolean Functions, Binary Operators and Logic Gates, Simplifying Boolean Expressions, Veitch-Karnaugh Map Method, Four Variable Karnaugh Map, Incompletely Specified Function, Quine-McCluskey Procedure

**UNIT II:**

**Digital logic circuits:** Combinatorial Switching Circuits,: Introduction, Combinatorial Circuit Design Procedure, Integrated NAND-NOR Gates, CMOS Transistor Gates, NAND-NOR Gates with CMOS Transistors, Open Drain and Tri-state Gates, Wired AND Gate, Driving a Bus from Many Sources, Tri-state Gates, Realization of Boolean Expressions Using NAND/NOR Gates, Combinatorial Circuits Commonly Used in Digital Systems, Design of Combinatorial Circuits with Multiplexers, Programmable Logic Devices, Realization with FPLAs, Realization with PALs

**Sequential Switching Circuits:** Types, Flip-Flops, Counters, Modelling Sequential Circuits – FSM. Synthesis of synchronous, Binary counters.

**UNIT III:**

**Arithmetic and Logic Unit:** Introduction, Binary Addition, Binary Subtraction, Complement, Representation of Numbers, Addition/Subtraction of Numbers in 1's Complement Notation, addition/Subtraction

of Numbers in Two's Complement Notation, Binary Multiplication, Multiplication of signed Numbers, Binary division, Integer Representation, Floating Point Representation of Numbers, Binary Floating Point Numbers, IEEE Standard Floating Point Representation, Floating Point addition/Subtraction, Floating Point Multiplication, Floating Point Division, Floating Point Arithmetic Operations, Logic Circuits for Addition/Subtraction, Half- and Full-Adder Using Gates, A Four-bit Adder, MSI arithmetic Logic Unit, A Combinatorial Circuit for Multiplication

#### UNITIV:

**Central Processing Unit:** Learning Goals, Introduction, Operation Code Encoding and Decoding, Instruction Set and Instruction Formats, Instruction set, Instruction Format, Addressing Modes, Register Sets, Clocks and Timing, CPU Buses, Dataflow, Data Paths and Microprogramming, Control Flow.

**Micro programmed Control:** Control Memory, Address Sequencing, Conditional Branching, Mapping of Instruction, Subroutines, Micro program Example, Computer Configuration, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program, Binary Micro program , Design of Control Unit, Micro program Sequencer

#### UNIT V:

**Memory Organization:** Introduction, Memory hierarchy, Dynamic Random Access Memory, Error Detection and Correction in Memories, Read Only Memory, Dual-Ported RAM, Enhancing Speed and Capacity of Memories, Program Behaviour and Locality Principle, Cache in Memory Organization, Design and Performance of Cache Memory System, Virtual Memory, address Translation, Page Replacement, Page Fetching, Page size, address Translation , Page Tables.

**Input-Output Organization:** Introduction, device Interfacing, Overview of I/O Methods, Program Controlled Data Transfer, Interrupt Structures, Single level Interrupt Processing, Handling Multiple Interrupts, Interrupt Controlled data Transfer, Software Polling, Bus Arbitration, Daisy Chaining, Vectored Interrupts, Multiple Interrupt Lines, VLSI Chip

Interrupt Controller, Programmable Peripheral Interface Unit, DMA Based Data Transfer, Input/output (I/O) Processors, Bus Structure, Structure of a Bus Types of Bus, Bus Transaction Type , Timings of Bus Transactions, Bus Arbitration, some Standard Buses, Serial Data Communication, Asynchronous Serial data communication

**TEXT BOOKS:**

1. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
2. Digital Logic Design, Moriss Mano, PHI
3. Computer System Architecture, 3<sup>rd</sup> ed ., M. Morris Mano, PHI, 1994

**REFERENCE BOOKS:**

1. Computer Organization, 5<sup>th</sup> ed., Hamacher, Vranesic and Zaky, TMH, 2002
2. Computer System Organization & Architecture, John D. Carpinelli, Pearson, 2008
3. Computer System Organization, Naresh Jotwani, TMH, 2009
4. Computer Organization & Architecture: Designing for Performance, 7<sup>th</sup> ed.,

I	L	P	Credits
	4	-	-
<b>DISCRETE MATHEMATICAL STRUCTURES AND GRAPH THEORY</b>			

**UNIT-I**

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving

Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

**UNIT-II**

Set theory & Relations: Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.

Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

**UNIT-III**

Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

**UNIT-IV**

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving

recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

### UNIT-V

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

### TEXTBOOKS:

1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians “J.L. Molt, A.Kandel, T.P.Baker, PHI

### REFERENCETEXTBOOKS:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra, TMH
2. Discrete Mathematics, Schaum’s Outlines, Lipschutz, Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6<sup>th</sup> ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6<sup>th</sup> ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6<sup>th</sup> ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5<sup>th</sup> ed., Pearson. 2006



9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao et al., USP, 2009
10. Discrete Mathematics, J K Sharma, 2<sup>nd</sup> ed., Macmillan, 2005
11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
13. Discrete Mathematics with Applications, Koshy, Elsevier, 2006.
14. Discrete Mathematics and its Applications, Rosen, 5<sup>th</sup> ed, T M Graw-Hill ed, 2006.
15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whitesides, Cengage., 2006.
16. Discrete Mathematical, Kevin Ferland, Cengage, 2008.
17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

I	L	P	Credits
	4	-	-
<b>PROBABILITY AND STATISTICAL APPLICATIONS</b>			

**UNIT I:**

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

**UNIT II**

Random variables and distribution: Random variables Discrete Probability Distributions,. Continuous probability distribution, Binomial, Poisson, uniform, Exponential, Normal.

**UNIT III**

Expectations and higher order moments – Moment Generating Function, Characteristic functions – Laws on large numbers – Weak Laws and strong laws of large numbers. Central limit theorem and other limit theorems.

Sampling distribution: Populations and samples - Sampling distributions of mean ( $\sigma$  known and unknown) proportions, sums and differences. Statistics based on Normal, Student's t and F distributions.

**UNIT IV:**

Tests of significance –Z-test, t-test, F-test,  $\chi^2$  test

Linear correlation coefficient Linear regression ; Non Linear regression Least square fit ; polynomial and Curve fittings

Time series and Forecasting : Moving averages , Smoothing of curves Forecasting models and methods , Statistical Quality Control Methods- bar charts p-charts etc.

**UNIT V**

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

**TEXTBOOKS:**

1. Probability, Statistics and Random Processes  
Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies,  
Deepti Publications.
2. Probability, Statistics and Random Processes , T.Veerarajan,  
TMH, India

**REFERENCEBOOKS:**

1. Probability and Statistics for Engineers: Miller and Freund,  
PHI.
2. Probability, Statistics and Queuing Theory Applications, 2<sup>nd</sup>  
ed, Trivedi, John Wiley and Sons.

JNTUK

I	L	P	Credits
	4	-	-
<b>ACCOUNTING AND FINANCIAL MANAGEMENT</b>			

**UNIT-I**

Accounting Generally Accepted Accounting Principles (GAAP) & Accounting standards, Characteristics and limitations of single entry system, double entry system of accounting, introduction of basis books of accounts, ledgers.

Preparation of trail balance – Final accounts – company final accounts – Users of Accounting Information, Role of Accountant in modern Organizations.

**UNIT-II**

Financial Management – meaning and scope, role, objectives of time value of money – over vitalization – under capitalization – profit maximization – wealth maximization – EPS maximization.

Ration Analysis - advantages - limitations - Fund flow analysis – meaning, importance, preparation and interpretation of Funds flow and cash flow statements – statements of changes in working capital.

**UNIT-III**

Costing – nature and importance and basic principles. Elements of cost – Absorption costing Vs. Marginal costing – Financial accounting Vs. cost accounting Vs. management accounting.

Marginal costing and Break – even Analysis : nature, scope and importance – practical applications of marginal costing, limitation and importance of cost – volume, profit analysis, short run decisions.

**UNIT-IV**

Standard costing and budgeting : nature, scope and computation and analysis – materials variance, labor variance and sales variance – cash budget, sales - budget – flexible Budgets, master budgets.

**UNIT-V**

Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Ourputs obtained.

**REFERENCES:**

1. Accounting for Managers, P. Vijaya Kumar, and Himalaya Publications.
2. Accounting for Management. Vijaya Kumar.TMH.
3. Financial Accounting, S.N Maheswari and S.K. Maheswari, Vikas.
4. Financial Accounting, A. Mukherjee and M. Heneef, TMH.
5. Basic Financial Accounting for Management, Ambaresh Gupta, Pearson.
6. Accounts And Finance for Non accounts, Chatterjee, D.K. Himalaya.
7. Financial Analysis and Accounting, P. Premchand Babu and M. Madam Mohan, Himalaya.
8. Essential of Financial Accounting, Ashish, K and Ballacharya, PHI.
9. Guide to Financial Management, John Tannent, Viva.

I	L	P	Credits
	-	2	-
<b>ENGLISH LANGUAGE COMMUNICATION SKILLS LAB</b>			

**Objectives:** The language lab focuses computer-aided multi-media instruction and language acquisition to achieve the following targets:

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format- making etc.

However, depending upon the available of infrastructure and budget, the above targets can also be achieved by procuring the minimum required equipment suggested for the establishment of Conventional Lab the details of which are given below. The lab should cater to the needs of the students to build up their confidence to help them develop leadership qualities through their communicative competence.

### **ENGLISH LANGUAGE LABORATORY PRACTICE**

1. Introduction to Phonetics.
2. Introduction to Vowels and Consonants and associated Phonetic symbols.
3. Introduction to Accent, Intonation and Rhythm.
4. Situational Dialogues/Role Play.
5. Debate
6. Public Speaking.
7. Group Discussions
8. Facing Interviews
9. Resume preparation
10. e- correspondence

MODULE	TOPICS/SUB-TOPICS	LABSESSIONS
1.	INTRODUCTION TOPHONETICS-Vowels, -Consonants, -Diphthongs INTRODUCTION TO STRESS & INTONATION-Articulation, -Respiration, -Phonation	3
2.	GROUP DISCUSSIONS FACING INTERVIEWS	4
3	SITUATIONAL/DIALOGUE/ ROLE PLAY RESUME PREPARATION	2
4	PUBLIC SPEAKING, DEBATE	2
5	GRE, TOEFL, GMAT MODELS, e-CORRESPONDENCE	3

### Suggested Software for Lab classes:

**Cambridge Advanced Learners' Dictionary with exercises**

**The Rosetta Stone English Library**

**Clarity Pronunciation Power**

**Mastering English in Vocabulary, Grammar, Spellings, Composition**

**Dorling Kindersley series of Grammar, Punctuation, Composition etc.**

**Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition**

**Language in Use, Foundation Books Pvt Ltd**

**Learning to Speak English - 4 CDs**

**Microsoft Encarta**

**Murphy's English Grammar, Cambridge**

**Time series of IQ Test, Brain-teasers, Aptitude Test etc.**

**English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**

### REFERENCE BOOKS:

1. The Human Touch: personal Skills for Professional Success – by Debra Paul.
2. The Definitive Book of body Language – by Allan Pease, Barbara Pease.
3. How to Face Interviews – by Clive Fletcher.s

4. The 7 Habits of Highly Effective People – by Stephen Covey.
5. The Google Resume: How to Prepare of a Career and Land a Job at Apple, Microsoft.
6. Good English –by G.H Vallins
7. Better English – G.H Vallins
8. Best English – G.H. Vallins
9. How to Talk to Anyone: 92 little tricks for big success in Relationships by Leli Lowndes.
10. The leader in you - by Dale Carnegie
11. 250 Job Interview Questions You'll most likely Be Asked – by Peter Veruki, Peter Verki.
12. Contemporary English Grammar, structures and Composition - by David Green.



I	L	P	Credits
	-	3	-
<b>COMPUTER PROGRAMMING DATA STRUCTURES LAB</b>			

**Objectives:**

- To learn/strengthen a programming language like C, To learn problem solving techniques
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, etc.,

**Recommended Systems/Software Requirements:**

- Intel based desktop PC, ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C

**Exercise 1.**

- Write a C program to find the sum of individual digits of a positive integer.
- A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a program which checks a given integer is Fibonacci number or not.

**Exercise 2.**

- Write a C program to calculate the following Sum:  

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- Write a C program to find the roots of a quadratic equation.
- Write a C program to implement Newton Raphson method for a quadratic equation
- Write a C program to implement Newton Raphson method for a general purpose algebraic equation

**Exercise 3**

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

- i) To find the factorial of a given integer.
- ii) To find the GCD (greatest common divisor) of two given integers.
- iii) To solve Towers of Hanoi problem.
- iv) Write program to calculate probability of head/tail by generating random numbers using random() function.

#### Exercise 4

- a) The total distance travelled by vehicle in 't' seconds is given by distance =  $ut + \frac{1}{2}at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration ( $m/sec^2$ ). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

#### Exercise 5

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices
  - iii) Checking symmetry of a square matrix.
  - iv) Calculating transpose of a matrix in-place manner.

#### Exercise 6

- a) Write a C program that uses functions to perform the following operations:
  - i) To insert a sub-string in to given main string from a given position.
  - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

**Exercise 7**

- a) Write a C program that displays the position/ index in the string S where the string T begins, or -1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

**Exercise 8**

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

**Exercise 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots\dots\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes  $1+5+25+125$ . Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

**Exercise 10**

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

**Exercise 11**

Write a C program that uses functions to perform the following operations using Structure:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

**Exercise 12**

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file.  
(Note: The file name and n are specified on the command line.)

**Exercise 13**

- a) Write a C program that uses functions to perform the following operations on singly linked list.:
  - i) Creation ii) Insertion iii) Deletion iv) Traversal
- b) Adding two large integers which are represented in linked list fashion.

**Exercise 14**

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

- i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

**Exercise 15**

- a.) Write C programs that implement stack (its operations) using
  - i) Arrays ii) Pointers iii) linked list.

**Exercise 16**

- a. Write C programs that implement Queue (its operations) using
  - i) Arrays ii) Pointers iii) linked lists.

**Exercise 17**

Write a C program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

**Exercise 18**

- a. Write a C program that uses functions to perform the following:
  - i) Creating a Binary Tree of integers
  - ii) Traversing the above binary tree in preorder, inorder and postorder.
- b. Program to check balance property of a tree.
- c. Program to check for its strictness.

**Exercise 19**

Write C programs that use both recursive and non recursive functions to perform the following searching operations

for a Key value in a given list of integers :

- i) Linear search ii) Binary search

**Exercise 20**

Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

- i) Bubble sort ii) Quick sort

**Exercise 21**

- a. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
  - i) Insertion sort
  - ii) Bubble sort
- b. Recursive implementation of sorting algorithms.

**Exercise 22**

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

**Exercise 23**

- a. Program to calculate mean and standard deviation of a population.
- b. Write C programs to implement the linear regression and polynomial regression algorithms.

**Exercise 24**

- a. Write C programs to implement Trapezoidal and Simpson methods. and
- b) Program for Calculating pi value.

**REFERENCEBOOKS:**

1. Digital Fundamentals, Floyd, Jain, 8<sup>th</sup> ed , Pearson
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

I	L	P	Credits
	-	3	-

**DIGITAL LOGIC AND COMPUTER SYSTEMS  
ORGANIZATION (DLCSO) LAB**

**Exercise 1**

Boolean Algebra: Theorems and logical guides, verification of truth tables

**Exercise 2**

Realization of Boolean expressions ; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates

**Exercise 3**

Latches Flip – Flops : RS, JK, T, D, Master – Slave FF, Edge – Triggered Flip – Flops

**Exercise 4**

Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

**Exercise 5**

Modulo Counter: Modulo - 5, Modulo – 10

**Exercise 6**

Adders / Sub tractors: Half Adder, Full Adder, 1 's and 2's complement addition

**Exercise 7**

Multiplexers/ Data Selector : 2- input and 8- input, Demultiplexers , Logic Function Generator

**Exercise 8**

Decoders and Encoders

**Exercise 9**

BCD adders and Comparators

**Exercise 10**

Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/ POSR

**Exercise 11**

Johnson Counter, Sequence Generator, Parity Generators/ Checkers

**Exercise 12**

Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal, BCD- to –Decimal, Binary – to- gray, gray- to - Binary

**Exercise 13**

Buffers / Drivers : Open ; collector Buffers

**Exercise 14**

Gates : CMOS / NMOS/TTL – Basic Operational Characteristics and parameters

**Exercise 15**

RAM, ROM, PROM, EPROM – Testing Memory Chips

**REFERENCEBOOKS**

1. Digital Fundamentals, Floyd & Jain , Pearson , 2005.
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

II	L	P	Credits
	4	-	-
<b>OOPS THROUGH JAVA</b>			

**UNIT-I**

**Basics of Object Oriented Programming(OOP):** Need for OO paradigm , A way of viewing world- Agents, responsibility, messages,methods,classes and instances, class hierarchies(Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity , abstraction mechanisms

**Java Basics:** 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.

**UNIT-II**

**Inheritance:** Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, sombination, benifits of inheritance costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

**Packages and Interfaces:** Defining, Creating and Accessing a package, Understanding CLASSPATH,Importing packages, differences between classes and interfaces, defining an interface, Implementing interface, applying interfaces variables in interface and extending interfaces.

**UNIT-III**

**Exception handling and Multithreading:** Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, 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**

**Event Handling:** Events, Event sources, Event classes, Event Listeners,



Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, list panes- scrollpane, dialogs, menubar, graphics, layout manager- layout manager types- boarder, grid, flow, card and grid bag.

## UNIT-V

**Applets:** Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets.

**Swings:** Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons-The JButton class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

## TEXTBOOKS:

1. Java-The complete reference,7/e, Herbert schildt, TMH.

## REFERENCES:

1. JAVA:How to program, 8/e, Dietal, Dietal,PHI.
2. Introduction of programming with JAVA,S.Dean,TMH.
3. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson.
4. Core Java 2, Vol 1(Vol 2) Fundamentals(Advanced), 7/e, Cay.S.Horstmann,Gary Cornell, Pearson.
5. Big Java2,3/e, Cay.S. Horstmann,Wiley.
6. Object Oriented Programming through Java, P.Radha Krishna, University Press.
7. JAVA&Object Orientation an Introduction, 2/e, John Hunt, Springer.
8. Introduction to JAVA Programming, 7/e, Y.Daniel Liang, Pearson.
9. AVA Programming and Object –Oriented Application Development, Johnson, Cengage Learning.
10. First Encounter with JAVA, S.P.Bhuta, SPD
11. JAVA for Professionals, B.M.Harwani, SPD.
12. Program with JAVA, Mahesh Bhave, Palekan, Pearson.
13. Programming with JAVA, 3/e, E.Balaguruswamy, TMH.

II	L	P	Credits
	4	-	-
<b>OPERATING SYSTEMS</b>			

**UNIT-I:**

Introduction: Computer –system organization, Computer- system Architecture, Operating- system Structure, Operating-system Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special- purpose systems, Computing Environments , Operating-system Structure: , Operating-system Services, User , Operating-system Interface, System calls, System programs, Operating-system Design and Implementation, , Operating-system structure, Virtual Machine

**UNIT-II:****Process Management:**

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems, Communication in Client-Server systems

Threads: Overview, Multithreading Models, Thread Libraries, Java Threads, Threading Issues, OSExamples

CPUScheduling:Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Operating system Examples

Process Synchronization: Background, The Critical- section problem, Petersons solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors, Atomic Transactions.

**UNIT-III:**

Memory management: Main memory: Swapping, Contiguous memory Allocation, Paging, Structure of the Page table, Segementation

Virtual memory: Background, Demand paging, copy-on-Write, Page Replacement, Allocation of frames, Thrashing, Memory-Mapped Files.

**UNIT-IV:**

File-system Interface: Concept, Access Methods, Directory structure, File-system Mounting, File sharing, Protection

File-system Implementation: File-system Structure, Implementation,

Directory Implementation, Allocation Methods, Free- Space Management, Efficiency and Performance, Recovery, Log-Structured File systems, NFS Mass –storage Structure: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and swap-space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure  
 I/O systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O requests to Hardware Operations, STREAMS, Performance.

#### **UNIT-V:**

Deadlocks: System model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance Deadlock Detection and Recovery form Deadlock.

Protection: Goals of Protection, Principles of protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability –Based systems, Languge-Based Protection

Security: The Security Problem, Program Threads, System and Network Threats, Cryptography as a security tool, User Authentication, Implementing security Defenses, Firewalling to protect systems and Networks.

#### **TEXTBOOKS:**

1. Operating system concepts, 7/e, Abraham Siliberschatz, Galvin, John Wiley & sons , Inc.

#### **REFERENCES:**

1. Operating systems,6/E,William stallings, PHI/Pearson.
2. Operating systems 3/e,Dietal ,Dietal,Pearson.
3. Operating systems, 2/e, Dhamdhare, TMH.
4. An introduction to Operating systems, Concepts and practice, Pramod Chandra P.Bhat, PHI
5. Operating systems, Elmasri, Carrick, Levine, TMH.
6. Operating systems ,3/e ,Nutt, Chaki, Neogy, Pearson.
7. Operating systems, Brian L. Stuart, Cengage.
8. Operating systems, Haldar, Aravind, Pearson.
9. Operating systems, PAL Choudhury, PHI.
10. Operating systems :design and Implementation, 3/e, Tanenbaum, Woodhull.

II	L	P	Credits
	4	-	-

**ORGANIZATIONAL STRUCTURE AND HUMAN RESOURCE MANAGEMENT**

**UNIT – 1****Introduction to Management :**

Concepts, nature and definitions of management – management and administration, principles of management - functions of management- planning, organizing, directing and controlling – importance of management.

**UNIT – II****Classical Theories of Organization:**

Functional approach – division of labor, levels of authority, span of Control, authority & responsibility, efficiency of management.

Concept of organization structure- Formal and Informal organization, difficulties due to informal organization- group behaviour- Committee- motivation and theories of motivation.

**UNIT – III****Human Resource Management:**

Objectives, functions of HRM, duties and responsibilities of HR manager- position of HR department in the organization- Changing, concept of personnel management in India. Job Description, recruitment, job specification and selection, interviewing techniques, transfers, promotion and its policies

Trainings and Development: Objectives of training – identifying trainings needs – training methods- on the job training – off the job training – job evolution- training function India- State-of – Art- survey

**UNIT – IV****Communication:**

Importance of communication, communication process- methods of communication two way communication, barriers of Communication, organizational barriers – essentials of effective Communication system

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**UNIT-V****Strategic Management:**

Introduction –study of strategic management – environmental scanning-internal environment and external environment-SWOT analysis- challenges' in LPG

**REFERENCES:**

1. Organization Structure and personal Management, 2/e, Subbarao. P, HPH.
2. personal and Human Resource Management, Recenzo, Robins, PHI.
3. Business Communications and soft skills, kuberudu B, and Krishna K.s, Excel publications.
4. Management process and Organizational Behaviour, karam pal, I.k.int.
5. Management process and Organizational Behaviour, karam pal, I.K int.
6. Human Resource Management Jyothoi, Oxford.
7. Organizations and Management, Agarwal, TMH.
8. Fundamentals of HRM, David A. Decenzo, Stephen R. Robins, Wiley India.
9. Organizational Structure and Human Resurce management, Varaprasad, SciTech.
10. Human Resource Management, Chabra. T.N, Dhanpat Rai.
11. Personal Management and Human Resources, Venkat Ratnam, TMH,

II	L	P	Credits
	4	-	-
<b>OPTIMIZATION TECHNIQUES</b>			

**UNIT-I**

Development: Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes. Allocation: introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle.

**UNIT-II**

Transportation problem: Formulation, optimal solution, unbalanced transportation, assignment problem: formulation, optimal solution, variations problem, degeneracy i.e. non square  $M \times N$  matrix, restrictions sequencing: Introduction, optimal solution for processing each of  $n$  jobs through three machines, travelling salesman problem(i.e. ) shortest acyclic route models.

**UNIT-III**

Replacement: Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements.

Waiting lines: Introduction, single channel, poisson arrivals, exponential service time infinite population and unrestricted queue.

**UNIT-VI**

Inventory: Introduction, single item, deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and with draws from stock is continuous, purchase inventory model with one price break, shortages are not allowed, instantaneous production demand production or purchase cost is relevant, stochastic models, simple problems.

**UNIT-V**

Theory of Games: Introduction, minmax(maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle

points. Dynamic programming: Introduction, Bellman's Principle of optimality, solutions for simple problems.

Project Management: PERT and CPM , difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities.

**TEXTBOOKS:**

1. Operations Research, S.D.Sharma, Ramnath,& Kedarnath co, Meerut.
2. Operations Research, An introduction , 8/e, Taha, Pearson.

**REFERENCES:**

1. Operations Research, P.K.Gupta, D.S. Hira, S.Chand.
1. Operations Research, R.D.Asrhedkar, R.V.Kulkarni.
2. Operations Research, Problems & sollutons, 3/e, JKSharma, Macmillan.
3. Operations Research, 8/e, Hillier, Liberman, TMH.
4. Operations Research, 2/e, Panneerselvam.

II	L	P	Credits
	4	-	-
<b>BUSINESS DATA PROCESSING</b>			

**UNIT-I**

Introduction to data processing, types of data processing, Overview of COBOL: History of COBOL, Coding formats of a COBOL program, Structure of a COBOL program, Character set, Cobol words, data names and identifiers, literals, figurative constants, hierarchy of COBOL statements, continuation of lines, language description notation, implementation differences.

Introduction to divisions(Identification, environment, data and procedure divisions),Format and functions of the different sections and paragraphs in each division.

**UNIT-II**

Data Division:Level structure(including special level Nos.66,77 and 88, picture clause, editing characters, concept of qualification of names, record structure, working storage section: VALUE clause, REDEFINES clause, RENAMES clause, USAGE clause, SIGN clause, JUSTIFIED clause, SYNCHRONIZED clause.

**UNIT-III**

Procedure division : Organization of a COBOL program: Section, Paragraph, sentence, Statement, syntax and function of the different COBOL verbs.

Elementary verbs: add, subtract, multiply, divide and compute.

Input-Output verbs: Accept, display.

Data movement: move verb

Conditional and sequence control verbs:

Types of conditions, condition name, condition, relation condition, class condition, sign condition, Relational operators, Logical operators, if and nested if statements, complex conditions, evaluation roles, abbreviated, compound conditions, EVALUATE statements, ALTER statement.

Miscellaneous verbs: GOTO,STOP,RUN, EXIT, CONTINUE.

Perform-verb:In-line and Out-Line PERFORM, Types of Out-line , PERFORM, PERFORM-UNITL, PERFORM -VARIYING, PERFORM -THRU, PERFORM-



TIMES, Usage of TEST BEFORE and TEST AFTER clauses, nested PERFORM.

#### **UNIT-IV**

Table handling: basic concepts, OCCURS clause, Assigning values to table elements, single, multiple dimensional table, INDEX/SUBSCRIPT, SET verb: indexed by clause, usage in index clause, SEARCH concepts, SEARCH verb, serial/ binary searching in COBOL, Handling sorted/ unsorted tables. String handling in COBOL: STRING statement, EXAMINE statement, INSPECT statement, UNSTRNG statement.

#### **UNIT-V**

File Handling: Basic file concepts, Characteristics, File Description, File Organization/access, file section and file control paragraphs, Sequential indexed and relevant file handling in COBOL, USE statement

Input- output Statements: open, close, read, write, rewrite, delete, start.

Compiler directing verb: Copy.

Sorting and Merging: Basic concepts, SORT verb, MERGE verb.

Inter –program communication: Basic concepts, subroutines, Linkage section, call verb, call by address and call by content.

Screen section, Report Writing.

#### **TEXT BOOKS:**

1. COBOL Programming, D.Ghosh Dasthidar, M.K.Roy, TMH.
2. Structured COBOL, Phillipakis, Kazmier, MGH.

#### **REFERENCES:**

1. Structured COBOL programming , 8/e, Stern, A.Stern, wiley.
2. COBOL for beginners, Worth, Thomas, PHI.

II	L	P	Credits
	-	3	-

**OOPS THROUGH JAVA LAB**

1. Use JDK 1.5 or above on any platform e.g. Windows or Unix.
2. Student is expected to complete any 16 programs.
  1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1,1.every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WJJP) that uses both recursive and nonrecursive functions to print the n<sup>th</sup> value of the Fibonacci sequence.
  2. WJJP to demonstrate wrapper classes and to fix the precision.
  3. WJJP that prompts the user for an integer and then prints out all the prime numbers upto that Integer.
  4. WJJP that checks whether a given string is a palindrome or not. Ex. MALAYALAM is a palindrome.
  5. WJJP for sorting a given list of names in ascending order.
  6. WJJP to check the compatibility for multiplication , if compatible multiply two matrices and find its transpose.
  7. WJJP that illustrates how runtime polymorphism is achieved.
  8. WJJP to create and demonstrate packages.
  9. WJJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.
  10. WJJP that reads on file name form the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.
  11. WJJP that displays the number of characters, lines and words in a text/text file.
  12. Write an Applet that displays the content of a file.
  13. WJJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +-\*?/% operations. Add a text field to display the result.
  14. WJJP for handling mouse events.

15. WAJP demonstrating the life cycle of a thread.
16. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
17. WAJP that lets users create Pie charts. Design your own user interface(with Swings & AWT).
18. WAJP that allows user to draw lines, rectangles and ovals.
19. WAJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data send from the client is the radius of a circle and the result produced by the server is the area of the circle.
20. WAJP to generate a set of random numbers between two numbers  $x_1$  and  $x_2$ , and  $x_1 > 0$ .
21. WAJP to create an abstract class named shape, that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method numberOfSides(), that contains the number of sides in the given geometrical figure.
22. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).
23. WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable).
24. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviours, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

II	L	P	Credits
	-	3	-
<b>BUSINESS DATA PROCESSING LAB</b>			

All the programs should be implemented in COBOL language. The standards that can be used are COBOL-68, COBOL-74, COBOL-85, MS-COBOL, COBOL 2002. The operating systems that can be used are :IBM's z/OS, Microsoft's Windows, and the POSIX families (Unixx/Linux etc.)etc. At least two programs from each set of 9.

1. **Beginners Programs**- Simple programs using ACCEPT, DISPLAY and some arithmetic verbs.
  1. Program illustrating usage of editing characters.
  2. Programs for simplification the following equations using
    - a) Arithmetic Verbs b) COMPUTE verb
 the equations are i)  $C=(5/9)(F-32)$  ii)  $A=\delta r^2$
2. **Selection and Iteration**- selection (IF,EVALUATE) and Iteration (PERFORM) example programs.
3. **Tables**-Example programs using tables.
  1. Program that determines the multiplication on two matrices.
  2. Programs for performing linear search and Binary search operations.
4. **String handling**-Example programs that show how to use Reference Modifications, STRING, UNSTRING INSPECT and UNSTRING.
  1. A data item Name contains 4 characters. Write a program to change all instances of "MR" or "Mr" by "Sri" and "MRS" or "Mrs" by "Smt".
5. **Sequential Files**: Programs that demonstrate how to process sequential files.
  1. Develop a program to maintain and process a sequential file to generate electrical bills. The bill should have the following details. APSEB, House Number, Operator, Owner's name, Zone, Category, previous meter reading, unit charge, total.
  2. Program to merge files and print the merged files. Take input form user.

3. Write a program which accepts student's details from a file and displays them along with grades. Input file should have details regarding Roll-no and marks in three subjects. Output file format should be

Name	RollNo	Maths	Physics	Computers	Total	Grade
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6. **Sorting and Merging**-Examples that use INPUT PROCEDURE'S and the SORT and the MERGE verbs.
  - Write sample programs for sorting and merging of sequential files using SORT and MERGE verbs.
7. **Direct Access Files**-Examples programs that show how to process Indexed and Relative files.
  1. Write a program that performs the conversion of sequential data to indexed data.
  2. Write a program which converts the given sequential file into relative file.
  3. Develop a program to maintain and generate bills in a supermarket. The master file is maintained as indexed organization with fields item -code, item-name, unit-price. Generate bills for customers with the random requests about items as common in any super market in the following Format..

S.No.	code	Description	Unit Price	Qty	Total
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Total Amount:

8. **CALLing sub-programs**-Example programs that Demonstrate contained, and external, sub-programs-sample programs illustrating Linkage section.
9. **The COBOL Report Writer**-Example programs using the COBOL Report Writer.
  1. Simple report using only one control break.
  2. Report containing all the control breaks but not using declaratives.
  3. Report containing all control breaks and using declaratives to calculate the sales person salary and commission.

III	L	P	Credits
	4	-	-
<b>DATA BASE MANAGEMENT SYSTEMS</b>			

**UNIT I**

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems. Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

**UNIT II**

Relational Algebra and Calculus: Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

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

**UNIT III**

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND,

THIRD Normal forms – BCNF – Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

#### **UNIT IV**

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

#### **UNIT V**

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

#### **TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3<sup>rd</sup> Edition, 2003.
2. Data base System Concepts, A. Silberschatz, H.F. Korth, S. Sudarshan, McGraw hill, VI edition, 2006.

3. Fundamentals of Database Systems 5th edition., Ramez Elmasri, Shamkant B.Navathe,Pearson Education,2008.

**REFERENCE BOOKS:**

1. Database Management System Oracle SQL and PL/SQL,P.K.Das Gupta,PHI.
2. Database System Concepts,Peter Rob & Carlos Coronel,Cengage Learning,2008.
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2<sup>nd</sup> ed.,ELSEVIER
5. Fundamentals of Relational Database Management Systems,S.Sumathi,S.Esakkirajan, Springer.
6. Introduction to Database Management,M.L.Gillenson and others,Wiley Student Edition.
7. Database Development and Management, Lee Chao,Auerbach publications,Taylor & Francis Group.
8. Introduction to Database Systems,C.J.Date,Pearson Education.



III	L	P	Credits
	4	-	-
<b>COMPUTER COMMUNICATIONS</b>			

**UNIT-I**

**Network Hardware reference model:** Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

**The data Link layer :** Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window protocols : Data link layer in HDLC, Internet and ATM.

**UNIT-II**

**Channel allocation methods:** TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard 802 for LANs – Ethernet, Token Bus, Token ring, Bridges.

**Network Layer Routing Algorithms:** Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention policies, Choke packets and Load shedding.

**UNIT-III**

**Internet Working :** Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, OSPF, BGP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

**UNIT-IV**

**The Transport Layer:** Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols : UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

**UNIT-V**

**Application Layer:** Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms : Authentication Protocols, Firewalls. Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications : SMTP, MIME, World Wide Web : HTTP, Network Management : SNMP.

**TEXT BOOKS :**

1. Computer Networks and rew, Tanenbaum, 4/e, Pearson
2. Data and computer communications, stallings, 8/e, PHI

**REFERENCE BOOKS**

1. Data communications and networking Forouzan, 4/e, TMH
2. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/e,Harcourt Asia
3. Compute communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
6. Computer networks , Anuranjan Misra, ACME Learning
7. Computer networks, C R Sarma, Jaico, Understanding data communications, Held, 7/e , Pearson

III	L	P	Credits
	4	-	-
<b>UNIX PROGRAMMING</b>			

**UNIT-I**

**Review of Unix Utilities and Shell Programming:** -File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell-, What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

**UNIT-II**

**Unix Files:** Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, octl, umask, dup, dup2. The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

**UNIT-III**

**Unix Process:**Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management, -fork, vfork, exit, wait, waitpid, exec, system, Threads, -Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, cancelling a thread, threads vs. processes, Signals-, Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

**UNIT-IV**

**Data Management:** Management Memory ( simple memory allocation, freeing memory) file and record locking ( creating lock files, locking regions, use of

read/ write locking, competing locks, other commands, deadlocks).

**Interprocess Communication:** Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC (system-V)- message queues, semaphores and shared memory.

**Message Queues-:** IPC, permission issues, Access permission modes, message structure, working message queues, Unix system-V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

## UNIT-V

**Semaphores:** -Unix system-V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores.

**Shared Memory:** -Unix system-V shared memory, working with a shared memory segment, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example.

**Sockets:** Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example- client/server program, advanced socket system calls, socket options.

## TEXT BOOKS:

1. Unix and shell Programming, N B Venkateswarlu, Reem
2. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

## REFERENCE BOOKS:

1. Unix and shell Programming, Sumitabha Das, TMH
2. A Beginner's Guide to Unix, N.P.Gopalan, B.Sivaselva, PHI
3. Unix Shell Programming, Stephen G.Kochan, Patrick Wood, 3/e, Pearson
4. Unix Programming, Kumar Saurabh, Wiley,India
5. Unix Shell Programming, Lowell Jay Arthus & Ted Burns,3/e, GalGotia
6. Nix Concepts and Applications, Das, 4/e, TMH

III	L	P	Credits
	4	-	-
<b>MANAGEMENT INFORMATION SYSTEMS</b>			

**UNIT-I**

**Management Information Systems: A Framework:** Importance of MIS , MIS: A Definition

ature and Scope of MIS , **Structure and Classification of MIS :** Structure of MIS, MIS Classification

**Information and System Concepts:** Information: A Definition, Types of Information, Dimensions of Information, System: A Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System

**Information Systems for Competitive Advantage:** Introduction, Changing concepts of Information System, Competitive Advantage, Information systems Strategies for Dealing with competitive Force, Porter's Value Chain Model, Strategic Information Systems (SIS)

**UNIT-II****BUSINESS APPLICATIONS OF IS**

**e – Commerce :** Introduction, e – Commerce

**ERP Systems :** Introduction, Enterprise Information Systems

**Decision – Support Systems:** Decision – Making: A Concept, Simon's Model of Decision - Making

Types of Decisions, Methods for Choosing Among Alternatives, Decision – Making and MIS, Decision Support Systems – Why?, Decision Support Systems: A framework, Characteristics and Capabilities of DSS

**Business Intelligence and knowledge Management System :** Business Intelligence, Knowledge Management System

**UNIT-III**

**Information System Planning :** Information System Planning: WHY?, Planning Terminology

Information System Planning, The Nolan Stage Model, The Four – Stage Model of is planning

Selecting A Methodology, Information Resources Management (IRM), Organisation Structure and Location of MIS

**System Acquisition :** Acquisition of Information Systems , Acquisition of Hardware and Software

#### UNIT – IV

**System Implementation:** IMPLEMENTATION PROCESS, Organisational Change

**Evaluation & Maintenance of IS :** Evaluation of MIS , System Maintenance

**IS Security and Control:** IS Security Threats, Protecting Information System, IS Security Technology

The Disaster Recovery Plan

#### UNIT – V

##### BUILDING OF IS

**System Development Approaches:** System Development Stages, System Development Approaches

**System Analysis and Design: SYSTEM ANALYSIS -** Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools

**SYSTEMS DESIGN:** Design Objectives , Conceptual Design , Design Methods, Detailed System Design

#### TEXT BOOKS:

1. Management Information System, Managerial Perspectives, D P Goyal, 3 ed, McMillan Publications

III	L	P	Credits
	4	-	-
<b>DESIGN AND ANALYSIS OF ALGORITHMS</b>			

**UNIT-I:**

Introduction: Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi-connected components.

**UNIT-II:**

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

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

**UNIT-III:**

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

**UNIT-IV:**

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**UNIT-V:**

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

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

**TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. The Algorithm Design Manual, 2<sup>nd</sup> edition, Steven S. Skiena, Springer.
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.

**REFERENCE BOOKS:**

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu BALachandra Dave, Pearson Education.
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.



III	L	P	Credits
	-	3	-
<b>DBMS Lab</b>			

1. Execute a single line and group functions for a table.
  2. Execute DCL and TCL Commands.
  3. Create and manipulate various DB objects for a table.
  4. Create views, partitions and locks for a particular DB.
  5. Write PL/SQL procedure for an application using exception handling.
  6. Write PL/SQL procedure for an application using cursors.
  7. Write a DBMS program to prepare reports for an application using functions.
  8. Write a PL/SQL block for transaction operations of a typical application using triggers.
  9. Write a PL/SQL block for transaction operations of a typical application using package.
  10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
  11. Create table for various relation
  12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
  13. Creating Views
  14. Writing Assertion
  15. Writing Triggers
  16. Implementing operation on relation using PL/SQL
  17. Creating Forms
  18. Generating Reports
- Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

III	L	P	Credits
	-	3	-

**UNIX PROGRAMMING LAB**

1. Program using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process cots : sniffer
5. Program using TCP sockets (Client and Server)
6. Program using UDP sockets (Client and Server)
7. Program using URL class to download webpages
8. Write a shell script for sorting, searching and insertion/deletion of elements in a list
9. Create two processes to run a for loop, which adds numbers 1 to n, say one process adds odd numbers and the other even
10. By creating required number of processors, simulate a communication between them as below:
11. Create a file that is shared among some users, write a program that finds whether a specific user has created read and write operations on the file
12. Create a shared lock and exclusive lock among some number of processes, say 1 to 10 on any data of 100 elements. For example, process 5 wants a shared lock on elements 5 to 50 or process 8 wants exclusive lock on elements 32 to 45. Create access violations on the locks and show what occurs, then.
13. Write a program demonstrating semaphore operation on a shared file for reading but not writing
14. Create a distributed key among some processes which exchange messages of the form (m, Ti, I) for resource sharing, where m=request, reply, release, Ti=time stamp and I=process id
15. Write a program demonstrating mutual exclusion principle
16. Write a program which reads a source file name and destination file

- name using command line arguments and then converts into specified format (i.e. either from lower case to upper case or upper case to lower case or inverse of each)
17. Write a program which takes a set of filenames alongwith the command line and print them based on their size in bytes either ascending or descending order
  18. Write a program which takes directory name along the command line and displays names of the files which are having more than one link
  19. Write a program to demonstrate the use of temporary files
  20. Write a program to demonstrate the use of exec family functions
  21. Write a program to display the good morning, good afternoon, good evening and good night depending on the users log on time
  22. Write a program to demonstrate the working of simple signal handler that catches either of the two user defined signals and prints the signal number
  23. Write a program to demonstrate the locking mechanism while accessing the shared files
  24. Write a shell script containing a function mycd() using which, it is possible to shuttle between directories
  25. write a shell script which works similar to the wc command. This script can receive the option -l, -w, -c to indicate whether number of lines/ words/characters
  26. Write a program to print prime numbers between x and y Write a shell script which deletes all lines containing the word
  27. Write a shell script which deletes all lines containing the word "UNIX" in the files supplied as arguments to this shell script
  28. Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions
  29. Write a menu-driven program which has the following options:
  30. Write a shell script for renaming each file in the directory such that it will have the current shell's PID as an extension. The shell script should ensure that the directories do not get renamed
  31. Write a program which demonstrates the shared memory functions

IV	L	P	Credits
	4	-	-
<b>SOFTWARE ENGINEERING</b>			

**UNIT – I****Introduction to Software Engineering:**

The evolving role of software, Changing Nature of Software, Software myths.  
(Text Book 3)

**The software problem:** Cost, schedule and quality, Scale and change.

**UNIT – II****Software Process:**

Process and project, component software process, Software development process models : Waterfall model, prototyping, iterative development, relational unified process, time boxing model, Extreme programming and agile process, using process models in a project. Project management process.

**UNIT - III**

**Software requirement analysis and specification:** Value of good SRS, requirement process, requirement specification, functional specifications with use-cases, other approaches for analysis, validation.

**Planning a software project:** Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

**UNIT – IV**

**Software Architecture:** Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

**Design:** Design concepts, function-oriented design, object oriented design, detailed design, verification, metrics

**UNIT-V**

**Coding and Unit testing:** Programming principles and guidelines, incrementally developing code, managing evolving code, unit testing, code inspection, metrics.

**Testing:** Testing concepts, testing process, black-box testing, white-box testing, metrics.

**TEXT BOOKS:**

1. A Concise introduction to software engineering (undergraduate topics in computer science), Pankaj Jalote, Springer International Edition.
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
3. Software Engineering, 3/e ,& 7e Roger S.Pressman , TMH

**REFERENCE BOOKS:**

1. Software Engineering, 8/e, Sommerville, Pearson.
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

IV	L	P	Credits
	4	-	-
<b>ADVANCED JAVA FOR WEB TECHNOLOGIES</b>			

**UNIT-I**

**Review of HTML4 :** Common tags ,HTML Tables and formatting internal linking, Complex HTML forms.

Introduction to Scripting Languages: Java Scripts, Control structures, functions, arrays & objects, DHTML, CSS, event model, filters & transitions.

**UNIT-II**

Review of Applets, Class, Event Handling, AWT Programming:

**Introduction to Swing:** Japplet, Handling Swing Controls like Icons, Buttons, Text Boxes, Combo Boxes, Tabbed Pains, Scroll Pains, Trees, Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing.

**UNIT-III**

**Java Beans:** Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API.

**Introduction to Servelets:** Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization Parameters, The javax.servlet.HTTP package, Handling, Http Request & responses, Using Cookies, Session Tracking, Security Issues.

**UNIT-IV**

**Introduction to JSP:** The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.

**Setting Up the JSP Environment:** Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

**JSP Application Development:** Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests,

and Users, Passing Control and Data Between Pages – Sharing Session and Application Data Memory Usage Considerations.

## UNIT-V

**Database Access:** Database Programming using JDBC, Studying Javax.sql.\* package. Accessing a Database from a JSP Page, Application – Specific Database Actions Deploying JAVA Beans in a JSP Page.

### TEXT BOOKS:

1. Internet and World Wide Web: How to program,6/e, Dietel, Dietel, Pearson.
2. The Complete Reference Java2, 8/e, Patrick Naughton, Herbert Schildt, TMH.
3. Java Server Faces, Hans Bergstan, O'reilly.

### REFERENCE BOOKS:

1. Web Programming, building internet applications, 2/e, Chris Bates, Wiley Dreamtech
2. Programming world wide web, Sebesta, PEA
3. Web Tehnologies, 2/e, Godbole, kahate, TMH
4. An Introduction to web Design , Programming ,Wang,Thomson

IV	L	P	Credits
	4	-	-
<b>DATA WAREHOUSING AND DATA MINING</b>			

**UNIT-1**

Introduction to Data mining, types of Data, Data Quality, Data Processing, Measures of Similarity and Dissimilarity, Exploring Data: Data Set, Summary Statistics, Visualization, OLAP and multi dimensional data analysis.

**UNIT-II**

**Classification:** Basic Concepts, Decision Trees and model evaluation: General approach for solving a classification problem, Decision Tree induction, Model over fitting: due to presence of noise, due to lack of representation samples, Evaluating the performance of classifier. Nearest Neighborhood classifier, Bayesian Classifier, Support vector Machines: Linear SVM, Separable and Non Separable case.

**UNIT-III**

**Association Analysis:** Problem Definition, Frequent Item-set generation, rule generation, compact representation of frequent item sets, FP-Growth Algorithms. Handling Categorical, Continuous attributes, Concept hierarchy, Sequential, Sub graph patterns

**UNIT-IV**

**Clustering:** Over view, K-means, Agglomerative Hierarchical clustering, DBSCAN, Cluster evaluation: overview, Unsupervised Cluster Evaluation using cohesion and separation, using proximity matrix, Scalable Clustering algorithm

**UNIT-V**

**Web data mining:** Introduction, Web terminology and characteristics, Web content mining, Web usage mining, web structure mining, Search Engines :Characteristics, Functionality, Architecture, Ranking of WebPages, Enterprise search



**TEXT BOOKS:**

1. Introduction to Data Mining: Pang-Ning tan, Michael Steinbach, Vipin kumar, Addison- Wesley.
2. Introduction to Data Mining with Case Studies: GK Gupta; Prentice Hall.

**REFERENCE BOOKS:**

1. Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson, 2008.
2. Fundamentals of data warehouses, 2/e , Jarke, Lenzerini, Vassiliou, Vassiliadis, Springer.
3. Data Mining Theory and Practice, Soman, Diwakar, Ajay, PHI, 2006.
4. Data Mining , Concepts and Techniques, 2/e, Jiawei Han, Micheline Kamber, Elsevier, 2006.

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE I)</b> <b>MOBILE COMPUTING</b>			

**UNIT-I:**

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, Handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices

**UNIT-II:**

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture.

Wireless medium access control, CDMA, 3G, and 4G communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-2000 3G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks.

**UNIT-III:**

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP

Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

**UNIT-IV:**

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server

**UNIT-V:**

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

**TEXT BOOK:**

1. RAJ KAMAL, "Mobile Computing," second edition, Oxford.
2. ASOKE K TALUKDER, HASAN AHMED, ROOPAR YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
3. UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE I)</b>			
<b>HUMAN COMPUTER INTERACTION</b>			

**UNIT-I**

**Introduction:** Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

**The graphical user interface:** Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user –interface popularity, characteristics- Principles of user interface.

**UNIT-II**

**Design process:** Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

**UNIT-III**

**Screen Designing :** Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

**UNIT-IV**

**Windows:** Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

**Components :** Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

**UNIT-V**

**Software tools :** Specification methods, interface, Building Tools.

**Interaction Devices:** Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

**TEXT BOOKS :**

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004.
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

**REFERENCE BOOKS :**

1. Designing the user interface. 4/e, Ben Shneidermann , PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
4. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE I)</b>			
<b>ERP &amp; SUPPLY CHAIN MANAGEMENT</b>			

**UNIT-I**

**Introduction to ERP:** Overview – Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining – On-line Analytical Processing, Supply Chain Management.

**ERP Implementation:** Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring.

**UNIT-II**

**Business Modules:** Business Modules in an ERP Package , Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

**Fundamentals of Supply Chain Management:**

Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

**UNIT-III****SCM Strategies, Performance:**

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

**UNIT-IV****Planning and Managing Inventories:**

Introduction to Supply Chain Inventory Management. Inventory theory

models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

**Distribution Management:**

Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

**UNIT-V**

**Strategic Cost Management in Supply Chain:**

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

**TEXT BOOKS:**

1. ERP Demystified, 2/e, Alexis Leon, TMH, 2007.
2. Supply Chain Management: Strategy, Planning, Operation, Sunil Chopra, Peter Meindel, PEA, 2002.

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE II)</b>			
<b>SOFTWARE TESTING METHODOLOGIES</b>			

**UNIT-I:**

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**UNIT-II:**

Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

**UNIT-III:**

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**UNIT-IV:**

Paths, Path products and Regular expressions:- path products & path \_expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

**UNIT-V:**

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.



**TEXT BOOKS:**

1. Software testing techniques - Boris Beizer, International Thomson computer press, second edition.
2. Software Testing- Yogesh Singh, CAMBRIDGE

**REFERENCE BOOKS:**

1. Introduction to Software Testing, Paul Amman, Jeff Offutt, CAMBRIDGE
2. Effective Software testing, 50 Specific ways to improve your testing, Elfriede Dustin, PEA

JNTUK

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE II)</b> <b>ARTIFICIAL INTELLIGENCE</b>			

**UNIT-I**

**Introduction to artificial intelligence:** Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

**Problem solving: state-space search and control strategies :** Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a\*, constraint satisfaction

**UNIT-II**

**Problem reduction and game playing:** Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

**Logic concepts:** Introduction, propositional calculus, propositional logic, natural deduction system, axiomatic system, semantic tableau system in propositional logic, resolution refutation in propositional logic, predicate logic

**UNIT-III**

**Knowledge representation:** Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames

**advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web

**Expert system and applications:** Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

**UNIT-IV**

**Uncertainty measure: probability theory:** Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory

**Fuzzy sets and fuzzy logic:** Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

#### **UNIT-V**

**Machine learning paradigms:** Introduction, machine learning systems, supervised and unsupervised learnings, inductive learning, deductive learning, clustering, support vector machines, case based reasoning and learning

**Artificial neural networks:** Introduction, artificial networks, single layer feed forward networks, multi layered forward networks, design issues of artificial neural networks

#### **TEXT BOOKS:**

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2<sup>nd</sup> ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3<sup>rd</sup> ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

#### **REFERNCE BOOKS:**

1. Artificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5<sup>th</sup> ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

IV	L	P	Credits
	4	-	-
<b>(ELECTIVE II)</b> <b>COMPUTER GRAPHICS</b>			

**UNIT -I:**

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

**Output primitives :** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT-II**

**2-D geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. (p.nos 204-227 of text book-1).

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

**UNIT-III**

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

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

**UNIT-IV**

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

**Visible surface detection methods :** Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**UNIT-V:**

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

**TEXT BOOKS:**

1. Computer Graphics *C version*, Donald Hearn, M.Pauline Baker, Pearson
2. Computer Graphics Principles & practice, 2/e, Foley, VanDam, Feiner, Hughes, Pearson

**REFERENCE BOOKS:**

1. Computer Graphics, Donald Hearn and M.Pauline Baker, 2/E, PHI
2. Computer Graphics, Zhigand xiang, Roy Plastock, Schaum's outlines, 2/E, TMH
3. Procedural elements for Computer Graphics, David F Rogers, 2/e, TMH
4. Principles of Interactive Computer Graphics, Neuman , Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH
7. Computer Graphics, Shirley, Marschner, Cengage
8. Computer Graphics, Rajesh Maurya, Wiley, india
9. Computer Graphics Pradeep Bhatiya, IK intentional

IV	L	P	Credits
	-	3	-
<b>ADVANCED JAVA &amp; WEB TECHNOLOGIES LAB</b>			

**Week-1:**

Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

The static home page must contain three **frames**.

**Top frame:**

Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

**Left frame:**

At least four links for navigation, which will display the catalogue of respective links.

**For e.g.:** When you click the link “CSE” the catalogue for CSE Books should be displayed in the Right frame.

**Right frame:**

The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

**2) LOGIN PAGE:**

This page looks like below:


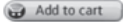



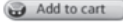

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : <input type="text"/> Password: <input type="password"/>  <input type="button" value="Submit"/> <input type="button" value="Reset"/>			

### 3) CATALOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name					
Home	Login	Registration	Catalogue	Cart		
CSE		Book : XML Bible Author : Winston Publication : Wiley	\$ 40.5			
ECE						
EEE	  	Book : AI Author : S.Russel Publication : Princeton hall	\$ 63			
CIVIL			Book : Java 2 Author : Watson Publication : BPB publications		\$ 35.5	
			Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication		\$ 50	

Note: Week 2 contains the remaining pages and their description.

### Week-2:

4) **CART PAGE:** The cart page contains the details about the books which are added to the cart. The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	<b>Book name</b>	<b>Price</b>	<b>Quantity</b>	<b>Amount</b>
ECE	Java 2	\$35.5	2	\$70
EEE	XML bible	\$40.5	1	\$40.5
CIVIL			<b>Total amount -</b>	<b>\$130.5</b>

### 5) REGISTRATION PAGE:

Create a “registration form “with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

### WEEK 3:

#### VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Use PHP to connect with the database to store the above details.

#### Week-4:

Design a web page using CSS (Cascading Style Sheets) which includes the following:

- 1) Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-decoration:underline}
</style>
</HEAD>
```

```
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}
```

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```



- 2) Set a background image for both the page and single elements on the page.

### **BODY {background-image:url(myimage.gif);}**

You can define the background image for the page like this:

- 3) Control the repetition of the image with the background-repeat property.

As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

- 4) Define styles for links as

A:link

A:visited

A:active

A:hover

Example:

```
<style type="text/css">
```

```
A:link {text-decoration: none}
```

```
A:visited {text-decoration: none}
```

```
A:active {text-decoration: none}
```

```
A:hover {text-decoration: underline; color: red;}
```

```
</style>
```

- 5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
```

```
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
```

```
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:4">LAYER 2</div>
```

- 6) Add a customized cursor:

```
Selector {cursor:value}
```

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

#### Week-5:

Write an XML file which will display the Book information which includes the following:

- |                      |                   |
|----------------------|-------------------|
| 1) Title of the book | 2) Author Name    |
| 3) ISBN number       | 4) Publisher name |
| 5) Edition           | 6) Price          |

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

#### Week-6:

##### VISUAL BEANS:

Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the “property window“.

**Week-7:**

- 1) Install TOMCAT web server and APACHE.  
While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.
- 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls :

<http://localhost:4040/rama/books.html> (for tomcat)

<http://localhost:8080/books.html> (for Apache)

**Week-8:****User Authentication:**

Assume four users user1, user2, user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servlet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords ) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display “ You are not an authenticated user “.

Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the `getInitParameters()` method.

**Week-9:**

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 (week2).

**Week-10:**

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database ( similar to week8 instead of cookies).

**Week-11:**

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount )) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

**Week-12:**

**HTTP** is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method `session.invalidate()` ). Modify your catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

IV	L	P	Credits
	-	3	-

**DATA WAREHOUSING AND MINING LAB**

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k-means

V	L	P	Credits
	4	-	-
<b>INFORMATION SECURITY</b>			

**UNIT-I**

**Introduction:** Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

**UNIT-II****Conventional Encryption:**

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

**UNIT-III**

**Public key:** Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

**UNIT-IV****IP Security:**

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

**Web Security:**

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

**Email Privacy:** Pretty Good Privacy (PGP) and S/MIME.

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**UNIT-V**

**SNMP:** Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

**Fire walls:** Firewall Design principles, Trusted Systems, Intrusion Detection Systems

**TEXT BOOKS:**

1. Network Security Essentials: Applications and Standards, William Stallings, PEA.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

**REFERENCE BOOKS:**

1. Network Security & Cryptography, Bernard Menezes, Cengage, 2010
2. Fundamentals of Network Security, Eric Maiwald, Dream Tech
3. Network Security: Private Communication in a Public World, Kaufman, Perlman, PEA/PHI.
4. Principles of Information Security, Whitman, Thomson.
5. Cryptography and Network Security, 3/e, Stallings, PHI/PEA
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Introduction to Cryptography, Buchmann, Springer

V	L	P	Credits
	4	-	-
<b>NETWORK PROGRAMMING</b>			

**UNIT-I**

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

**UNIT-II**

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

**UNIT-III**

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

**I/O Multiplexing and socket options:** I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

**UNIT-IV**

**Elementary UDP sockets:** Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

**Elementary name and Address conversions:** DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

**UNIT-V**

**IPC :** Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores.



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

**TEXT BOOK:**

1. UNIX Network Programming, Vol. I, Sockets API, 2<sup>nd</sup> Edition. - W.Richard Stevens, Pearson Edn. Asia.
2. UNIX Network Programming, 1<sup>st</sup> Edition, - W.Richard Stevens. PHI.

**REFERENCES:**

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3<sup>rd</sup> Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2<sup>nd</sup> Edition M. J. ROCHKIND, Pearson Education

V	L	P	Credits
	4	-	-
<b>OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)</b>			

**UNIT-I**

**Introduction to UML:** The meaning of Object-Orientation, object identity, encapsulation, information hiding, polymorphism, genericity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

**UNIT-II**

**Basic structural Modelig:** Classes, relationships, common mechanisms, diagrams, Advanced structural modeling: advanced relationships, interfaces, types & roles, packages, instances.

**Class & object diagrams:** Terms, concepts, examples, modeling techniques, class & Object diagrams.

**UNIT-III**

**Collaboration diagrams:** Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

**Sequence diagrams:** Terms, concepts, differences between collaboration and sequence diagrams, depicting synchronous messages with/without priority call back mechanism broadcast message.

**UNIT-IV**

**Behavioral Modeling:** Interactions, use cases, use case diagrams, activity diagrams.

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

**UNIT-V**

**Architectural Modeling:** Terms, concepts, examples, modeling techniques for component diagrams and deployment diagrams.

**TEXT BOOKS:**

1. The Unified Modeling Language User Guide, Grady Booch, Rambaugh, Ivar Jacobson, PEA
2. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Addison Wesley

**REFERENCE BOOKS:**

1. Head First Object Oriented Analysis & Design, Mclaughlin,SPD OReilly,2006
2. Object oriented Analysis& Design Using UML, Mahesh ,PHI
3. The Unified Modeling Language Reference Manual, 2/e, Rambaugh, Grady Booch,etc., PEA
4. Object Oriented Analysis & Design, Satzinger, Jackson, Thomson
5. Object Oriented Analysis Design & implementation, Dathan.,Ramnath, University Press
6. Object Oriented Analysis & Design, John Deacon, PEA
7. Fundamentals of Object Oriented Analysis and Design in UML, M Pages-Jones, PEA
8. Object-Oriented Design with UML, Barclay,Savage,Elsevier,2008

V	L	P	Credits
	4	-	-
<b>(ELECTIVE –III)</b> <b>ANIMATION &amp; GAMING</b>			

**UNIT-I**

What is mean by Animation – Why we need Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.

**UNIT-II**

Creating Animation in Flash: Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers

**UNIT-III**

Concept Development –Story Developing –Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets - 3D Animated Movies.

**UNIT-IV**

Animation: The Animation Loop, Calculating Frame Rates, Scheduling Tasks at Alternate Frame Rates, Restoring the Background, Double Buffering, Time – Based Motion, Scrolling the Background, Parallax, User Gestures, Timed Animations, Animation Best Practices

**UNIT-V**

A Game Engine , The Game Loop, Loading Images, Multitrack Sound, Keyboard Events, High Scores, The Game Engine Listing, The Ungame, A Pinball Game

**TEXTBOOK:**

1. PRINCIPLES OF MULTIMEDIA – Ranjan Parekh, 2007, TMH. (Unit I, Unit III)
2. Multimedia Technologies – Ashok Banerji, Ananda Mohan Ghosh – McGraw Hill Publication. (Unit II: Chapter 10)
3. Core HTML5 CANVAS, Graphics, Animation and Game Development, David Geary, PEARSON ( Unit IV, Unit V)

V	L	P	Credits
	4	-	-
<b>(ELECTIVE –III)</b>			
<b>COMPUTER FORENSICS</b>			

**UNIT-I:**

**Computer Forensics and Investigations:** Understanding Computer Forensics, Preparing for Computer Investigations, Taking A Systematic Approach, Procedure for Corporate High-Tech Investigations, Understanding Data Recovery Workstations and Software,

**Investor's Office and Laboratory:** Understanding Forensics Lab Certification Requirements, Determining the Physical Requirements for a Computer Forensics Lab, Selecting a Basic Forensic Workstation

**UNIT-II**

**Data Acquisition:** Understanding Storage Formats for Digital Evidence, Determining the Best Acquisition Method, Contingency Planning for Image Acquisitions, Using Acquisition Tools, Validating Data Acquisition, Performing RAID Data Acquisition, Using Remote Network Acquisition Tools, Using Other Forensics Acquisition Tools

**Processing Crime and Incident Scenes:** Identifying Digital Evidence, Collecting the Evidence in Private-Sector Incident Scenes, Processing law Enforcement Crime Scenes, Preparing for a Search, Securing a Computer Incident or Crime Scene, Sizing Digital evidence at the Scene, Storing Digital evidence, obtaining a Digital Hash.

**UNIT-III**

**Current Computer Forensics Tools:** Evaluating Computer Forensics Tool Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software

**Computer Forensics Analysis and Validation:** Determining What Data to Collect and Analyze, Validating Forensic Data, Addressing Data-Hiding Techniques, Performing Remote Acquisition

**UNIT-IV**

**Recovering Graphics and Network Forensics:** Recognizing a Graphics File, Understanding Data Compression, Locating and Recovering Graphics Files, Understanding Copyright Issues with Graphics, Network Forensic, Developing Standard Procedure for Network Forensics, Using Network Tools, Examining Hiney Project

**UNIT-V**

**E-mail Investigations Cell Phone and Mobile Device Forensics:** Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Understanding E-mail Servers, Using Specialized E-mail Forensics Tools, Understanding Mobile Device Forensics, Understanding Acquisition Procedure for Cell Phones and Mobile Devices

**TEXTBOOK:**

1. Nelson, Phillips Enfinger,Steuart, “ Computer Forensics and Investigations, Cengage Learning.

V	L	P	Credits
	4	-	-
<b>(ELECTIVE –III)</b> <b>E-COMMERCE</b>			

**UNIT-I**

Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce, Mercantile Process models.

**UNIT-II**

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

**UNIT-III**

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

**UNIT-IV**

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

**UNIT-V**

Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering.

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

**TEXTBOOK:**

1. Frontiers of Electronic Commerce , Kalakata, Whinston, PEA,2006.

**REFERENCE BOOKS:**

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee, Dillon, Chang, John Wiley.
2. E-Commerce, A Managerial Perspective, Turban E, Lee J, King, Chung H.M., PEA, 2001.
3. E-Commerce An Indian Perspective, 3/e, P.T. Joseph, PHI, 2009.
4. E-Commerce, S. Jaiswal, Galgotia.
5. Electronic Commerce, Gary P. Schneider, Thomson.

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V	L	P	Credits
	4	-	-
<b>(ELECTIVE –IV)</b> <b>MIDDLEWARE TECHNOLOGIES</b>			

**UNIT-I****Introduction to Object Oriented Systems :**

Preview of Object-orientation, Concept of distributed object systems, Reasons to distribute for centralized Objects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server.

**UNIT-II****Introduction to Middleware Technologies:**

General Middleware, Service Specific Middleware, Client/Server Building blocks, RPC - messaging, Peer-to-Peer, Java RMI.

**Introduction to Distributed Objects :**

Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

**UNIT-III****EJB Architecture :**

Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

**UNIT-IV****CORBA :**

Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

**CORBA Services and CORBA Component Model :**

Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

**UNIT-V****COM and NET:**

Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

**Service Oriented architecture (SOA) Fundamentals:**

Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA , Enterprise Service Bus (ESB), SOA enterprise Software Models.

**TEXT BOOKS:**

1. Distributed Component Architecture, G. Sudha Sadasivam , Wiley
2. Service Oriented Architecture: Concepts , Technology & Design, Thomas Erl, PHI
3. Java programming with CORBA, 3/e, G. Brose, A Vogel, K. Duddy, Wiley-dreamtech
4. Distributed Systems, 2/e, Tanenbaum, Van Steen, PEA

**REFERENCE BOOKS:**

1. Client/server Programming with Java & Corba W/cd, Robert Orfali, Dan Harkey, Wiley
2. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, PEA.
3. Inside CORBA, Mowbray, PEA
2. COM and CORBA side by side, Jason Pritchard, PEA
3. Enterprise JavaBeans 3.0, 5/e, Bill Burke, O'Reilly .
4. Component Based technology, Sudha Sadasivam, Wiley

V	L	P	Credits
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<b>(ELECTIVE –IV)</b>			
<b>MULTIMEDIA APPLICATION DEVELOPMENT</b>			

**UNIT - I****Fundamental concepts in Text and Image:**

Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

**UNIT - II****Fundamental Concepts in Video and Digital Audio:**

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

**UNIT-III**

**Action Script I:** Action Script Features, Object-Oriented Action Script, Datatypes and Type Checking, Classes, Authoring an Action Script Class.

**Action Script II :** Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

**Application Development:**

An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

**UNIT - IV****Multimedia Data Compression:**

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

**Basic Video Compression Techniques:**

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

**UNIT-V****Multimedia Networks:**

Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

**TEXT BOOKS:**

1. Fundamentals of Multimedia , Ze-Nian Li , Mark S. Drew, PHI/PEA.
2. Multimedia Systems, Parag Havaldar, Gerard Medioni, cengage, 2009.
3. Essentials Action Script 3.0, Colin Moock, SPD O, Reilly,2007.

**REFERENCE BOOKS:**

1. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
2. Digital Multimedia, Nigel Chapman, Jenny Chapman, Wiley-Dreamtech.
3. Multimedia & Communications Technology, Steve Heath, Elsevier .
4. Multimedia Technology & Applications, David Hilman , Galgotia.
5. Multimedia Technologies, Banerji, Mohan Ghosh, MGH.

V	L	P	Credits
	4	-	-
<b>(ELECTIVE –IV)</b> <b>SOFTWARE PROJECT MANAGEMENT</b>			

**UNIT-I**

**Conventional Software Management :** The waterfall model, conventional software Management performance.

**Evolution of Software Economics :** Software Economics, pragmatic software cost estimation.

**Improving Software Economics :** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**The old way and the new :** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

**UNIT-II**

**Life cycle phases :** Engineering and production stages, inception, Elaboration, construction, transition phases.

**Artifacts of the process :** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

**UNIT-III**

**Model based software architectures :** A Management perspective and technical perspective.

**Work Flows of the process :** Software process workflows, Iteration workflows.

**Checkpoints of the process :** Major mile stones, Minor Milestones, Periodic status assessments.

**Iterative Process Planning :** Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

**UNIT-IV**

**Project Organizations and Responsibilities :** Line-of-Business Organizations, Project Organizations, evolution of Organizations.

**Process Automation :** Automation Building blocks, The Project Environment.

**Project Control and Process instrumentation :** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

**UNIT-V**

**Tailoring the Process :** Process discriminates.

**Future Software Project Management:** Modern Project Profiles, Next generation Software economics, modern process transitions.

**TEXT BOOKS:**

1. Software Project Management, Walker Royce, PEA, 2005.

**REFERENCE BOOKS:**

1. Software Project Management, Bob Hughes, 3/e, Mike Cotterell, TMH
2. Software Project Management, Joel Henry, PEA
3. Software Project Management in practice, Pankaj Jalote, PEA, 2005,
4. Effective Software Project Management, Robert K. Wysocki, Wiley, 2006
5. Project Management in IT, Kathy Schwalbe, Cengage
6. Quality Software Project Management, Futrell, Donald F. Shafer, Donald I. Shafer, PEA

<b>V</b>	<b>L</b>	<b>P</b>	<b>Credits</b>
	-	3	-
<b>UML LAB</b>			

1. To create a UML diagram of ATM APPLICATION.
2. To create a UML diagram of LIBRARY MANAGEMENT SYSTEM.
3. To create a UML diagram of ONLINE BOOK SHOP
4. To create a UML diagram of RAILWAY RESERVATION SYSTEM
5. To create a UML diagram for BANKING SYSTEM

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V	L	P	Credits
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<b>NETWORK PROGRAMMING LAB</b>			

**Objectives:**

- To teach students various forms of IPC through Unix and socket Programming

**Recommended Systems/Software Requirements:**

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space  
LAN Connected
- Any flavour of Unix / Linux

**Week1.**

Implement the following forms of IPC.

a) Pipes

b) FIFO

**Week2.**

Implement file transfer using Message Queue form of IPC

**Week3.**

Write a programme to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use senphores to avoid race conditions

**Week4.**

Design TCP iterative Client and server application to reverse the given input sentence

**Week5.**

Design TCP iterative Client and server application to reverse the given input sentence

**Week6.**

Design TCP client and server application to transfer file

**Week7.**

Design a TCP concurrent server to convert a given text into upper case using multiplexing system call “select”



**Week8.**

Design a TCP concurrent server to echo given set of sentences using poll functions

**Week9.**

Design UDP Client and server application to reverse the given input sentence

**Week10**

Design UDP Client server to transfer a file

**Week11**

Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.

**Week12**

Design a RPC application to add and subtract a given pair of integers

**REFERENCEBOOK:**

1. Advance Unix Programming Richard Stevens, Second Edition Pearson Education
2. Advance Unix Programming, N.B. Venkateswarlu, BS Publication.