

**M.D.UNIVERSITY, ROHTAK (HARYANA)**  
**SCHEME OF STUDIES & EXAMINATION FOR BACHELOR OF TECHNOLOGY**  
**COURSE IN**  
**COMPUTER SCIENCE & INFORMATION TECHNOLOGY**

**SEMESTER-V**

**‘F’ Scheme effective from 2011-12**

SNo	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam
			L	T	P	Total	Class work	Theory	Practical	Total	
1	CSE-301-F	Principles of Operating Systems	3	1	-	4	50	100	-	150	3
2	EE-309-F	Microprocessors & Interfacing	3	1	-	4	50	100	-	150	3
3	CSE-303-F	Computer Graphics	3	1	-	4	50	100	-	150	3
4	CSE-404-F	Advance JAVA	3	1	-	4	50	100	-	150	3
5	HUM-453-F	Human Resource Management	3	1	-	4	50	100	-	150	3
6	EE-217-F	Digital & Analog Communication	3	1	-	4	50	100	-	150	3
7	EE-329-F	Microprocessor & Interfacing Lab	-	-	2	2	25	-	25	50	3
8	CSE-309-F	Computer Graphics Lab	-	-	2	2	50	-	50	100	3
9	CSE-406-F	Advance JAVA Lab	-	-	2	2	50	-	50	100	3
10	CSE-315-F	Practical Training-I	-	-	2	2	-	-	-	-	-
		<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>8</b>	<b>32</b>	<b>425</b>	<b>600</b>	<b>125</b>	<b>1150</b>	

**NOTE:**

**1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**

**2. Assessment of Practical Training-I, undergone at the end of IV semester, will be based on seminar, viva-voce, report and certificate of practical training obtained by the student from the industry. According to performance letter grades A, B, C, F are to be awarded. A student who is awarded ‘F’ grade is required to repeat Practical Training.**

**CSE-301-F**

**PRINCIPLES OF OPERATING SYSTEMS**

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

Introduction to Operating System Concepts (including Multitasking, multiprogramming, multi user, Multithreading etc)., Types of Operating Systems: Batch operating system, Time-sharing systems, Distributed OS, Network OS, Real Time OS; Various Operating system services, architecture, System programs and calls.

Process Management: Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job- First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling.

**Section-B**

Memory Management: Logical & Physical Address Space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging; virtual memory management - Demand Paging & Page-Replacement Algorithms; Demand Segmentation.

**Section-C**

File System: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, Introduction to distributed file system.

Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; methods for handling deadlocks-deadlock prevention, avoidance & detection; deadlock recovery.

## **Section-D**

I/O Systems: I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues.

Unix System and Windows NT Overview Unix system call for processes and file system management, Shell interpreter, Windows NT architecture overview, Windows NT file system.

### **TEXT BOOKS:**

1. Operating System Concepts by Silberchatz et al, 5<sup>th</sup> edition, 1998, Addison-Wesley.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings, 4<sup>th</sup> edition, 2001, Prentice-Hall

### **REFERENCE BOOKS:**

1. Operating System By Peterson , 1985, AW.
2. Operating System By Milankovic, 1990, TMH.
3. Operating System Incorporating With Unix & Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik & Donovan, TMH
5. Operating Systems By Deitel, 1990, AWL.
6. Operating Systems – Advanced Concepts By Mukesh Singhal , N.G. Shivaratri, 2003.

**EE-309-F**

**MICROPROCESSORS AND INTERFACING**

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

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**Section-A**

THE 8085 PROCESSOR: Introduction to microprocessor, 8085 microprocessor: Architecture, instruction set, interrupts structure, and assembly language programming.

THE 8086 MICROPROCESSOR ARCHITECTURE: Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

**Section-B**

INSTRUCTION SET OF 8086: Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

**Section-C**

INTERFACING DEVICE: The 8255 PPI chip: Architecture, control words, modes and examples.

DMA: Introduction to DMA process, 8237 DMA controller.

**Section-D**

INTERRUPT AND TIMER: 8259 Programmable interrupt controller, Programmable interval timer chips.

**TEXT BOOKS:**

1. Microprocessor Architecture, Programming & Applications with 8085: Ramesh S Gaonkar; Wiley Eastern Ltd.
2. The Intel Microprocessors 8086- Pentium processor: Brey; PHI

**REFERENCE BOOKS:**

1. Microprocessors and interfacing: Hall; TMH
2. The 8088 & 8086 Microprocessors-Programming, interfacing,Hardware & Applications :Triebel & Singh; PHI
3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design: Yu-Chang Liu & Glenn A Gibson; PHI.
4. Advanced Microprocessors and Interfacing: Badri Ram; TMH

L T P  
3 1 0

Class Work Marks: 50  
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### **Section-A**

Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

### **Section-B**

Two/Three Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland cohen algorithm, parametric line clipping algorithm (Cyrus Beck). Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two dimensional transformations: transformations, translation, scaling, rotation, reflection, composite transformation. Three dimensional transformations: Three dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

### **Section-C**

Viewing in 3D: Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Hidden surface removal: Introduction to hidden surface removal. The Z- buffer algorithm, scanline algorithm, area sub-division algorithm.

Representing Curves and Surfaces: Parametric representation of curves: Bezier curves, B-Spline curves. Parametric representation of surfaces; Interpolation method.

### **Section-D**

Illumination, shading, image manipulation: Illumination models, shading models for polygons, shadows, transparency. What is an image? Filtering, image processing, geometric transformation of images.

**TEXT BOOKS:**

1. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addison Wesley.
2. Computer Graphics by Donald Hearn and M.Pauline Baker, 2<sup>nd</sup> Edition, 1999, PHI

**REFERENCE BOOKS:**

1. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
2. Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addison Wesley.
3. Computer Graphics: Secrets and Solutions by Corrign John, BPB
4. Graphics, GUI, Games & Multimedia Projects in C by Pilaian & Mahendra, Standard Publ.
5. Computer Graphics Secrets and solutions by Corrign John, 1994, BPV
6. Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

**CSE-404-F****ADVANCED JAVA**

L T P

3 1 0

Class Work Marks: 50

Exam Marks: 100

Total Marks: 150

Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AWT & Applet Programming.

Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

**Section-B**

The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Java IDL and CCRA, Remote Method Calls with SOAP

**Section-C**

SWING: Lists, Trees, Tables, Styled Text Components, Progress Indicators, Component Organizers

AWT :The Rendering Pipeline, Shapes, Areas, Strokes, Paint, Coordinate Transformations, Clipping, Transparency and Composition, Rendering Hints, Readers and Writers for Images, Image Manipulation, Printing. The Clipboard, Drag and Drop

**Section-D**

JAVABEANS COMPONENTS: Beans, the Bean-Writing Process, Using Beans to Build an Application, Naming Patterns for Bean Components and Events Bean Property Tubes Bean info Classes Property Editors Cuatomizes.

SECURITY: Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

**TEXT BOOK:**

1. Core Java TM 2, Volume II-Advanced Features, 7<sup>th</sup> Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004

**REFERENCE BOOKS:**

1. Professional Java Programming by Brett Spell, WROX Publication

2. Advanced Java 2 Platform, How to Program, 2<sup>nd</sup> Edition, Harvey. M. Dietal, Prentice Hall



**HUM-453-F**

**HUMAN RESOURCE MANAGEMENT**

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section A**

Understanding Organizational Behavior: Definition, Goals of Organizational behavior. Key forces affecting Organizational Behavior. Fundamental Concepts of Organizational Behavior. Motivation : Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, Mc Gregor's Theory Herzberg's theory.  
Morale : Meaning; Factors affecting morale, types of morale and productivity, Evaluation of morale, improving morale.

**Section B**

Communication: Definition & importance, Nature of leadership various approaches to leadership styles.  
Leadership: Definition & importance, Nature of leadership various approaches to leadership styles.

**Section C**

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach.  
Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing meaning and importance of placement Meaning and techniques of induction. Training and development : Concepts of training and development, importance of training and development, Management development its nature, purpose and method.

**Section D**

Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

**Text Books:**

1. Human Resource and Personnel Management-K. Aswathappa-Tata McGraw Hill Publishing Company Ltd.
2. Personnel Management : C.B. Mamoria, Himalaya Publishing House.
3. Organisational Behavior-Dr. L.M. Prasad (Sultan Chand & Sons).

**Reference Books:**

1. Personnel Management & Industrial Relations : Dr. T.N.Bhagoliwal Sahitya Bhawan Agra.
2. Personnel Management : V.G. Karnik, Jaico Publishing House.
3. Personnel management & Industrial Relation : Tripathi : Sultan Chand & Sons.
4. Personnel Management-Arun Monappa & Mirza Saiyadain- Tata McGraw Hill Publishing Co. Ltd.
5. Personnel Management and Industrial Relations-D.C. Sharma & R.C. Sharma S.J. Publications.
6. Principles of Personnel Management-Edwin B. Flippo (McGraw Hill).
7. Organizational Behavior-K. Adwathappa.
8. Organizational Behavior-John W. Newsstorn & Keith Davis, Tata McGraw Hill Publishing Company Limited, New Delhi.

EE-217-F

**DIGITAL AND ANALOG COMMUNICATION  
(CSE, IT)**

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section A: Communication system components:**

Introduction to Communication: Definition & means of communications; Digital and analog signals: sign waves, square waves; Properties of signals: amplitude, frequency, phase; Theoretical basis for data communication: Fourier analysis: Fourier series and Fourier Transform (property, ESD, PSD and Raleigh) effect of limited bandwidth on digital signal.

**Section B: Data Transmission System:**

Physical connections: modulation, amplitude-, frequency-, phase- modulation; Data encoding: binary encoding (NRZ), Manchester encoding, differential Manchester encoding. Transmission Media: Twisted pair-, co-axial-, fiber optic-cables, and wireless media Transmission impairments: attenuation, limited bandwidth of the channels, delay distortion, noise, data rate of the channels (Nyquist theorem, Shannon limit). Physical layer interfaces: RS 232, X.21

**Section C: Standards in data communications:**

Communication modes: simplex, half duplex, full duplex; Transmission modes: serial parallel-transmission; Synchronizations: Asynchronous-, synchronous-transmission; Type of services: connection oriented-, connectionless-services; Flow control: unrestricted simplex protocol, simplex stop- and -wait protocol, sliding window protocol; Switching systems: circuit switching; picketing switching: data gram, virtual circuits, permanent virtual circuits. Telephone Systems: PSTN, ISDN, asynchronous digital subscriber line. Multiplexing: frequency division-, time-, wave- division multiplexing.

**Section D: Security in data communications:**

Transmission errors: feedback-, forward-error control approaches; Error detection; Parity check, block sum check, frame check sequences; Error correction: hamming codes, cyclic redundancy check; Data encryption: secret key cryptography, public key cryptograph; Data compression: run length encoding, Huffman encoding.

**TEXT BOOK:**

- Data Communications, Computer Networks and Open Systems Halsall Fred, (4<sup>th</sup> edition) 2000, Addison Wesley, Low Price edition

**REFERENCE BOOKS:**

- Business Data Communications, Fitzgerald Jerry, 7th Ed. New York, 2001, JW&S,
- Communication Systems, 4th Edi, by A. Bruce Carlson, Paul B. Crilly, Janet C. Rutledge, 2002, TMH.
- Data Communications, Computer Networks and Open Systems, Halsall Fred, 1996, AW.
- Digital Communications, J.G. Proakiss, 4th Ed., MGH
- Satellite Communication, Pratt, John Wiley
- Data & Computer Communications, W.Stallings PHI
- Digital & Data Communication systems, Roden 1992, PHI,
- Introduction to Digital & Data Communications, Miller Jaico Pub.
- Data Communications and Networking, Behrouz A. Forouzan, 2003, 2nd Edition, T.M.

L T P  
0 0 2

Class Work Marks: 25  
Exam Marks: 25  
Total Marks: 50  
Duration of exam: 3 hrs

**LIST OF EXPERIMENTS:**

1. Study of 8085 Microprocessor kit.
2. Write a program using 8085 and verify for:
  - a. Addition of two 8-bit numbers.
  - b. Addition of two 8-bit numbers (with carry).
3. Write a program using 8085 and verify for:
  - a. 8-bit subtraction (display borrow)
  - b. 6-bit subtraction (display borrow)
4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition Method. Check for minimum number of additions and test for typical data.
5. Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method and verify.
6. Write a program using 8085 for division of two 8- bit numbers by repeated subtraction Method and test for typical data.
7. Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
8. Study of 8086 microprocessor kit
9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.
10. Write a program using 8086 for finding the square root of a given number and verify.
11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
12. Write a program using 8086 and verify for:
  - a. Finding the largest number from an array.
  - b. Finding the smallest number from an array.
13. Write a program using 8086 for arranging an array of numbers in descending order and verify.
14. Write a program using 8086 for arranging an array of numbers in ascending order and verify.
15. Write a program for finding square of a number using look-up table and verify.
16. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.
17. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

**NOTE: At least ten experiments have to be performed in the semester out of which seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-309-F.**

**CSE-309-F**

**COMPUTER GRAPHICS LAB.**

L T P  
0 0 2

Class Work Marks: 50  
Exam Marks: 50  
Total Marks: 100  
Duration of exam: 3 hrs.

**List of programs to be developed:-**

1. Write a program for 2D line drawing as Raster Graphics Display.
2. Write a program for circle drawing as Raster Graphics Display.
3. Write a program for polygon filling as Raster Graphics Display
4. Write a program for line clipping.
5. Write a program for polygon clipping.
6. Write a program for displaying 3D objects as 2D display using perspective transformation.
7. Write a program for rotation of a 3D object about arbitrary axis.
8. Write a program for Hidden surface removal from a 3D object.

**Note: At least 5 to 10 more exercises to be given by the teacher concerned.**

**CSE-406-F**

**ADVANCED JAVA LAB.**

L T P  
0 0 2

Class Work Marks: 50  
Exam Marks: 50  
Total Marks: 100  
Duration of exam: 3 hrs

**Development of programs relating to:**

1. JDBC
2. Servlets
3. Beans
4. RMI
5. JSP

**Note : At least 10 programs are required to be developed in the semester.**

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**SEMESTER-VI**

S No	Course No.	Course Title	Teaching Schedule				Marks For Class Work	Marks for Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1	CSE-206-F	Theory of Automata and Computation	3	1	-	4	50	100	-	150	3
2	CSE-302-F	Principles of Software Engineering	3	1	-	4	50	100	-	150	3
3	CSE-304-F	Intelligent Systems	3	1	-	4	50	100	-	150	3
4	CSE-305-F	Analysis and Design of Algorithms	3	1	-	4	50	100	-	150	3
5	IT-303-F	System Programming and System Administration	3	1	-	4	50	100	-	150	3
6	IT-305-F	Computer Networks	3	1	-	4	50	100	-	150	3
7	EE-402-F	Wireless Communication	3	1	-	4	50	100	-	150	3
8	CSE-306-F	Intelligent Systems Lab	-	-	3	3	25	-	25	50	3
9	CSIT-301-F	UNIX Lab	-	-	3	3	50	-	50	100	3
10	GP-302-F	General Proficiency	-	-	-	-	50	-	-	50	-
		<b>TOTAL</b>	21	7	6	34	475	700	75	1250	

**NOTE:**

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
2. Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the VII semester.



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Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

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### Section-A

**Finite Automata and Regular Expressions:** Finite State Systems, Basic Definitions Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

**Introduction to Machines:** Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

### Section-B

**Properties of Regular Sets:** The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

**Grammars:** Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

### Section-C

**Pushdown Automata:** Introduction to Pushdown Machines, Application of Pushdown Machines  
**Turing Machines:** Deterministic and Non-Deterministic Turing Machines, Design of T.M., Halting problem of T.M., PCP Problem.

### Section-D

**Chomsky Hierarchies:** Chomsky hierarchies of grammars, Unrestricted grammars, Context sensitive languages, Relation between languages of classes.

**Computability:** Basic concepts, Primitive Recursive Functions.

**TEXT BOOK:**

1. Introduction to automata theory, language & computations- Hopcroft & O.D.Ullman, R. Mothwani, 2001, AW

**REFERENCE BOOKS:**

1. Theory of Computer Sc. (Automata, Languages and computation):K.L.P.Mishra & N.Chandrasekaran, 2000, PHI.
2. Introduction to formal Languages & Automata-Peter Linz, 2001, Narosa Publ..
3. Fundamentals of the Theory of Computation- Principles and Practice by RamondGreenlaw and H. James Hoover, 1998, Harcourt India Pvt. Ltd..
4. Elements of theory of Computation by H.R. Lewis & C.H. Papaditriou, 1998, PHI.
5. Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.

L T P  
3 1 0

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Duration of Exam: 3 Hrs.

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### Section-A

Introduction: The process, software products, emergence of software engineering, evolving role of software, software life cycle models, Software Characteristics, Applications, Software crisis. Software project management: Project management concepts, software process and project metrics Project planning, project size estimation metrics, project estimation Techniques, empirical estimation techniques, COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Requirements Analysis and specification requirements engineering, system modeling and simulation Analysis principles modeling, partitioning Software, prototyping: , Prototyping methods and tools; Specification principles, Representation, the software requirements specification and reviews Analysis Modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling; The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the control and process specification; The data dictionary; Other classical analysis methods.

### Section-B

System Design: Design concepts and principles: the design process: Design and software quality, design principles; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity; the design model; Design documentation. Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs, architectural complexity; Mapping requirements Into software architecture; Transform flow, Transaction flow; Transform mapping: Refining the architectural design.

### Section-C

Testing and maintenance: Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, white box testing, basis path testing:

Control structure testing: Black box testing, testing for specialized environments, architectures and applications. Software Testing Strategies: Verification and validation, Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, the debugging process debugging approaches. Software re-engineering, reverse engineering, restructuring, forward engineering

### **Section-D**

Software Reliability and Quality Assurance :Quality concepts, Software quality assurance , SQA activities; Software reviews: cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting and record keeping, review guidelines; Formal approaches to SQA; Statistical software quality assurance; software reliability: Measures of reliability and availability ,The ISO 9000 Quality standards: The ISO approach to quality assurance systems, The ISO 9001 standard, Software Configuration Management.

Computer aided software Engineering: CASE, building blocks, integrated case environments and architecture, repository.

#### **TEXT BOOK:**

1. Software Engineering – A Practitioner’s Approach, Roger S. Pressman, 1996, MGH.

#### **REFERENCE BOOKS:**

1. Fundamentals of software Engineering, Rajib Mall, PHI
2. Software Engineering by Ian Sommerville, Pearson Edu, 5<sup>th</sup> edition, 1999, AW,
3. Software Engineering – David Gustafson, 2002, T.M.H
4. Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995 JW&S,
5. An Integrated Approach to software engineering by Pankaj jalote , 1991 Narosa,

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#### **Section-A**

Foundational issues in intelligent systems: Foundation and history of AI, AI problems and techniques – AI programming languages, introduction to LISP and PROLOG- problem spaces and searches, blind search strategies, Breadth first- Depth first- heuristic search techniques Hill climbing: best first- A \* algorithm AO\* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning.

#### **Section-B**

Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

#### **Section-C**

Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and Dempster shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non monotonic reasoning.

#### **Section-D**

Planning, planning in situational calculus, representation for planning, partial order planning algorithm, learning from examples, discovery as learning, Learning by analogy, explanation based learning, neural nets, genetic algorithms.

Principles of Natural language processing, rule based systems architecture, Expert systems, knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

#### **TEXT BOOK:**

1. Artificial Intelligence: A Modern Approach,. Russell & Norvig. 1995, Prentice Hall.

#### **REFERENCE BOOKS:**

1. Artificial Intelligence, Elaine Rich and Kevin Knight, 1991, TMH.
2. Artificial Intelligence-A modern approach, Stuart Russel and Peter Norvig, 1998, PHI.
3. Artificial intelligence, Patrick Henry Winston, 1992, Addison Wesley 3<sup>rd</sup> Ed.,

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

#### **Section-A**

Brief Review of Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.

Divide and Conquer: General method, binary search, merge sort, quick sort, selection sort, Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

#### **Section-B**

Greedy Method: General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single source paths and analysis of these problems.

Dynamic Programming: General method, optimal binary search trees, 0/1 knapsack, the traveling salesperson problem.

#### **Section-C**

Back Tracking: General method, 8 queen's problem, graph colouring, Hamiltonian cycles, analysis of these problems.

Branch and Bound: Method, 0/1 knapsack and traveling salesperson problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations.

#### **Section-D**

NP Hard and NP Complete Problems: Basic concepts, Cook's theorem, NP hard graph and NP scheduling problems some simplified NP hard problems.

**TEXT BOOKS:**

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni,1978, Galgotia Publ.,
2. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH

**REFERENCE BOOKS:**

1. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
2. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986. Johan Wiley & Sons,
3. Writing Efficient Programs, Bentley, J.L., PHI
4. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetnieni, 1997, MGH.
5. Introduction to Computers Science- An algorithms approach , Jean Paul Trembley, Richard B.Bunt, 2002, T.M.H.
6. Fundamentals of Algorithms: The Art of Computer Programming Voll, Knuth, D.E.:1985, Naresh Publ.

## **IT-303-F      SYSTEMS PROGRAMMING & SYSTEM ADMINISTRATION**

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3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

### **Section-A**

Evolution of Components Systems Programming, Assemblers, Loaders, Linkers, Macros, Compilers. Software tools, Text editors, Interpreters and program generators, Debug Monitors, Programming environment.

Compiler: Brief overview of compilation process, Incremental compiler, Assembler: Problem statement, single phase and two phase assembler, symbol table; Loader schemes, compile and go Loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct linkage Loader, Binders, Linking loader, overlays.

### **Section-B**

Macro language and macro-processor, macro instructions, features of macro facility, macro instruction arguments, conditional macro expansion, macro calls with macro instruction defining macros.

Theoretical Concept of UNIX Operating System: Basic features of operating system; File structure: CPU scheduling; Memory management: swapping, demand paging; file system: block and fragments, inodes, directory structure; User to user communication.

### **Section-C**

Getting Started with Unix: User names and groups, logging in; Format of Unix commands; Changing your password; Characters with special meaning; Unix documentation; Files and directories; Current directory, looking at the directory contents, absolute and relative pathnames, some Unix directories and files; Looking at the file contents; File permissions; basic operation on files; changing permission modes; Standard files, standard output; Standard input, standard error; filters and pipelines; Processes; finding out about processes; Stopping background process; Unix editor vi.



Test Manipulation: Inspecting files; File statistics; Searching for patterns; Comparing files; Operating on files; Printing files; Rearranging files; Sorting files; Splitting files; Translating characters; AWK utility.

#### **Section-D**

Shell Programming: Programming in the Bourne and C-Shell; Wild cards; Simple shell programs; Shell variables; Shell programming constructs; interactive shell scripts; Advanced features.

System Administration: Definition of system administration; Booting the system; Maintaining user accounts; File systems and special files; Backups and restoration; Role and functions of a system manager. Overview of the linux operating system

#### **TEXT BOOKS:**

1. Systems Programming by Donovan, TMH.
2. The UNIX programming environment by Brian Kernighen & Rob Pike, 1984, PHI & Rob Pike.
3. Design of the UNIX operating system by Maurich Bach, 1986, PHI.
4. Introduction to UNIX and LINUX by John Muster, 2003, TMH.

#### **REFERENCE BOOK:**

1. Advanced Unix programmer's Guide by Stephen Prato, BPB
2. Unix- Concept and applications by Sumitabha Das, 2002, T.M.H

**IT-305-F**

**COMPUTER NETWORKS**

L T P  
3 1 0

Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example networks ARPANET, Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete -, Irregular –Topology; Types of Networks : Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer

**Section-B**

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

**Section-C**

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay .Wireless Links.

**Section-D**

Introduction to Network Management: Remote Monitoring Techniques: Polling, Traps, Performance Management, Class of Service, Quality of Service, Security management,

Firewalls, VLANs, Proxy Servers, Introduction to Network Operating Systems: Client-Server infrastructure, Windows NT/2000.

**TEXT BOOKS:**

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.

**REFERENCE BOOKS:**

1. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
2. Business Data Communications, Fitzgerald Jerry.
3. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2<sup>nd</sup> Edition
4. Computer Networking – ED Tittel , 2002, T.M.H.

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Class Work Marks: 50  
Exam Marks: 100  
Total Marks: 150  
Duration of Exam: 3 Hrs.

**NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

#### **Section-A**

**INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS:** Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

**MODERN WIRELESS COMMUNICATION SYSTEMS:** Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

#### **Section-B**

**INTRODUCTION TO CELLULAR MOBILE SYSTEMS:** Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

**CELLULAR SYSTEM DESIGN FUNDAMENTALS:** Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

#### **Section-C**

**MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION:** Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

**WIRELESS NETWORKING:** Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

### **Section-D**

**INTELLIGENT CELL CONCEPT AND APPLICATION:** Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

#### **TEXT BOOKS:**

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

#### **REFERENCE BOOK:**

1. Mobile Communications: Jochen Schiller; Pearson

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Class Work Marks: 25  
Exam Marks: 25  
Total Marks: 50  
Duration of exam: 3 hrs.

1. Study of PROLOG.

Write the following programs using PROLOG.

2. Write a program to solve 8 queens problem.
3. Solve any problem using depth first search.
4. Solve any problem using best first search.
5. Solve 8-puzzle problem using best first search
6. Solve Robot (traversal) problem using means End Analysis.
7. Solve traveling salesman problem.

**Note: At least 5 to 10 more exercises to be given by the teacher concerned.**

**CSIT-301-F****UNIX LAB**

L T P  
0 0 3

Class Work Marks: 50  
Exam Marks: 50  
Total Marks: 100  
Duration of exam: 3 hrs

- Study of WINDOWS 2000 Operating System.  
Study of LINUX Operating System.
- Study of UNIX Operating System (Linux kernel, shell, basic commands pipe & filter commands).
- Administration of UNIX Operating System.
- Writing of Shell Scripts (Shell programming).  
AWK programming.

**Note: At least 10 programs**