

**SCHEME OF EXAMINATION FOR B.TECH. DEGREE COURSE**  
**Sixth Semester Examination**  
**(Information Technology)**  
**(w.e.f. 2005 – 2006)**

Course No.	Subject	Teaching Schedule				Examination Schedule			Total Marks	Duration of Exam (Hrs.)
		L	T	P	Total	Theory	Sessional	Practical		
IT-352	Analysis & Design of Algorithm	4	1	0	5	100	40	0	140	3
IT-354	Software Engineering	4	1	0	5	100	40	0	140	3
IT-356	Computer Graphics	4	1	0	5	100	40	0	140	3
IT-358	Computer Network	4	1	0	5	100	40	0	140	3
IT-360	Management Information System	3	1	0	4	75	50	0	125	3
IT-362	Software Engineering Lab	0	0	2	2	0	30	30	60	3
IT-364	Computer Graphics Lab	0	0	3	3	0	40	40	80	3
IT-366	Networking Lab	0	0	2	2	0	30	30	60	3
IT-368	Visual Basic .Net Lab	0	0	3	3	0	40	40	80	3
IT-370	Colloquim	0	1	0	1	0	35	0	35	3
	<b>Total</b>	19	6	10	35	475	385	140	1000	

**Note:** Students shall undertake 6 weeks Practical Training after 6<sup>th</sup> Semester Exam. In reputed organization

IT-352

## Analysis & Design of Algorithms

L	T	Theory	Sessional	Duration
4	1	100	40	3 Hrs

### Unit – 1:

**Introduction:** Algorithm, Analyzing algorithm, Designing algorithm, Concept of algorithmic efficiency, Run time analysis of algorithms, Asymptotic Notations.

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

### Unit – 2:

**Greedy Method:** Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution ( Knapsack problem), Single source shortest paths.

**Dynamic programming:** Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman problem, longest common sequence.

### Unit – 3:

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

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

### Unit – 4:

**Graph searching and Traversal:** Overview, Traversal methods (depth first and breadth first search).

**Trees:** Review of trees, Binary search tree, Traversal, Insertion & Deletion in Binary Search Tree, B-Trees, B+Trees, Basic operations on B Trees.

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

#### Text Book:

E. Horowitz, S. Sahni, and S. Rajsekran, “ Fundamental of Computer Algorithms,” Galgotia Publication

#### Reference Books:

1. T. H. Cormen, Leiserson, Rivest and Stein, “Introduction of Somputer algorithm,” PHI.
2. Sara Basse, A. V. Gelder, “ Computer Algorithms,” Addison Wesley.

**Note:** Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-354

Software Engineering

L	T	Theory	Sessional	Duration
4	1	100	40	3 Hrs

**Unit – 1:**

**Introduction:** Program vs. software products, emergence of software engineering, software life cycle, models: waterfall, prototype, evolutionary and spiral model, 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.

**Unit – 2:**

**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.

**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 in to software architecture; Transform flow, Transaction flow; Transform mapping; Refining the architectural design.

**Unit – 3:**

**Testing and maintenance:** Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, Unit testing: white box testing, basic path testing: Control structure testing: Black box testing, testing for specialized environments, architectures and applications. Software Testing Strategies: Verification and validation, Integration testing, Validation testing, alpha and beta testing. System testing: Recovery testing, security testing, stress testing performance testing; The art of debugging process debugging approaches. Software re-engineering: Reverse engineering, restructuring, forward engineering.

**Unit – 4:**

**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, SEI-CMM Capability Maturity Model.

**Computer Aided Software Engineering:** CASE, building blocks, integrated case environments and architecture, repository.

**Text Books:**

- Software Engineering – A Practitioner’s Approach, Roger S. Pressman, 1966, MGH.

**Reference Books:**

- Fundamentals of software Engineering, Rajib Mall, PHI
- An Integrated Approach to Software Engineering by Pankaj Jalote, 1991 Narosa.
- Software Engineering by an Ian Sommerville, Pearson Edu, 5<sup>th</sup> edition, 1999, AW.
- Software Engineering Fundamentals, Oxford University, Ali Behforooz and Frederick J. Hudson.

**Note:** Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-356

## Computer Graphics

L	T	Theory	Sessional	Duration
4	1	100	40	3 Hrs

### Unit – 1:

**Introduction:** What is Computer Graphics, Computer Graphics Applications, Computer Graphics hardware and Software, Two dimensional Graphics Primitives: Points and Lines, Point Plotting Techniques: Coordinate system, Incremental Method, Line drawing algorithms: DDA, Bresenham's Circle drawing algorithms: Using polar coordinates, Mid point circle drawing algorithms, Filled area algorithms: Scan line, Polygon filling algorithms, Boundary filled algorithms.

**Point & Positioning Devices:** Light pen, Mouse, Tablet, Input technique, Positioning technique, and character recognition.

### Unit – 2:

**Two Dimensional Viewing:** Viewing pipeline, Window to view port transformation, Window to view port mapping.

Clipping: Point & Line clipping algorithm. 4-bit code algorithm., Cohen-Sutherland Line clipping algorithms, Liang-Barsky line clipping algorithms.

Polygon clipping: Sutherland-Hodgeman Polygon clipping algorithm. Curve clipping, Text clipping.

### Unit – 3:

**Three Dimensional Viewing:** Viewing pipeline, Viewing coordinates, Projection: Parallel. Perspective.

**Two Dimensional Geometric Transformations:** Two Dimensional transformations: Transformations translation scaling rotation, other transformations: reflection. Shear, Homogeneous Coordinate system.

**Raster Graphics:** Raster graphics fundamental, solid area scan conversion, interactive raster graphics and raster graphics system.

### Unit – 4:

**Representation of 3-D Curves and Surfaces:** Curved lines and surfaces, spline representations, interpolation and approximation alines, Parametric conditions, Geometric continuity conditions.

Bezier curves and surfaces: Beizer curves, properties of beizer curves, beizer surfaces, B-apline curves and surfaces.

**Hidden Surfaces removal:** Hidden surface elimination, depth buffer algorithm, scan line coherence and area coherence algorithm, priority algorithm.

**Case study:** Device independent graphics system, graphics system design case study of graphics kernel system.

**Books Recommended:-**

1. Hern & Baker – Computer Graphics, 2<sup>nd</sup> Ed. PHI.
2. Newmann & Sprawl – Introduction to interactive Computer Graphics, MGH.
3. Harrington – Computer Graphics – A programming Approach.
4. Rogers – Principles of Computer Graphics – MGH.
5. Foley – Fundamental of Interactive Computer Graphics – Addison Welsey

**Note:** Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-358

## Computer Network

L	T	Theory	Sessional	Duration
4	1	100	40	3 Hrs

### Unit – 1:

**Introduction:** Basics of Computer Networks, need and Evolution of computer networks, description of LAN, MAN, WAN & wireless networks.

**Basics terminology of Computer Networks:** Bandwidth, physical and logical topologies, media 10 base A, 10base 5, 10 base 5, 10base-t, 100 base FX, 100base LX and wireless. LAN & WAN devices – Router, Bridge Ethernet switch HUB, Modem SCU/DSU.

### OSI Reference Model:

Laying architecture of networks, OSI model, Functions of each layer, Services and Protocols of each Layer.

### Unit – 2:

**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, SNMP, TELNET, overview of IP version 6.

OSI and TCP/IP model with description of data encapsulation & peer to peer communication, comparison of OSI and wireless.

**Physical Layer:** Representation of a bit on physical modem that is in wired network, optical network and wireless network. Encoding/Modulation – TTL, Manchester Encoding, AM, FM and PM. Dispersion, Jitter, Latency and Collision. Different types of media-twisted pair, unshielded twisted pair, coaxial cable, optical Fiber cable and wireless.

### Unit – 3:

**Data Link Layer:** LLC and MAC sub layer, MAC addressing layer 2 devices, framing error control and flow control. Error detection & correction CRC, block codes parity and checksum, elementary data link protocol, sliding window protocol, channel allocation problem-static and dynamic, Multiple Access protocol- ALOHA, CSMA/CU, Token bus, token ring, FDDI.

**Network Layer:** Segmentations and autonomous system path determination, network layer addressing, network layer data gram, IP addressed Classes. Sub netting – Sun network, Subnet Mask, Routing algorithm-optionally principle, Shortest path routing, hierarchical routing, Broadcast routing, Multicast routing, routing for mobile host – Concatenated Visual Circuits, tunneling fragmentation and DHCP, Routing protocol- RIP, IGRP, USPF and EIGRP. Network layer in ATM networks.

### Unit – 4:

**Transport Layer:** Layer – 4 protocol TCP & UDP. Threeway hand shakes open connection. ATM AAL layer protocol, session layer design issue, presentation layer issue, and Application layer design issue.

**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 system: Client-Server infrastructure, Windows NT/2000.

### Text Book:

1. Tanenbaum. “Computer Networks”, PHI

### Reference Books:

1. Darlx, “ Computer Network and their protocols”, DLA Labs.
2. Freer, “Comp. Communication and Networks”, East – West-Press.
3. Data Communications, Computer Networks and open systems (4<sup>th</sup> Edition).

4. Halsall Fred, 2000, Addison Wesley, low price Edition.
5. Business data communications, Fitzgerald Jerry.
6. Computer Networks – A system approach, Larry L. Peterson & Bruce S. Davie, 2<sup>nd</sup> Edition.
7. Computer Networking – ED Tittel, 2002, T.M.H.

**Note:** Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

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IT-360

## Management Information System

L	T	Theory	Sessional	Duration
3	1	75	50	3 Hrs

### Unit – 1:

**Introduction:** Definition information system, role and impact of MIS, The challenges of Information system, Nature of MIS, Characteristics of MIS, Myths regarding MIS, Requirements of MIS, Problems & Solutions in implementing MIS, Benefits of MIS, Limitations of MIS, Significance of MIS, Components of MIS. Role of MIS, Major Management challenge to building and using information system in Organization, functions of management.

### Unit – 2:

**Information system and Organizations:** The relationship between Organization and Information System, Information needs of different organization levels: Information concept as quality product, classification and value of information, methods of data and information collection. Strategic role of information system, Salient features of Organization, Information, management and decision making, How Organization affect Information Systems, How Information system affect Organization, Ethical and Social impact of information system.

### Unit – 3:

**Business application of Information System:** Foundation Concepts Information systems in Business: Information system and technology, Business Applications, Development and Management. The internetworked E-business Enterprise: Internet, and Extranet in business. Electronic Commerce System: Electronics commerce Fundamentals, Commerce Application and issues. E-business Decision Support: Decision support in E-Business, Artificial Intelligence Technologies in business.

### Unit – 4:

**Technical Foundation of Information System:** Computers and information processing, Computer Hardware, Computer software, Managing data resources, Telecommunication, Enterprise: wide computing and networking.

**Strategic and Managerial Implications of Information Systems:** Strategic Information System: Introduction, Characteristics of Strategic Information Systems, Strategic Information Systems (SISP), Strategies for developing an SIS, Potential Barriers to developing a Strategic Information System (SIS), Decision Support System (DSS): Decision making concepts, methods, tools and procedures. Managing Information Resources: Introduction, IRM, Principal of Managing Information Resources, IRM functions, Computer Security: Introduction, Computer Security, Types of Computer Security, Disaster Recovery Plan.

### Books Recommended:

1. W .S . Jawadakar, “Management Information System”, McGraw Hill
2. J. O. Brien, “ Management Information System”, TMH, New Delhi
3. Uma G . Gupta, “Management Information System” Fifth Edition TMH.
4. Kenneth C. Laudon, “Management Information System Organisation and Technology” TMH.

**Note:** Eight questions will be set in all by the examiners taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

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**IT-366**

**Computer Network Lab**

<b>P</b>	<b>Practical</b>	<b>Sessional</b>	<b>Duration</b>
<b>2</b>	<b>30</b>	<b>30</b>	<b>3Hrs</b>

1. Study the physical media of connectivity.
2. Study the pin-structure of cross-over cable.
3. Study the different LAN Technologies.
4. Study the functioning of a Switch.
5. Study the Functioning of a Router.
6. Establishing LAN (Star topology) for your LAB using Hubs (18 port, 16 port).
7. Study and install the media converting using optical fiber.
8. Install and configure the LAN card.
9. Install and configure window 200 Server.
10. Study and implement the virtual network.

**Note:** Students should perform at least 10 experiments.

**IT-364**

**Computer Graphics Lab**

**P  
3**

**Practical  
40**

**Sessional  
40**

**Duration  
3Hrs**

**List of experiments:**

1. Write a program to implement DDA line drawing algorithm.
2. Write a program to implement Bresenham's line drawing algorithm.
3. Implement the Bresenham's circle drawing algorithm.
4. Write a program to draw a decagon whose all vertices are connected with every other vertex using lines.
5. Write a program to show a ship moving using the concepts of 2-D transformations.
6. Write a program to show a ball moving on the screen according to the given requirements.
7. Write a program to implement the midpoint circle drawing algorithm.
8. Write a program to implement the Beizer curve.
9. Implement the line clipping algorithm using C.
10. Implement boundary fill algorithm using C.
11. Implement the depth buffer algorithm using C.

**Note:** Students should perform at least 10 experiments.

**IT-368**

**Visual Basic.Net Lab**

<b>P</b>	<b>Practical</b>	<b>Sessional</b>	<b>Duration</b>
<b>3</b>	<b>40</b>	<b>40</b>	<b>3Hrs</b>

**Experiment List:**

1. Create a calculator that can be used for adding, subtracting, multiplication and division.
2. Write an application to use WMI to retrieve information about your PC.
3. Write an application to create a File and Folder browser.
4. Write a program in VB.NET to send an email via SMTP.
5. Write a program to create a MDI web browser.
6. Write an application to access registry in VB.NET.
7. Write a program to retrieve a web page source from the Internet.
8. Create a slot machine game using standard controls and random number generator.
9. Write a program to create a word processor.
10. Write a program for encryption and decryption.
11. Write an application to capture screen.
12. Create a drawing application in VB.NET.
13. Write an application in VB.NET to play MP#3 files.

**Note:** Students should perform at least 10 experiments.

IT-362

**Software Engineering Lab**

<b>P</b>	<b>Practical</b>	<b>Sessional</b>	<b>Duration</b>
<b>3</b>	<b>30</b>	<b>30</b>	<b>3Hrs</b>

1. Study and categorize the generic phases of software development and maintenance.
2. Study various software development models.
3. Study various type of feasibility study and steps in doing feasibility study.
4. Study various steps for doing the requirement analysis of any project.
5. Write algorithm and draw flow chart to implement the constructive cost estimation model (COCOMO).
6. Making use of Graphical Design notation, study the concept in developing data flow diagram (DFD) for any selected project.
7. Making use of object oriented design, implement a student & employee record system using the concept of inheritance.
8. Select an appropriate programming language & translate the detailed design made in experiment 7 in appropriate programming language.
9. Develop a complete test strategy for the project selected in exp-8. Document it in a test specification.
10. Apply the debugging process to the project selected in exp-9 in accordance with the result generated from its testing in exp-9.
11. Study various concepts involved in cost / benefit analysis.
12. Draw flow chart and write algorithm for designing an editor.

**Note:** Students should perform at least 10 experiments.

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