

**MAHATMA GANDHI
UNIVERSITY**

B.TECH. DEGREE COURSE

6TH SEMESTER

**SCHEME
&
SYLLABUS**

2002

**COMPUTER SCIENCE
&
ENGINEERING BRANCH**

COMPUTER SCIENCE & ENGINEERING

SCHEME

6TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	Pac/ Proj.		Sessional	Theory	Practical	Total
A	R 601	PC & PC based Systems	3	1	-	3	50	100	-	150
B	RT602	Software Engineering	2	1	-	3	50	100	-	150
C	R 603	Project Management and Quality Assurance	2	1	-	3	50	100	-	150
D	RT604	Computer Networks	3	1	-	3	50	100	-	150
E	RT605	Network Computing	3	1	-	3	50	100	-	150
F	R 606	Algorithm Analysis and Design	3	1	-	3	50	100	-	150
G	R 607	System Software Lab	0	0	4	3	50	-	100	150
H	R 608	Mini Project	0	0	4	3	50	-	100	150
		Total	16	6	8	-	400	600	200	1200

SYLLABUS

PC & PC BASED SYSTEMS

R601

3+1+0

Module 1 Introduction to PC

Hardware components – study of motherboards —Different types of ports, slots and connectors-Add-on cards-Power supply– SMPS- function & operations.

Module 2 Storage Devices

Floppy – Floppy Disk Controller - Disk Physical specification & operations – Disk magnetic properties – Cylinders – Clusters – Hard disks – Hard disk drive operation – Magnetic data storage - Sectors – Disk formatting – partitioning - Hard disk features – Hard disk data transfer modes –Programmed I/O – Direct memory access – Ultra DMA – Data addressing – Standard CHS addressing – Extended CHS addressing – Logical Block Addressing.

Module 3 Optical Storage

CD ROM, CD Technology, Sector layout, CD-R, CD-RW, CDROM, drive specifications- data transfer rate – Access time – Constant linear velocity – constant angular velocity - Buffers – Interface – Magneto optical drives – WORM devices –DVD- RAID – Holographic storage.

Module 4 Memory Management in PC

Parity – ECC – Static & Dynamic RAM – Memory Addressing – Segmented addressing - 64 KB Limits – 640 KB barrier – Logical, segmented, virtual, linear and physical memory addresses – Extended and Expanded memory – Cache memory – Video memory – HMA - Flat memory model – Advanced memory technologies.

Module 5 Bus Structures

ISA, PCI, PCMCIA, AGP, USB, Hard Disk Interfaces – IDE, EIDE, ATA – Communication ports – Serial – Parallel port – Keyboard / Mouse Interface connectors.

References

1. PC Hardware Complete Reference - Craig Zacker & John Rourke, Tata McGraw Hill
2. Inside the PC (8th Edition) - Peter Norton,BPB
3. The Indispensable PC Hardware Book - Messmer, Pearson Education
4. Troubleshooting and Repairing Your PC - Corey Candler, Wiley
5. Upgrading and repairing PC's (4th edition) - Scott Mueller, Pearson Education
6. IBM PC Assembly Language Programming - Abel, PHI
7. PC Upgrading Maintenance & Trouble shooting guide - Dr. S. K. Chauhan, Kataria

SOFTWARE ENGINEERING

RT 602

2+1+0

Module 1 Introduction to Software engineering

Introduction – Software and software Engg.- Phases in software development- Software development process models-Role of Management in software development –Role of Metrics and measurement –Software requirement specification(SRS) - Problem Analysis - validation .

Module 2 Project Planning

Cost Estimation – Uncertainties – models – COCOMO model – Project scheduling – average duration estimation – Project scheduling and milestones – staffing and personal plan – Rayleigh curve – personnel plan – team structure – software configuration – management plans – quality assurance plans – verification and validation – inspections and reviews - project monitoring plans - time sheets – reviews – cost schedule – milestone graph – risk management.

Module 3 System Design

Design Principles – Problem partitioning and hierarchy – abstraction – modularity – top down and bottom_up – strategies – module level concepts - coupling - cohesion – structured design methodology - verification - matrices.

Module 4 Coding

Top-down and Bottom-up - Structured Programming - Information Hiding - Programming style - Internal Documentation – Verification - Code Reading - Static Analysis - Symbolic execution - Proving Correctness - Code inspections – Unit testing.

Module 5 Testing

Testing fundamentals - Functional and Structured Testing - Testing Process - Comparison of Verification and Validation Techniques - Reliability assessment - Programmer Productivity - Error removal efficiency.

Text Book

1. An integrated approach to Software Engineering - Pankaj Jalote, Narosa Publication

References

1. Software Engineering - Roger S. Pressman, Tata McGraw Hill
2. Software Engineering - Ian Sommerville, Pearson Education
3. Software Engineering Theory and Practice - Shari Lawrence, Pearson Education Asia
4. Fundamentals of Software Engineering –Rajib Mall, PHI
5. Fundamentals of Software Engineering – Carlo Ghezzi, Mehdi Jazayeri, PHI

PROJECT MANAGEMENT AND QUALITY ASSURANCE

R603

2+1+0

Module 1 PROJECT PLANNING

Overview – Capital expenditure - Phases of capital budgeting – Project development cycle – 7-s of project management – Requirements of a project manager – Forms of project organization.

Module 2 PROJECT ANALYSIS

Market Analysis – Technical Analysis - Financial Analysis – Risk Analysis – Social cost Benefit Analysis.

Module 3 CONTROL OF PROJECT

Control Systems – Control of major constraints – Project management software & information systems.

REVIEW: Performance of Evaluation – Abandonment Analysis – Behavioral issues in Project Management

Module 4 TOTAL QUALITY MANAGEMENT

Quality systems – ISO 9000 series – ISI – Benchmarking – Quality Function development (QFD) – Total Productive Maintenance (TPM) – ISO 14000.

Module 5 CONCEPTS IN SAMPLING

Sampling designs and schemes – Errors in sampling – Simple random sample – stratified random sample – Cluster sample.

Sample size destination – Estimating population mean – Estimating population proportion.

References

1. Projects preparation, Appraisal, Budgeting & Implementation – Prasanna Chandra – Tata McGraw Hill
2. Projects – Planning, Analysis, Selection, Implementation & Review - Prasanna Chandra – Tata McGraw Hill
3. Project Management - Harvey Maylor - Pearson Education
4. Total Quality Management – Dale H. Besterfield – Pearson Education
5. Quality control and Improvement – Amitava Mitra – Pearson Education
6. Quality assurance and TQM – Jain & Chitale – Khanna Publishers

COMPUTER NETWORKS

RT 604

3+1+0

Module 1

Introduction: ISO-OSI Reference Model – TCP/IP Reference Model – Comparison Network hardware-Repeaters, Routers, Bridges, Gateways, Hub, Cable Modem.

Physical Layer: Transmission Media– ISDN system Architecture – Communication Satellites – geostationary satellites - Medium Earth Orbit Satellites- Low earth orbit satellites– Satellite v/s Fiber

Module 2

Data Link Layer: Design issues-Error Detection and correction – Elementary Data link protocols- Sliding window protocols. .

LAN Protocols: Static & Dynamic channel allocation in LAN's and WAN's, Multiple access protocols – ALOHA – Pure ALOHA – Slotted ALOHA – Carrier Sense Multiple Access protocols – persistent and non-persistent CSMA – CSMA with collision detection – IEEE 802.3 standards for LAN

Module 3

Network layer: Virtual Circuits, Datagrams, Routing Algorithm – Optimality principle - Flooding - Flow Based Routing - Link state routing – Distance vector routing – Multicasting – Link state multicasting – Distance vector multicasting - Congestion Control Algorithms – General principles – Packet discarding – Choke packets - Congestion prevention policies – Traffic shaping – Leaky bucket algorithm – Flow specifications – jitter control

Module 4

Transport Layer: - Transport Service - Elements of transport protocols – Internet Transfer Protocols UDP and TCP – ATM – Principle characteristics.

Module 5

Application Layer: Domain name system – DNS name space – Resource records – Name servers – operation of DNS - Electronic Mail – MIME

Mobile networks: Mobile telephone systems, Bluetooth - Components – Error correction – Network topology – Piconet and scatternet – L2CAP layers – Communication in Bluetooth networks

References

1. Computer Networks (Fourth Edition): Andrew S.Tanenbaum, Pearson Education Asia/ PHI
2. An Introduction to computer networking: Kenneth C. Mansfield Jr., James L. Antonakos, Prentice-Hall India
3. Communication Network: Leon, Garcia, Widjaja Tata McGraw Hill.

4. Computer Networks (Second Edition): Larry L Peterson & Bruce S Davie, (Harcourt India)
5. Computer Networking: James F Kurose & Keith W Ross, Pearson Education
6. Introduction to Data Communications and Networking: Behrouz, Forouzan, McGraw Hill

NETWORK COMPUTING

RT 605

3+1+0

Module 1

HTML Documents Basic Tags for Font & Paragraph Formatting Lists, Tables, Frames, image Maps

Cascading Style Sheets Style Element, Inline style sheets, Embedded style sheets, External Style sheets, CLASS Attribute, Absolute and relative positioning of elements, DIV & SPAN Tags.

Module 2

Dynamic HTML Pages Client side scripting - Java Script – variables, Arithmetic operations – message boxes, Arrays, control statements, functions, event handling, document object model.

Dynamic updating of pages with JAVA Script.

Embedding ActiveX controls - using the structured graphics – ActiveX Control.

Module 3

Java programming – Features of Java, Creating & using classes in Java – Static classes – Inheritance – Final methods, variables and classes – Interfaces - Nested classes – Inner classes – Anonymous Inner classes – Exception handling – Creating & using exceptions, Multithreaded programs and thread synchronization, creating and using packages. Creating GUI with AWT and Swing – -JDK1.1 event model

Module 4

Network Programming with Java - Features of Java – Applets & Application – Life cycle of applets - Security features for applets - Inter applet communication – Threads & Thread synchronization – TCP/IP Programming with Java – Iterative & Concurrent servers. Datagrams, IP multicasting, RMI (Structure and Working of a simple RMI Program only)

Module 5

HTTP Protocol working – HTTP methods, GET, PUT, DELETE, POST, HEAD
Server side scripting – HTML Forms & CGI – GET & POST, Basic working of a CGI supported web server – Simple CGI program in C to validate user name & Password. Email: Working of SMTP and POP protocols (Overview only).

References

Module 1,2,5

1. Internet and World Wide Web How to program - Deitel,Deitel & Nieto, Pearson Education Asia
2. HTML, DHTML, Java Script, Perl, CGI - Evan Bayross, BPB

Module 3,4,5

3. Java 2 Complete reference - Herbert, Schildt, Tata McGraw Hill
4. Java 2, AWT, Swing, XML and JavaBeans Programming Black Book – Steven Holzner, Wiley Dreamtech
5. The Java Programming Language 3rd Edition - Arnold, Gosling, Holmes, Pearson Education Asia
6. Using Java 2 Platform - Joseph Weber, PHI
7. Computer Networks - Tenanbaum, PHI/ Pearson Education Asia

Additional References

8. *Unix Network Programming* - Stevens W Richard, PHI
9. TCP/IP Protocol suite, 2/e -Behrouz A. Forouzan, TMH

ALGORITHM ANALYSIS AND DESIGN

R606

3+1+0

Module 1 Introduction and Complexity

What is an algorithm – Properties of an Algorithm, Difference between Algorithm, Computational Procedure and Program, Study of Algorithms; Pseudo-code Conventions; Recursive Algorithms –Space and Time Complexity – Asymptotic Notations – ‘Oh’, ‘Omega’, ‘Theta’, Common Complexity Functions; Recurrence Relations and Recurrence Trees for Complexity Calculations; Profiling. –Deterministic and non - deterministic algorithms.

Module 2 Divide and Conquer

Control Abstraction, Finding Maximum and Minimum, Binary Search, Divide and Conquer Matrix Multiplication, Strassen’s Matrix Multiplication, Merge Sort, Quick Sort.

Module 3 Greedy Strategy

Control Abstraction, General Knapsack Problem, Optimal Storage on Tapes, Minimum Cost Spanning Trees – Prim’s Algorithm, Kruskal’s Algorithm – Job sequencing with deadlines.

Module 4 Dynamic Programming

Principle of Optimality, Multi-stage Graph, All-Pairs Shortest Paths, Travelling Salesman Problem.

Lower Bound Theory - Comparison Trees for Searching and Sorting, Oracles and Adversary Arguments – Merging, Insertion & Selection Sort; Selection of 'k'th Smallest Element.

Module 5 Backtracking

Control Abstraction - Bounding Functions, Control Abstraction, N-Queens Problem, Sum of Subsets, Knapsack problem.

Branch and Bound Techniques – FIFO, LIFO, and LC Control Abstractions, 15-puzzle, Travelling Salesman Problem.

Text Book

1. Fundamentals of Computer Algorithms - Horowitz and Sahni, Galgotia

References

1. Computer Algorithms – Introduction to Design and Analysis - Sara Baase & Allen Van Gelder, Pearson Education
2. Data Structures algorithms and applications - Sahni, Tata McGrHill
3. Foundations of Algorithms - Richard Neapolitan, Kumarss N., DC Hearth & Company
4. Introduction to algorithm- Thomas Coremen, Charles, Ronald Rivest -PHI

SYSTEM SOFTWARE LAB

R607

0+0+4

1. Symbol table construction
2. Single pass and two pass assembler.
3. Macro processor module binder (with limited Instruction set)
4. Lexical analyzer.
5. Bottom Up and Top Down Parser.
6. Code generation.
7. Generation of code for linkers & loaders. Working of device drivers, process scheduling methods.

Any experiment according to the syllabus of RT505 can be substituted.

MINI PROJECT

R608

0+0+4

The aim of the mini project is to prepare the students for the final year project. The topic for the mini project should be simple as compared to the main project, but should cover all the aspects of a complete project.

