

PEOPLE'S UNIVERSITY, BHOPAL



PROGRAMME: M Tech (CSE)

SEM: I

Subject Title	Subject Code
Advanced Algorithms	MTCS 101

Unit	Contents (Theory)
I	INTRODUCTION to DATA STRUCTURES & ALGORITHMS Introduction to Data Structures, Classification of Data Structures, Introduction to Arrays, Addressing in Arrays, Trees, Types, Traversal Schemes, Stack, Multistack, Queue, Classification, Linked Lists, Types, Graphs, Traversal Schemes and their Applications and Operation, Introduction to Algorithms and Problem Solving
II	Introduction to Analysis & Design of Algorithms Introduction to Analysis of Algorithms, Priori and Posteriori Analysis, Introduction to Algorithmic Complexity, Space and Time Complexity, Introduction to Asymptotic Notations, Introduction to Algorithmic Design Techniques, Divide & Conquer Technique, Linear Search, Binary Search, Introduction to Sorting, Bubble Sort, Merge Sort, Quick Sort, Introduction to Greedy Strategy, Spanning Trees, Kruskal's and Prim's Algorithm, Knapsack Problem, Huffman Coding and Shortest Path Algorithm
III	Introduction to Design Techniques Introduction to Dynamic Programming, 0/1 Knapsack Problem, Multistage Graphs, Reliability Design Problem, Introduction to Backtracking, 8 Queen's Problem, Hamiltonian Cycle Problem, Graph Coloring Problem, Introduction to Branch & Bound Technique, Traveling Salesman Problem, 15 Puzzle Problem and Introduction to Lower Bound Theory
IV	Introduction to Complexity Classes Introduction to Complexity Classes, P, NP, NP Hard, NP Complete, Polynomial Time Reducibility, Introduction to Randomized Algorithms, its Applications, Introduction to Geometric Algorithms, its Applications, Introduction to Graph Algorithms and its Applications, Introduction to Parallel Algorithms and Approximation Algorithms
V	Introduction to Programming Introduction to Programming, Programming Languages, Classification of Programming Languages, Object Oriented Programming, Study of OOP Languages like C++, C# and Java, Introduction to Dynamic Memory Allocation and Garbage Collection

References:

1. Fundamentals of Computer Algorithms by Sartaj Sahni, Galgotia Publications
2. Design & Analysis of Computer Algorithms by Aho, Hopcroft & Ullman, Addison Wesley Publishing Company
3. Introduction to Algorithms by Cormen, Leiserson, Rivest & Stein, PHI
4. Data Structures & Algorithms by Seymour Lipshutz, Tata McGraw Publications
5. Object Oriented Programming with C++ by E Balagurusamy, Tata McGraw Hill Publications
6. Computer Algorithms by Horowitz Sahni, Rajasekaran, Galgotia Publication
7. Data Structures using C & C++ by Tanenbaum A.S, Langram Y, Augestien M.J, Prentice Hall of India
8. Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss, Pearson Education.
9. Data Structures and Algorithms by Aho Hopcroft Ullman, Pearson Education
10. Data structures and Algorithms in C++ by Michael T.Goodrich, R.Tamassia and Mount, Wiley and Sons.

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PROGRAMME: M Tech (CSE)

SEM: I

Subject Title	Subject Code
Advanced Data Base Management Systems	MTCS 102

Unit	Contents (Theory)
I	RDBMS & Query Processing Introduction to Relational Databases, Data Models, ER Diagrams, Specialization, Generalization, Aggregation and Association, Integrity Constraints, Extended ER diagram, Relational Algebra & Calculus, Functional, Multivalued and Join Dependency, Normal Forms, Query Processing and Optimization, Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Deductive Databases, Datalog and Recursion
II	Types of Data Bases Introduction to types of Databases, Image and Multimedia Databases, Modeling and Storage of Image and Multimedia Data, Multimedia Data Formats, Video Data Model, Audio & Handwritten Data, Geographic Information Systems (GIS), WEB Database, Accessing Databases through WEB, WEB Servers, XML Databases and Commercial Systems.
III	Object Oriented Data Base & Distributed Data Base Introduction to Objected Oriented and Object Relational Databases, Modeling Complex Data Semantics, Objects, Object Identity, Object Reference, Architecture of Object Oriented and Object Relational Databases, Parallel and Distributed Databases, Distributed Data Storage, Characteristics, Distributed Query Processing and Optimization, Distributed Transaction Modeling and Concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases and Parallel Query Evaluation.
IV	Transaction Processing Introduction to Transaction Processing, ACID Protocols, Advanced Transaction Processing, Nested and Multilevel Transactions, Compensating Transactions, Long Duration Transactions, Transaction Work Flows, Transaction Processing Monitors, Active Database and Real Time Databases, Triggers in SQL, Introduction to Event Constraint and Action, ECA Rules and Databases Recovery.
V	Data Mining & Data Warehousing Introduction to Data Mining, Knowledge Representation Using Rules, Association and Classification Rules, Sequential Patterns, Algorithms for Rule Discovery, Introduction to Data Warehousing, Data Warehousing Architecture, Multidimensional Data Model, Introduction to OLAP and OLTP, OLAP Types, OLAP Queries and Case Study of ORACLE.

References:

1. An Introduction to Database Systems by Date, Kannan, Swaminathan, Pearson Education
2. Database System Concepts, design and application, by Singh S.K, Pearson Education
3. Database System Concepts by Silberschatz, Korth, Sudarshan, Mcgraw Hill
4. Modern Database Systems by W. Kim, ACM Press, Addison - Wesley
5. Principals of database systems by Ullman, J. D., Galgotia publications,
6. Data base Processing by David M. Croenke and David J.Auer, PHI
7. Data Base Management System by Ramakrishan, McGraw hill
8. Data base system, design, implementation and management by Peter Rob and Control, Cengage Learning
9. Introduction to data base System by Data C J, Addison Wesley Publishing Company

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PROGRAMME: M Tech (CSE)

SEM: I

Subject Title	Subject Code
System Programming & Operating Systems	MTCS 103

Unit	Contents (Theory)
I	Introduction of System Programming Introduction to System Program and System Programming, Review of different system programs such as assembler, loaders, linkers, compilers, interpreters, operating system, device drivers, Elements of assembly level programming Language Processing Activities and Language Processors Development Tools, Assemblers, Design of assembler, Macro definition, Design of Macro preprocessor, Relocating and linking concepts, Design of linker, Programming Environments.
II	Compiler Aspects of Compilation, overview of the various phases of compiler, Scanning, Syntax error handling, Symbol table conceptual design, Intermediate Code conceptual Design, Intermediate code interfaces, Dynamic storage allocation techniques, Dynamic Programming code generation algorithm, Principal sources of optimization, Approaches to compiler development. Register allocation techniques. Concurrentisation and vectorisation of programs
III	Introduction of OS Introduction to Operating Systems, Types of operating Systems & Services. Basic concepts of CPU scheduling, scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling. Process concept, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization, Disk scheduling
IV	Deadlock Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling. Concepts of memory management, logical and physical address space, swapping, Fixed and Dynamic Partitions, Best-Fit, First-Fit and Worst Fit Allocation, paging, segmentation, and paging combined with segmentation.
V	Virtual Memory Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation, File concepts, File manager, File organization, access methods, allocation methods, free space managements, directory systems, file protection, file organization & access mechanism, file sharing implement issue. Introduction to distributed systems, Design Issues in distributed operating system

References:

1. Systems Programming and Operating systems by Dhamdhare, TMH
2. Distributed operating system by Sinha, PHI
3. Modern Operating System by Tanenbaum, PHI Learning.
4. Operating system by Silberschatz, Willey Publication
5. Operating System Principles, Design & Applications by Stuart, Cengage Learning
6. Operating System by Achyut S Godbole, TMH.
7. Operating system by William stalling, Pearson Education
8. Operating Systems by Deitel & Deitel, Pearson Education
9. Operating Systems by Flynn & Mchoes, Cengage Learning
10. Operating System by Haldar, Pearson Education

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PROGRAMME: M Tech (CSE)

SEM: I

Subject Title	Subject Code
Advanced Computer Network	MTCS 104

Unit	Contents (Theory)
I	Introduction Introduction to Network models-ISO-OSI, and TCP/IP models. Review of Physical layer and Data link layers, Review of LAN (IEEE 802.3, 802.5, 802.11b/a/g, FDDI) and WAN (Frame Relay, ATM, ISDN) standards.
II	Network layer Internet architecture and addressing, internetworking, IPv4, ICMP, Routing Protocols-RIP, OSPF, BGP, IP over ATM, IPv6, Next Generation IP protocol, Wireless Networks, GSM, CDMA, Mobility in networks, Mobile IP, Mobile IP multicasting, BSD Sockets.
III	Transport layer Design issues, Connection management, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Finite state machine model. TCP extensions for high speed network, TCP/IP programming
IV	Application layer Application Layer, File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application, Example Networks - Internet and Public Networks.
V	Network Security IP Security, Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management, Web Security: Secure socket layer and transport layer security, secure electronic transaction (SET), System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems, Study of various network simulators, Network performance analysis using NS2

References:

1. Networks for Computer Scientists and Engineers by Youlu Zheng / Shakil Akhtar, , Oxford University Press
2. TCP/IP Protocol Suite by Forouzan, Tata McGraw Hill.
3. High Performance Communication Networks by Walrand & Varaiya,Elsevier
4. Network Analysis, Architecture & Design by James D. McCabe, Elsevier India
5. Computer Networks by Andrew S. Tanenbaum, PHI
6. Network Security: PRIVATE Communication in a PUBLIC World by Charlie Kaufman, Radia Perlman, Mike Speciner, Prentice Hall India.
7. Network Security Essentials:- Applications and Standards byWilliam Stallings, Pearson Education.
8. Top-Down Network Design by Priscilla Oppenheimer, Pearson Education India
9. Effective TCP/IP Programming by Snader J.,Addison-Wesley Publication

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PROGRAMME: M Tech (CSE)

SEM: I

Subject Title	Subject Code
Web Technology and E-Commerce	MTC5 105

Unit	Contents (Theory)
I	Introduction: Internet and networking Technologies, Network Protocols, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.
II	Web Technologies: Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.
III	UDP: introduction, UDP header, UDP checksum, IP Fragmentation, UDP Server design DNS Introduction- basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction packet format, server design, through router TCP: Introduction, services, headers, connection establishment and termination timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design, SNMP Introduction, protocol, structure of management information, object identifiers management information base, instance identification Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol examples, SMTP protocols, examples, NFS, TCP/IP Applications.
IV	Ecommerce: What is E-Commerce, Forces behind E-Commerce Industry Framework, Brief history of E-Commerce, Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer to Business E-Commerce, Architectural framework Network Infrastructure for E-Commerce, Network Infrastructure for E-Commerce, Global Information Distribution Network, Broad band Telecommunication.
V	Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Application, Mobile Information Devices, Electronic Payments: Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card, Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking, Net Commerce: EDA, EDI Application in Business, Legal requirement in E-Commerce.

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References:

1. E-Commerce by Greenstein and Feinman, TMH
2. Frontiers of Electronic Commerce, by Ravi Kalakota, Andrew Whinston, Addison Wesley Publication
3. The E-Business Revolution by Denical Amor, Addison Wesley Publication
4. E-Commerce: The Cutting Edge of Business by Bajaj & Nag, TMH
5. Web programming, building internet application by Chris Bates, Wiley Dreamtech Press
6. Internet and world wide web - how to program by Dietel and Nieto, Pearson Education
7. Programming World wide web by Sebesta, Pearson Education
8. Computer Networking A Top-Down Approach Featuring the Internet by James F. Kurose and Keith W. Ross, Pearson Education
9. Computer Networks by Larry L. Peterson and Peter S. Davie, Harcourt Asia Pvt. Ltd
10. E-Commerce by Diwan, Sharma, Excel publication

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PEOPLE'S UNIVERSITY, BHOPAL

Subject Title	Subject Code
LAB-1	MTCS 106

Set -1

1. Write a program to Implement Multidimensional Array.
2. Write a program to Implement Multistack.
3. Write a program to Implement Priority Queue.
4. Write a program to Implement Huffman code Algorithm.
5. Write a program to Implement Merge Sort Algorithm.
6. Write a program to Implement Quick Sort Algorithm.
7. Write a program to implement minimum spanning trees using Kruskal's algorithm.
8. Write a program to implement minimum spanning trees using Prim's algorithm.
9. Write a program for traveling salesman problem.
10. Write a program to Implement Dynamic Memory Allocation.

Set -2

1. WAP to Implement joins
2. WAP to Implement OLAP queries
3. WAP to Implement cube operator in OLAP queries in data warehousing
4. and decision support system
5. Implement decision tree of data mining problem
6. Implement view modification and materialization in data warehousing and decision support systems
7. Consider the following relational database schema:
STUDENT (Student_id, Sname, Major, GPA) FACULTY (Faculty_id, fname, dept, designation, salary)
COURSE (Course_id, Cname, Faculty_id) ENROL (Course_id, Student_id, grade) Use the above schema and solve the queries using SQL
 - i) List the names of all students enrolled for the courses "CS-53"
Regulations and Syllabi for AMIETE Examination 50
 - ii) List the names of students enrolled for the courses "CS-53" and have received "A" grade.
 - iii) List all the departments having an average salary of above Rs20,000.
 - iv) Give a 15% raise to salary of all faculty.
 - v) List the names of all faculty members beginning with "R" and ending with letter "U".
8. Consider the following relations for an order processing database application in a company.
CUSTOMER (cust #: int, cname: string, city: string) ORDER (order #: int, odate: date, cust #: int, ord-
Amt: int) ORDER – ITEM (order #: int, Item #: int, qty: int) ITEM (item #: int, unit price: int) SHIPMENT
(order #: int, warehouse#: int, ship-date: date) WAREHOUSE (warehouse #: int, city: string)
 - a) Create the above tables by properly specifying the primary keys and the foreign keys.
 - b) Enter atleast five tuples for each relation.
 - c) Produce a listing: CUSTNAME, #oforders, AVG_ORDER_AMT, where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer.
 - d) List the order# for orders that were shipped from all the warehouses that the company has in specific city.
 - e) Demonstrate how you delete item# 10 from the ITEM table and make that field null in the ORDER_ITEM table.
 - f) Generation of suitable reports.
9. Consider the following database for a banking enterprise:
BRANCH(branch-name:string, branch-city:string, assets:real) ACCOUNT(accno:int, branch-name:string,
balance:real) DEPOSITOR(customer-name:string, accno:int) COUSTOMER(customer-name:string,
customer-street:string, customer-city:string) LOAN(loan-number:int, branch-name:string, amount:real)
BORROWER(customer-name:string, loan-number:int)
 - a) Create the above tables by properly specifying the primary keys and the foreign keys.
 - b) Enter atleast five tuples for each relation
 - c) Find all the customers who have atleast two accounts at the Main branch.
 - d) Find all the customers who have an account at all the branches located in a specific city.
 - e) Demonstrate how you delete all account tuples at every branch located in a specific city.

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1. Fundamentals of Computer Algorithms by Sartaj Sahni, Galgotia Publications
2. Design & Analysis of Computer Algorithms by Aho, Hopcroft & Ullman, Addison Wesley Publishing Company
3. Introduction to Algorithms by Cormen, Liecerson, Rivest & Stein, PHI
4. Data Structures & Algorithms by Seymour Lipshutz, Tata McGraw Publications
5. Object Oriented Programming with C++ by E Balagurusamy, Tata McGraw Hill Publications
6. An Introduction to Database Systems by Date, Kannan, Swaminathan, Pearson Education
7. Database System Concepts, design and application, by Singh S.K ,Pearson Education
8. Database System Concepts by Silberschatz, Korth, Sudarshan, Mcgraw Hill,
9. Modern Database Systems by W. Kim, ACM Press, Addison – Wesley Publishing Company
10. The Theory of Relational Databases by D. Maier,, Computer Science Press, Rokville, Maryland
11. Principals of database systems by Ullman, J. D., Galgotia publications

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Subject Title	Subject Code
LAB -II	MTCS 107

Set -1

1. Study of Compiler and its Phases
2. Implementation of Machine Op-Code Table, Symbol Table and Pseudo Op- Code table using First Pass Assembler.
3. Implementation of Machine Op- code table using Two pass Assembler.
4. Implementation of Macro Name Table, Macro definition Table and Argument List Array during Pass One of Two Pass Macro.
5. Study of Lexical Analyzer.
6. Implementation of FCFS, SJF & Round Robin CPU Scheduling Algorithms
7. Implementation of Banker's Algorithm
8. Implementation of FIFO, LRU and Optimal Page Replacement Algorithms
9. Implementation of LL(1) Parser
10. Implementation of Recursive Descent Parsing

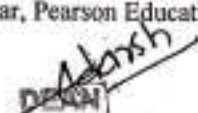
Set -2


1. Simulation of ISO-OSI reference model.
2. Error control in computer Networks
 - Hamming code
 - CRC
3. Implementation of Flow control Mechanism
 - Stop and Wait
 - Go back N
 - Selective repeat
4. Simulation of Data Link Protocol: HDLC
5. Study and implementation of routing algorithm
6. Study and implementation of congestion control algorithm.
7. Implementation of subnet mask concept.
8. Simulation of ARP and RARP protocols.
9. Simulation of TCP protocol.
10. 10. Network socket programming.


References:

1. Systems Programming and Operating systems by Dhamdhere ,TMH
2. Distributed operating system by Sinha , PHI
3. *Modern Operating System by Tanenbaum, PHI Learning.*
4. Networks for Computer Scientists and Engineers by Youlu Zheng / Shakil Akhtar, Oxford University Press
5. TCP/IP Protocol Suite by Forouzan, Tata McGraw Hill
6. High Performance Communication Networks by Walrand & Varaiya, Elsevier Publication
7. Network Analysis, Architecture & Design by James D. McCabe, Elsevier India
8. Computer Networks by Andrew S. Tanenbaum, PHI
9. Operating Systems by Flynn & Mchoes, Cengage Learning
10. Operating System by Haldar, Pearson Education


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