



बिलासपुर विश्वविद्यालय, बिलासपुर (छ.ग.) से संबद्ध
समस्त स्नातकोत्तर (शासकीय एवं अशासकीय) महाविद्यालयों में
सत्र 2016-17 से लागू सेमेस्टर पद्धति के अनुसार
नियमित छात्रों के लिए
सेमेस्टर पाठ्यक्रम

एम.एससी. (मास्टर ऑफ साइंस)
M.Sc. (Master of Science)

विषय - संगणक विज्ञान
Subject – Computer Science

बिलासपुर विश्वविद्यालय, बिलासपुर (छ.ग.)

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Scheme of Examination

(1st to 4th Semesters)

M.Sc. (CS) First Semester							
Subject Code	Subject	Subject Nature	End Semester Examination (ESE)		Internal Assessment		Total Minimum Marks
			Maximum	Minimum	Maximum	Minimum	
MCST-101	Digital Electronics and Microprocessor	Theory	80	29	20	7	36
MCST-102	Advance Computer Network	Theory	80	29	20	7	36
MCST-103	OOPs using JAVA	Theory	80	29	20	7	36
MCST-104	Advanced Operating System	Theory	80	29	20	7	36
MCSP-105	Lab 1: Digital Electronics	Practical	100	36	--	--	36
MCSP-106	Lab 2: Java Programming	Practical	100	36	--	--	36
Total Marks			600				
M.Sc. (CS) Second Semester							
MCST-201	Analysis and Design of Algorithm	Theory	80	29	20	7	36
MCST-202	Relational Database Management System (RDBMS)	Theory	80	29	20	7	36
MCST-203	Data Structure using C++	Theory	80	29	20	7	36
MCSP-204	Software Engineering	Theory	80	29	20	7	36
MCSP-205	Lab 3: RDBMS	Practical	100	36	--	--	36
MCSP-206	Lab 4: Data Structure using C++	Practical	100	36	--	--	36
Total Marks			600				

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M.Sc. (CS) Third Semester							
MCST-301	Theory of Computation and Compiler Design	Theory	80	29	20	7	36
MCST-302	Artificial Intelligence and Expert System	Theory	80	29	20	7	36
MCST-303	Soft Computing	Theory	80	29	20	7	36
MCST-304	.NET Technology	Theory	80	29	20	7	36
MCSP-305	Lab 5: MATLAB	Practical	100	36	--	--	36
MCSP-306	Lab 6: Programming through .NET	Practical	100	36	--	--	36
Total Marks			600				
M.Sc. (CS) Forth Semester							
MCST-401	Advance trends and Technology in Computer Science	Theory	80	29	20	7	36
MCST-402	Elective: 1. Data Mining and Data Ware Housing 2. Computer Graphics and Multimedia 3. Embedded System 4. Network security and cryptography	Theory	80	29	20	7	36
MCSP-403	Major Project	Theory	400	144	---		144
Total Marks			600				
GRAND TOTAL			2400				

Note: Internal assessment of 20 marks will consist of two parts

- (i) Unit Test (10 Marks): Two tests will be conducted and average of these tests will be the marks of Unit Test.
- (ii) Seminar/Assignment (10 Marks): To be conducted by the teacher concerned.

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Detail Syllabus

1st Semester

MCST-101

DIGITAL ELECTRONICS AND MICROPROCESSOR

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Evolution of Digital System & Logic Families

Semiconductor Materials, Types of Solids, Imperfections and Impurities in Solids, pn Junction Diodes, BJTs and other junction Devices, FET and MOSFET, Digital Electronic Signals and Switches, Diode and Transistor as a Switch, Logic Families – Significance and Types, Electrical characteristics of logic families, Comparison of Different Logic Families.

UNIT-II

Boolean concepts and Design of Combinational Circuits

Fundamentals of Logic Gates: AND Gate, OR Gate, Inverter, NAND Gate, NOR Gate. Boolean Algebra and Simplification Techniques: Introduction to Boolean Algebra, Simplification Techniques: Sum-of-Products Boolean Expressions, Product-of-Sums Expressions, Karnaugh Maps for Multi-Output Functions, Karnaugh Map Method, Karnaugh Map for Boolean Expressions with a Larger Number of Variables.

UNIT-III

Design of Combinational Circuits

Implementing Combinational Circuits using K-Map: Half-Adder, Full Adder, Half-Subtractor, Full Subtractor, BCD Adder, Design of code converters, comparators and various Circuits: BCD to excess-3 code and excess-3 to BCD converters, Binary to Gray Code and Gray Code to Binary Code converter, One & Two Bit Comparator, BCD to 7-segment decoder, BCD to 84-2-1 code converter and other code converter, Carry Propagation–Look-Ahead Carry Generator, Multipliers. Design of Multiplexers, Demultiplexers, Decoder and Encoder.

UNIT-IV

Design of Sequential Circuit

Introduction to sequential circuits: Moore and Mealy machines, Introduction to flip-flops like SR, JK, D & T with truth tables, logic diagrams, and timing relationships, Conversion of Flip-Flops, Excitation table, State tables, and realization of state tables, Design of shift registers, Counters: Ripple (Asynchronous) Counter, Synchronous Counter, UP/DOWN Counters, Design of Different Synchronous Counter using K-Map, Design of sequence generators and detectors, Introduction to Programmable Devices, Architecture of PLDs.

UNIT-V

Microprocessors System

Introduction to Microprocessors, Evolution of Microprocessors and family of microprocessor, Architecture of Microprocessor, Microprocessor Instructions, Addressing Modes and needs, Absolute or

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Memory Direct Addressing Mode, Immediate Addressing Mode, Register Direct Addressing Mode, Register Indirect Addressing Mode, Indexed Addressing Mode, Implicit Addressing Mode and Relative Addressing Mode.

Text Books:

1. Digital Electronics, William H. Gothmann, PHI
2. Introduction to Digital Systems, Palmer and Perlman, Tata Mc Graw-Hill
3. A Systematic Approach to Digital Design, Fletcher, Prentice Hall.
4. Digital Design, M. Mano, PHI
5. Microprocessors; Principal and Application, Gilmore, Tata Mc Graw-Hill
6. Circuit Design and Simulation with VHDL, V. Pedroni, MIT Press

Reference Book:

1. Digital Design , Samuel Lee, Pearson
2. The Intel Microprocessor- Architecture, Programming and Interfacing, Brey, PHI.
3. Introduction to Microprocessor for Engineers and Scientists, Hosh And Sridhar, PHI.

MCST-102 ADVANCE COMPUTER NETWORK

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Basics of Data Communication

Introduction to Computer Networks, Network Hardware and Software, OSI and TCP/IP Reference Models, Network topology ,Data Communications, Communication System, transmission modes.

UNIT-II

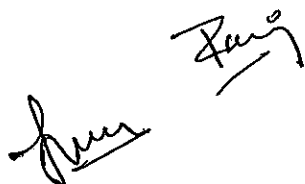
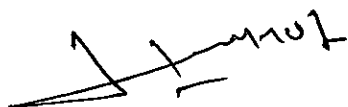
Physical layer and Media

Data and Signal, Transmission Impairment, Digital and Analog Transmission, Transmission media: Guided media, Wireless transmission: Electromagnetic spectrum, Radio and Micro Waves, Infrared, Lightwave, Spread Spectrum Systems, Multiplexing, Switching: Circuit Switched Network, Datagram Network, Virtual Circuit Network.

UNIT-III

Data Link Layer

Data link layer design issues: Services, Framing, Error detection and correction, Error and flow control, Stop-and-Wait protocol, Sliding Window protocol, HDLC, Channel allocation: Static and Dynamic allocation, Multiple Access Protocols: ALOHA, CSMA, Collision-free and limited-contention protocols, Virtual LAN, LAN and MANs: IEEE Standards for LAN and MAN, High Speed LAN, Bluetooth, Cellular telephony, Broadband wireless technologies, Wireless LAN, Transmission in ISDN, Broad Band ISDN ,ATM Networks.



UNIT-IV

Upper Layers

Network Layer: Design Issues in Networks, Routing Algorithms, Congestion Control Algorithms, Internet Protocol (IP), ICMP, IGMP, Delivery, Forwarding and routing, IP Address, Need of Subnetting, and Internetworking, Transport Layer: Services of transport layer , TCP, UDP and SCTP Protocols, Quality of Service, Services of presentation layer, Overview of application layer protocol: Telnet, DNS, SNMP, SMTP, FTP, TFTP, BOOTP, HTTP Protocols, World Wide Web, Firewalls.

UNIT-V

Advanced Concept and Network Security

Over View of Cellular Networks, Adhoc Networks, Mobile Adhoc Networks, Wireless Medium Access Control, Properties of a MANET, Sensor Networks, Virtual Private Networks, Mobile Network Layer: Mobile IP. Network Security: Cryptography, Symmetric key and Asymmetric key cryptography, Security services: Confidentiality, Integrity and authentication, Digital signature, IP security.

Text Books:

1. Data Communication and Networking, Behrouz A. Forouzan, Tata McGraw-Hill, Fourth edition, 2006.
2. Computer Networks, Andrew S. Tanenbaum, PHI / Pearson Education Inc.,
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Pearson Education Inc., New Delhi.
4. Data and computer Network Communication, Firewall Media, Shashi Manjal, First Edition, 2007.
5. Network Security and Management, Brijendra Singh, PHI Learning Private limited.
6. Computer Network, Udit Agarwal, Dhanpat Rai and Co. , 2013.
7. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication
8. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education Inc., New Delhi.
9. Network Security and Cryptography, Bernard Menezes, Cengage Learning, 2010.

Reference Books:

1. Data and Computer Communication, William Stallings, Pearson Education.
2. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007.
3. Data & Computer Communication, Black, PHI.
4. Communication Networks, Walrand, TMH.
5. Internetworking with TCP/IP, Douglas E. Comer, Prentice Hall India.

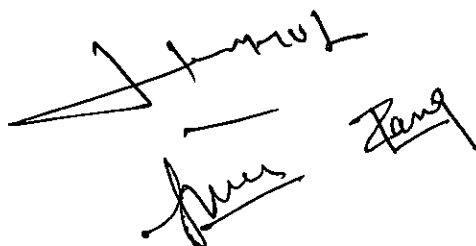
MCST-103 **OOPs USING JAVA**

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

An overview of Java

Object-Oriented Programming: Classes and Objects, Variables, Constants, and Data Types, Primitive Data Types, Variable Scope, Wrappers, Conditional Statement if, switch Statement, Inheritance, Method Overriding, Class Methods: Method Arguments, Method Overloading, Constructors, Keyword super,



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this, final, static, Passing by Value, passing by Reference, Variable Scopes, Life Cycle of a Java Program, JDK and JRE, Java Editions, Polymorphism, Dynamic method dispatch.

UNIT-II

Package, Applet, Swing and JDBC

Packages, Interfaces, and Encapsulation, Abstract Classes, , Graphic User Interface, Event Handling , Java Applets: Writing Applets Using Swing, Error Handling, Java Exceptions, Databases Using JDBC: JDBC Driver Types.

UNIT-III

Network-socket Programming and JDBC

Introduction to Collections, and Introduction to Generics, Java Serialization, Network Programming, Socket Programming, Processing E-Mails with Java: Protocols and Servers, Creating Mailer, Required Supporting Classes, Writing the Mail Sender, Introduction to Multi-Threading, Swing with JTable: JTable and the MVC Paradigm, Remote Method Invocation (RMI), Writing RMI Clients, Finding Remote Objects. Java Enterprise Edition Overview: JCP, JSR, and Other Acronyms, Tiers of Java EE Applications.

UNIT-IV

Servlet, Java Beans and JNDI

What is Servlet?, Deploying a Servlet, Installing GlassFish Plug-In for Eclipse, creating Servlet with Eclipse, Browser-Servlet Data Flow, HTTP Get and Post Requests, Cookies, Server-Side HttpSession, Filters, Event Listeners, Asynchronous Servlets. JavaServer Pages (JSP):-Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, JavaBeans, JSTL. Developing Web Applications with servlet and JSP.

UNIT-V

Enterprise JavaBeans (EJB) and other APIs

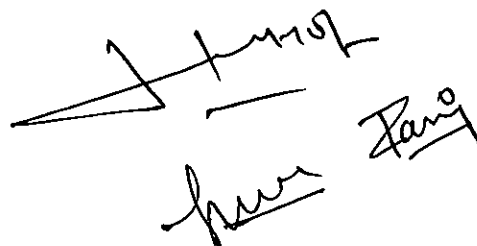
Overview of EJB, Types of EJB, Stateless and Stateful Session Beans, Singleton Beans, Deploying EJB, Message-Driven Beans, Timer Service. Introduction to the Java Persistence API: Mapping Objects to Database Tables, JPQL, Overview of Spring MVC, Introduction to Hibernate Framework

Text Books:

1. The Complete Reference – Java, Herbert Schildt, Tata McGraw Hill.
2. Introduction to Programming with JAVA – A Problem Solving Approach , John Dean, Raymond Dean, Tata Mc Graw Hill
3. Java Programming, Joyce Farrell, Cengage Learning.
4. Java Programming: A Practical Approach, C. Xavier, Tata McGraw Hill,
5. Introduction to Java programming: comprehensive version, Y. Daniel Liang, Pearson Education

Reference Books:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt, Dale Skrien, Tata McGraw Hill.
2. Java Programming: From the Ground Up, Ralph Bravaco, Shai Simonson, Tata McGraw Hill Edition.
3. Java Programming, D.S.Malik, Cengage Learning.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Using JAVA 2, Joseph L weber, PHI
6. JSP Java Server Pages, Barry Burd, IDG Books India(p) Ltd
7. Java2, swing, servlets, JDBC & JAVA Beans Programming Black Book Steven Holzner, Dreamtech press.


Y. Daniel Liang

MCST-104 ADVANCED OPERATING SYSTEM

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Operating System Basics

Processor Registers, Instruction Execution, Interrupts, Interrupts and the Instruction Cycle, Interrupt Processing, Multiple Interrupts, Multiprogramming, The Memory Hierarchy, Cache Memory, I/O Communication Techniques, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, Operating System Objectives and Functions, Types of Operating system.

UNIT-II

Processes and Process Control Strategy

Process States, Process Description, Process scheduling Process Control block, Execution of the Operating System, Security Issues, Processes and Threads, Multithreading, Thread Functionality, Windows Thread and SMP Management, Solaris Thread and SMP Management, Linux Process and Thread Management, Principles of Concurrency, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Integrated Deadlock Strategy.

UNIT-III

Memory Management and Scheduling

Memory Partitioning, Paging, Segmentation, swapping, Security Issues. Virtual Memory concept, Algorithms, Locality and Virtual Memory, Operating System Software, UNIX and Solaris Memory Management, Linux Memory Management, Windows Memory Management, Types of Processor Scheduling, Scheduling Algorithms, Traditional UNIX Scheduling, Multiprocessor Scheduling, Real-Time Scheduling, Linux Scheduling, Windows Scheduling, Process and Thread Priorities, Multiprocessor Scheduling.

UNIT-IV

I/O Management and File Management

Disk Scheduling, I/O Devices, Organization of the I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling, LINUX I/O, Windows I/O, File Organization and Access, File Directories, File Sharing, Record Blocking, Secondary Storage Management, File System Security, UNIX File Management, LINUX Virtual File System, Windows File System.

UNIT-V

Advance Topics of Operating System

Embedded Operating Systems, eCos, TinyOS, Computer Security Concepts, Threats, Attacks, and Assets, Intruders, Malicious Software Overview, Viruses, Worm, Authentication, Access Control, Intrusion Detection, Malware Defense, Dealing With Buffer Overflow Attacks, Distributed Process Management, Process Migration, Distributed Global States, Distributed Mutual Exclusion, Distributed Deadlock.

Text Books:

1. Operating System Concepts, Silberschatz and Galvin, Pearson Education Pub.
2. Operating Systems, Madnick E., Donovan J., Tata McGraw Hill,

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3. Operating Systems, A. S. Tannenbaum, PHI

Reference Books:

1. Operating Systems Internals and Design Principle, William Stallings, Prentice Hall Publishers
2. Operating Systems- A Concept-Based Approach, Dhananjay M. Dhamdhare, McGraw-Hill

MCSP-105

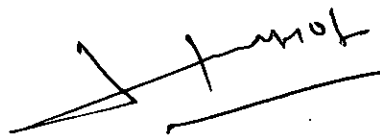
LAB 1: DIGITAL ELECTRONICS

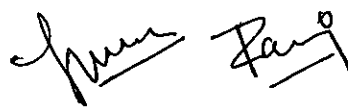
MCSP-106

LAB 2: JAVA PROGRAMMING

LAB Detail

Break-up of marks for External Practical Examination			
S. No.	Argument	Maximum Marks	Minimum Marks
1	Lab Record	20	
1.	Viva-voce	40	
2.	Program Development and Execution	40	36
Total Marks		100	36





2nd Semester

MCST-201 ANALYSIS AND DESIGN OF ALGORITHM

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Introduction:

Analysis of algorithms, asymptotic notations, Standard notations and common functions, Recurrence solution: Substitution method, iteration method and the master method, algorithm design techniques: basic

UNIT-II

Divide and Conquer

Binary search, Min-Max Problem, merge sort, quick sort, and Matrix Multiplication.

Introduction to NP-Completeness

The class P and NP, Polynomial reduction, NP-Completeness Problem, NP-Hard Problems

UNIT-III

Graph Algorithms

Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort.

String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.

UNIT-IV

Greedy Method

Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.

UNIT-V

Dynamic Programming

0/1 Knapsack problem, all Pair's shortest paths: Warshal's and Floyd's algorithms, Single source shortest paths, Backtracking, Branch and Bound: Travelling Salesman Problem.

Text Books :

1. Introduction to Algorithms, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd./ Pearson Education.
2. Computer Algorithms: Introduction to Design & Analysis, Basse, Addison Wesley.
3. Fundamental of Computer Algorithm, Horowitz & Sahani, Galgotia.
4. Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education.

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Reference Books:

1. A practical guide to data Structures and algorithms Using JAVA, Sally Goldman & Kenneth Goldman, CRC Press
2. Data Structures and Algorithms, V. Aho, J. E. Hopcroft, and J. D. Ullman, Pearson Education.
3. Fundamentals of Data structures in C++, E. Horowitz, S.Sahni and Dinesh Mehta, University Press.

MCST-202
RELATIONAL DATABASE MANAGEMENT SYSTEM

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Fundamentals of Relational DBMS

Data Models, Schemas and Instances, Data Abstraction, Data Independence, Codd's 12 rules, Overview & Architecture of commercial RDBMSs: Oracle, SQL Server, My SQL etc.,

UNIT-II

Entity - Relationship (ER) Model, Relational data model concepts, Database Language: SQL, SQL Programming Techniques: DDL, DML, DCL query statements, Constraints and Triggers, Views and Indexes, SQL in Server Environment. Data dependency, Functional dependencies and Normalization of Relational Databases, First, Second and Third Normal forms, Boyce-Codd Normal form (BCNF),

UNIT-III

Transaction Processing

ACID Properties of Transactions, Concurrency control, Serializability and Recoverability, Transaction support in SQL, Locking Techniques, Time Stamp ordering, Validation Techniques, Granularity of Data Items, Database recovery techniques - Shadow paging, Log Based Recovery. Database Security: Access control, Statistical Database Security, Deadlock: Detection, Avoidance and Recovery.

UNIT-IV

Object Model and Object-Oriented Databases

User defined abstract data types and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Overview of Object-Oriented concepts, Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS, Query processing and Optimization.

UNIT-V

Parallel and Distributed Databases and Client-Server Architecture

Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases. An overview of Client-Server architecture.

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Text Books:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, Pearson Education Inc., New Delhi.
2. Database Systems Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw-Hill Education, New Delhi
3. Fundamentals of Database Management Systems, Mark L. Gillenson, Wiley India Pvt. Ltd., New Delhi.
4. Introduction To Database Systems, C.J.Date, Longman, Pearson Education

Reference Books:

1. Database Systems: A Complete Book, Hector Garcia-Molina, Jeffret D. Ullman, Jennifer Widom, Pearson Education Inc., New Delhi.
2. Database Systems: Design, Implementation, and Management, Peter Rob & Carlos Coronel, CENGAGE Learning India Pvt. Ltd., New Delhi.
3. Database Systems Using Oracle, Nilesh Shah, PHI Learning Pvt. Ltd., New Delhi.

MCST-203 DATA STRUCTURE USING C++

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Introduction

Data structure, Data types: primitive, non-primitive data types, ADT, Linear and non linear data structure, Complexity and its Notation, List Structures:

Arrays

One dimensional, Multidimensional arrays, allocation methods, address calculations, sparse arrays.

Linked List

Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these list. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)

UNIT-II

Stack

Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack, use of stack in recursion, Stacks in C++ Using Templates

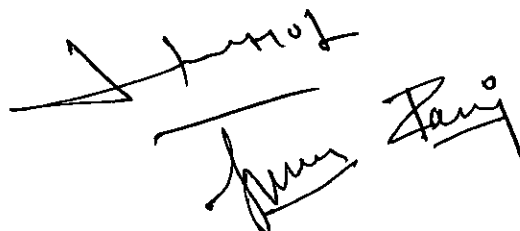
Queue

Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications.

UNIT-III

Tree

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees, Balanced multi way search trees: 2-3 tree, Red Black tree, B tree, B+ tree, their applications.



UNIT-IV

Sorting

Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort, complexity analysis of sorting techniques SEARCHING: Linear or sequential search, Binary search, Hashing, collision resolution methods.

UNIT-V

Graph

Definition of Graph, Basic Terminology types of Graph, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Krushkal and prims algorithms.

Text Book:

1. Data Structures using C, A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
2. Data Structures using C by A. K. Sharma, Pearson Education
3. Data Structures and Algorithms, A.V. Aho, J.E. Hopcroft and T.D. Ullman, Addison-Wesley, Low Priced Edition.
4. Fundamentals of Data structures, Ellis Horowitz & Sartaj Sahni, AW Pub.
5. Fundamentals of computer algorithms, Horowitz Sahni and Rajasekaran, Pearson Edu.
6. Data Structures and Program Design in C, Robert Kruse, PHI.

Reference Books:

1. Theory & Problems of Data Structures, Jr. Symour Lipschetz, Schaum's outline by TMH
2. Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
3. Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H
4. Classical Data Structure, D. Samanta, PHI
5. Data Structures, schaum's Outlines,Adapted by G A PAI

MCST-204 SOFTWARE ENGINEERING

Note: There will be two parts of the question paper: Section A and Section B. Section A will consist 10 short answer type questions/ Objective questions of 2 marks each covering entire syllabus while section B will consist two questions from each unit of 16 marks each, student has to solve any one from these two (50% internal choice).

UNIT-I

Fundamentals of Software Engineering and Process models

Software myths, Software engineering- A layered technology, Software Development Life Cycle, Capability Maturity Model Capability Maturity Model CMM, Process models: waterfall model, Incremental process models, Evolutionary process models, Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, software requirements document.

UNIT-II

S/W Requirements and Design Engineering

Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management, System models: Context Models, Behavioral models, Data models, Object models, Design

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process and Design quality, Design concepts, the design model, software architecture, Fundamental issues in software design: Goodness of design, cohesions, coupling. Function-oriented design: structured analysis and design.

UNIT-III

Testing Strategies and Product metrics

A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging, Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT-IV

Testing Plan and Maintenance

Snooping for information, Coping with complexity through teaming, Testing plan focus areas, Testing for recoverability, Planning for troubles, Preparing for the tests: Software Reuse, Developing good test programs, Data corruption, Tools, Test Execution, Testing with a virtual computer, Simulation and Prototypes, Managing the Test, Customer's role in testing, Software maintenance issues and techniques. Software reuse. Client-Server software development.

UNIT-V

Software Reengineering and Project Management

Software Reengineering, Evolution of Software Economics, Life Cycle Phases and Process artifacts, Model based software architectures, Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments, Process Planning, Project Control and process instrumentation: Seven core metrics, management indicators, quality indicators, life-cycle expectations

Text Books:

1. Fundamentals of Software Engineering, Rajib Mall, PHI Learning Pvt. Ltd.
2. Software Engineering, Ian Sommerville, Pearson Education Inc., New Delhi.
3. Software Engineering: A Practitioner's Approach, Roger S. Pressman, Tata McGraw-Hill
4. Software Project Management, Walker Royce, Pearson Education.

Reference Books:

1. Software Engineering, Shari Lawrence Pfleeger, Joanne M. Atlee, Pearson Education, Inc. New Delhi.
2. Software Engineering, Pankaj Jalote, Wiley India Pvt. Ltd., New Delhi.
3. Software Engineering, Dines Bjørner, Springer India Pvt. Ltd., New Delhi.
4. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
5. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH.
6. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.

MCSP-205 LAB 3: RDBMS

MCSP-206 LAB 4: DATA STRUCTURE

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LAB Detail

Break-up of marks for External Practical Examination			
S. No.	Argument	Maximum Marks	Minimum Marks
1	Lab Record	20	36
1.	Viva-voce	40	
2.	Program Development and Execution	40	
Total Marks		100	36

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