SCHEME OF TEACHING AND EXAMINATIONS 2019-2020
MASTER OF SCIENCE IN COMPUTER SCIENCE

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
Paper I	Principles of Programming Languages	3	2	-	4	100	50		150	40	30		70
Paper II	Advance Operating System	3	2	-	4	100	50		150	40	30		70
Paper III	Data Structure through algorithms using 'C'	3	2	-	4	100	50		150	40	30		70
Paper IV	Programming in Java	3	2	-	4	100	50		150	40	30		70
Paper V	Computer System Architecture	3	2	-	4	100	50		150	40	30		70
Practical I	Programming Lab Based on Paper-III			3x2	3		25	100	125		15	50	65
Practical II	Programming Lab Based on Paper-IV			3x2	3		25	100	125		15	50	65
TOTAL		15	10	12	26	500	300	200	**1000**	200	180	100	480

FIRST SEMESTER : M.Sc.(CS)

Paper I : Principles of Programming Languages

Max Marks : 100 **Min Marks : 40**

UNIT – I: Introduction

Introduction to programming language, Classifications of programming languages, Role of programming language, characteristics of good language, Syntactic element of a language, Programming language paradigm.

UNIT-II: Overview of Problem Solving

Introduction to Computer based Problem Solving, Programming Concepts with Flowcharting and algorithms, Algorithm types, Developing and debugging flowcharts for Programming Problem, Programming Environment {Assemblers, compilers, interpreters, linkers, and loaders}

UNIT –III: Data Types and Binding

Names, Binding, Type Checking, and Scope, Properties of type, Elementary data type (Numeric data type, Enumeration, Boolean, Character), Composite Data type (Character String type, Pointer, Files and I/O), Derived data type(Vector and arrays, Union, Set, List, Records), Abstract data type, Control Statements (Branching, Looping, switch, break, continue, goto statements).

UNIT-IV: Procedures and Object Oriented Programming

Fundamental of sub programs, Subprogram Control, Scope Rules, Parameter passing method, Storage Management, Design Principles, Control Flow for imperative Programming, Execution steps for procedural programming, Desirable and Undesirable characteristics of procedural programming, Application of Procedure Programming, programming Design Principles for Object Oriented Programming, Application of Object Oriented programming.

UNIT-V: Functional and Logic Programming

Introduction of functional programming, Fundamental of functional programming languages, LISP Basics, Application of functional programming, Introduction of logic programming, brief introduction to predicate calculus, Origin of Prolog, Application of logic programming.

RECOMMONDED BOOKS

1. Concept of Programming Languages: Robert W. Sebesta
2. Principles of Programming Languages: Seema V. Kedar & Sanjay Thakare
3. Programming and Problem Solving: Seema V. Kedar
4. Programming Language Concepts: Ghezzi
5. Programming Language Design and Implementation: T. W. Pratt

FIRST SEMESTER : M.Sc.(CS)

Paper II : Advance Operating Systems

Max Marks : 100 **Min Marks : 40**

UNIT-I

Introduction

What is operating system, basic concept, terminology, batch processing, spooling, multiprogramming, time sharing, real time systems, protection, multiprocessor system, operating system as resource manager, process view point, memory management, process management, device management and information management, other views of operating system, historical, functional job control language and supervisor service control.

UNIT-II

Advanced Processor Management Features

Multi- threaded operating system architecture micro-kernels operating system architecture multiple operating system- subsystem and environments, client-server architecture, protected mode software architecture ,visual machine- JAVA virtual machine and virtual 8086 mode, hard and soft real time operating system, pre-emptive and non-pre-emptive multitasking and scheduling inter process communication shared memory semaphore message queues, signals sessions management, multiprocessor and distributed process synchronization, symmetric multiprocessing systems.

UNIT-III

Advanced Memory Management

Virtual address space, description of user process and kernal, virtual memory architecture of Pentium group of processor. Translation Lookaside Buffers, implementation of file mapping, shared memory through virtual memory virtual swap space.

UNIT - IV

Advanced Device Management Feature

Device driver framework classifying devices and driver, invoking driver code, devices switch table and driver entry points, dynamic loading and unloading of device drivers

UNIT V

Advanced File Management Features

Virtual file systems and v-node architecture, distributed file system, network file system, remote procedure call

RECOMMENDED BOOKS

1. Principles of Operating System - Peterson.
2. Operating System - Mandinick & Donovan.
3. Advanced concepts in operating systems – Singhal Mukesh, TMH

FIRST SEMESTER : M.Sc.(CS)

Paper III : Data Structure through algorithms using 'C'

Max Marks : 100 **Min Marks : 40**

UNIT – I : Introduction and Preliminaries -

Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms : complexity , time-space Tradeoff.. Mathematical Notation and functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Sub algorithms, Variables, Data Type.

UNIT - II : String Processing, Arrays, Records And Pointers –

Basic Terminology, Storing String, Character Data Type, String Operations, Word Processing, Pattern Matching Algorithms. Linear Array, Representation of linear Array in Memory, Traversing Linear Arrays, Inserting And Deleting, Sorting; Bubble Sort, Searching; Liner Search, Binary Search, Multidimensional Array, Pointers; Pointer Array, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

UNIT - III : Linked Lists, Stacks, Queues, Recursion -

Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage Collection, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists. Stacks, Array Representation of Stack, Arithmetic Expressions; Polish Notation, Quick sort, an application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Dequeues, Priority Queues.

UNIT - IV : Trees & Graphs -

Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree, Heap; Heap sort, Path Lengths; Huffmans Algorithms, General Tree. Graph Theory Terminology, Sequential Representation of Graph; Adjacency Matrix, Path Matrix, Linked Representation of Graph.

UNIT - V : Sorting And Searching –

Sorting, Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and data modification, hashing.

BOOKS RECOMMENDED:

1. Data Structures with C - Seymour Lipschutz (Schaum's Series), TMC Publication
2. Data Structures through C -Yashwant Kanetkar, BPB Publication
3. Data Structure using C -A.K. Sharma, Pearson Eduction
4. Data Structure & Program Design - Robert L. Kruse, 3rd Ed., Prentice Hall.
5. Data Structures using C -Tenenbaum, Pearson Education

FIRST SEMESTER : M.Sc.(CS)

Paper IV : Programming in Java

Max Marks : 100 **Min Marks : 40**

UNIT-I

Introduction: History and features of Java, Difference between C, C++ & JAVA. JAVA and Internet, WWW, Web Browsers, java supports system, Java Environment. JDK, JVM, Byte code Java **Programming Basics:** Structure of Java program, JAVA tokens and Statements, Constants & Variables, Data types, Operators, Command line arguments. Java Statements & Arrays: if and switch statement. while, do-while and , for. Introduction to arrays, types of arrays, new operator, Strings. String class & its methods, Vectors. Classes & Objects: Specifying classes, Methods and fields, creating objects. Passing objects to methods, returning objects, static fields & methods. Constructors, Garbage collection, Overloading methods & constructors, this keyword.

UNIT-II

Inheritances: Specifying sub class, types of inheritance, visibility control: public, private, protected, package. super keyword, Overriding methods, Dynamic method dispatch, Abstract methods and classes, final methods & classes,

Packages & Interfaces : Introduction to packages, naming conventions, package statement, creating packages, import statement, accessing package, use of CLASSPATH, adding class to package, hiding classes. Interface, implementing interfaces, multiple interfaces.

Multithreading: Creation threads, Extending Thread class, implements Runnable interface, stopping and blocking thread, Thread life cycle, thread priorities & Thread synchronization, using Thread methods.

UNIT-III:

Exception Handling: Managing errors, types of errors, exceptions, syntax of exception handling code. try, catch, throw, throws and finally statements, multiple catch & nested try statements.

Java Input output: Java I/O package, Byte/Character Stream, Buffered reader / writer, File reader / writer, File Sequential / Random. Reading numeric, character & strings data from keyboard.

Applet programming: Applet Vs. Application, Creating applets, life cycle, local & remote applets. <APPLET> tag & its attributes, adding applet to HTML file, Running applet.

UNIT-IV:

Abstract Windows Toolkit (AWT): Components and Graphics, Containers, Frames and Panels, Layout Managers, Border layout, Flow layout, Grid layout, Card layout, AWT components. Event delegation Model, Event source and handler, Event categories, Listeners, Interfaces, Controls such as text box, radio buttons, checkboxes, lists, choice, command buttons, text area etc.

JDBC: Java database connectivity, Types of JDBC drivers, Writing JDBC applications, Types of statement objects(Statement, PreparedStatement and CallableStatement), Types of resultset, Inserting and updating , records, JDBC and AWT,

UNIT-V:

Networking with Java : Networking basics, Sockets, port., Internet addressing, java.net – networking classes and interfaces, Implementing TCP/IP based Server and Client

Servlets: Introduction Servlet API Overview, Writing and running Simple Servlet, Servlet Life cycle, Generic Servlet, HTTPServlet, ServletConfig, ServletContest, Writing Servlet to handle Get and Post methods.

RECOMMENDED BOOKS

1. Core Java: An Integrated Approach -Dr. R. Nageswara Rao
2. Core JavaTM2, Vol.1&2, 7edition - Horstman Cay, Cornell Gary, Pearson Education.
3. Programming with JAVA, A Primer -E. Balguruswamy (TMH)
4. Java Database Programming -Maithew Siple, TMH Publication
5. Java 2 from scratch by Steven Haines the -PHI

REFERENCE BOOKS

1. Herbert Schildt, The Complete Reference, seventh edition, [TMH]
2. Steven Holzner, JAVA 2 Programming Black Book, Wiley India.
3. Ivor Horton, Beginning Java 2, JDK 5 Ed, Wiley India.

FIRST SEMESTER : M.Sc.(CS)

Paper V : Computer System Architecture

Max Marks: 100 **Min Marks: 40**

UNIT - I : Representation of Information

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks, Gates, Multiplexers, Decoders, etc Sequential building block, flip-flop, registers, counters, ALU, RAM etc.

UNIT - II : Register transfer language and micro operations

Concepts of bus, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logical operations along with register transfer timing in register transfer

UNIT - III : Basic Computer Organization and Design

Instruction code, Computer Instructions, Timing and Control, Execution of Instruction, Input and Output Interrupt, Design of Computer.

UNIT - IV : Computer Software

Programming Language, Assembly Language, Assembler, Program Loops, Input /Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing,.

UNIT - V : Input –Output & Memory Organization

Input –Output Organization : Peripheral Devices, Input/Output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor.

Memory Organization : Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

BOOKS RECOMMENDED:

1. Computer System Architecture - M. Morris Mano (PHI).
2. Digital Computer Electronics - Malvino.
3. Digital Computers and Logic Design - M.Morris Mano (PHI).
4. Structured Computer Organization - Andrew M. Tanenbanm (PHI).

REFERENCE BOOKS

1. The Elements of Computing System -Noam Nisan
2. Computer Organisation and Design -David Patterson
3. Computer Architecture: A Quantitative Approach -John L. Hennessy