

UNIVERSITY OF MYSORE

Syllabus for PG Admission Entrance Examination – 2024-2025

Program: M.Sc. in Computer Science

Subject: Computer Science

Unit-1:

Computer Fundamentals Evolution of Computers, Generation of Computers, Computer Applications in various fields, Classification of Computers, Functional Units – Input, Output and memory devices, Internal and External memory, Types of memories: ROM: PROM, EPROM, EEPROM, RAM: SRAM, DRAM, SDRAM, RDRAM, Secondary Storage – Magnetic Disk, Tape, Optical memory, CDROM, DVD, Hardware and Software – Types of Storage, stages in Problem solving, algorithms and flowcharts, Computer Languages.

Unit-2:

Number System Binary, Octal, Hexadecimal number systems, Conversion from one system to another, Binary arithmetic, Complements – 1's and 2's Complement, BCD Code, BCD addition, Non weighted codes – Excess 3, Gray, Floating point and fixed point representation, Alphanumeric codes. Boolean Algebra – Boolean Laws, Demorgan's Theorem, Logic gates – Basic gates and Universal gates, SOP and POS expression, realization of Boolean expression using gates, Simplification of Boolean expression using Karnaugh map.

Unit-3:

Introduction and Web Design: Introduction to Internet, WWW and Web 2.0, Web browsers, Web protocols and Web servers, Web Design Principles and Web site structure, client-server technologies, Client-side tools and technologies, Server-side Scripting, URL, MIME, search engine, web server- Apache, IIS, proxy server, HTTP protocol. HTML5 Basics tags, Formatting tags in HTML, HTML5 Page layout and Navigation concepts, Semantic Elements in HTML, List, type of list tags, tables and form tags in HTML, multimedia basics, images, iframe, map tag, embedding audio and video clips on webpage, Introduction to XML, XML Syntax, XML Tree, Elements, Attributes, Namespace, Parser, XSLT DOM, DTD, and Schema. Introduction to CSS, CSS syntax, CSS selectors, CSS Background Cursor, CSS text fonts, CSS-List Tables, CSS Box Modeling, Display Positioning, Floats, CSS Gradients, Shadows, 2D and 3 Transform, Transitions, CSS Animations.

Unit-4:

Basics of 'C' Language Features of C, General structures of C program, Keywords and Identifiers, Constants and Variables, Data types in C, Operators in C, Mathematical Functions, Input and Output functions, Decision making – if, if else, nested if, else if ladder, switch, break and continue statements, looping statements – for, do and while loops, Arrays – Declaration and initialization of one and two dimensional arrays, Strings – String functions.

Unit-5:

Advanced C Language Functions – Categories of functions, Functions with arrays and strings, recursion, storage classes, call by value and call by reference, structures and unions : Definition and use of structures, declaring, initializing and accessing structure members, Array of structures, nested

structures, Introduction to unions, Pointers – Declaring and initializing a pointer, accessing a variable using pointers, Pointers and arrays, pointers and functions, pointers and structures, files in C-Definition and need of file, defining, opening and closing a file, Input and output operations on files, Random access files.

Unit-6:

Data structures: Fundamentals, classifications, operations on primitive and non-primitive data structures, arrays-Different operations on array – Traversal, insertion, deletion, sorting, searching, merging, two dimensional array as a linear data structure – memory representation with address computation, Stack – Memory representation, algorithm for stack operations, linear queue – Memory representation, algorithms for different operations on linear queue, disadvantages of linear queue. Circular queue – Memory representation of circular queue, different operations of circular queue, applications of stack and queues, Linked list – Memory representation, Operations on linked list – Insertion, deletion, searching, different types of linked lists – Circular, double and header linked list, Trees – Tree as a linear data structure, different memory representation of trees, tree traversal, different types of trees-complete, binary, balanced and skewed tree.

Unit-7:

Python Programming: Introduction to Features and Applications of Python; Python Command Line mode and Python IDEs; Python Basics: Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Built-in Functions Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions. Types of Errors; Exceptions; Exception Handling, Types of Python Functions; Function Definition, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Strings - Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings, Format Specifiers; Escape Sequences; Raw and Unicode Strings.

Unit -8:

Java Programming Introduction to Java, Java tokens, Character set, keywords, identifiers, literals, operators, decision making and iterative statements, classes and objects – Adding variables, Adding methods, Creating objects, Accessing class members, constructors, various types of inheritance, method overloading, various types of access controls, arrays – One dimensional and multidimensional, strings. Java packages, networking with Java. Threading – Thread life cycle, Thread methods, Thread exceptions, Errors and exceptions. Applets – Creating and executing applets, applet life cycle, Applet methods, Handling text fields, buttons, check box, radio buttons, file and I/O streams.

Unit-9:

Introduction to Database system applications. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS. Entity-Relationship Modeling: Concepts, Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationship between entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E-R diagram. Relational model concepts: Characteristics of relations. Domain constrains, key

constraints, primary & foreign key constraints, integrity constraints and null values. Basic Relational Algebra operations, Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Data Normalization: Anomalies in relational database design. Decomposition. Functional dependencies - Axioms, minima and maxima cover. Normalization- 1NF, 2NF, 3NF, BCNF, Transaction Processing, Need of concurrency control, Types of failures, Transaction states, Desirable properties (ACID properties) of Transactions

Unit-10:

Computer Networks Introduction, benefits of networks, network classification, network topologies, transmission media – Guided and unguided, digital and analog transmission, encoding schemes – Digital to analog encoding: ASK, FSK and PSK, Analog to digital encoding: Pulse amplitude modulation and pulse coded modulation, Multiplexing - FDM, TDM, Error detection and correction, ISO OSI reference model – Functions and services of various layers, repeaters, bridges – Functions of bridge, types of bridge, routers – Issues involved in routing, gateways. Virtual and datagram services, introduction to TCP/IP.