

TENTATIVE SYLLABUS FOR PROGRAMMER

(KERALA UNIVERSITIES)

MODULE I:

Digital Computer Principles: Number systems – Binary, Decimal, Octal and Hexadecimal Conversion, Arithmetic operations, Boolean algebra, Logic gates, SOP, POS, Min-term and max-terms, Boolean expression, simplification, Postulates and theorems, Simplifications, K-Map, Combinational logic circuits – Adder, Subtractor, Multiplexer, De-multiplexer, Encoder, Decoder, Sequential Circuits – SR, JK, T, D flip flops, Shift registers, Asynchronous, synchronous and Modulo n Counters.

Computer Architecture: Multiprocessors and microcomputers, Assembly language, Assembler directives, Semiconductor memory – Internal organization, SRAM, DRAM, SDRAM, Rambus memory, ROM technology, Cache memory, virtual memory, working of magnetic disks and tapes, optical disks, Instruction sequencing, Instruction execution, Hardwired control and micro programmed control, micro instructions, Pipelining

Microprocessors: Internal architecture of 8085 and 8086, interfacing with peripheral devices, microcontrollers.

MODULE II:

Set Theory and Statistics: Sets, relations, functions, groups, partial orders, lattice, algebraic structures, Mathematical Induction, The Principle of Inclusion-Exclusion, Probability theory: Sample spaces, Events and probability, Discrete probability: Union, Intersection and Compliment of events, Conditional probability, Baye's theorem. Linear correlation coefficient, Linear regression, Non Linear regression, Multiple correlation and Multiple regression, Theory of sampling and population

Theory of Computation: Regular languages and finite automata, context-free languages & push-down automata, recursively enumerable sets & Turing machines, undecidability.

System Software and Operating Systems: Compiler design, lexical analysis, parsing, syntax directed translation, code generation and optimization, Assemblers, linkers and loaders, microprocessor. CPU scheduling, Deadlocks, Memory management, file systems, disk scheduling. Process, threads and their synchronization. Real Time OS: clock synchronization and task scheduling. System initialization, booting and handling user accounts. Backup and restore, Bourne shell programming for Linux.

MODULE III:

Computer Networks: Layered architecture, LAN technologies, wireless LAN, flow and error control, routing algorithms, congestion control, TCP/UDP and sockets, IPv4, IPv6, ICMP, DNS, SMTP, POP, FTP, HTTP, MIME, Hubs, switches, routers and gateways, public key and private key cryptography, digital signature, firewalls, wireless networks, 2G and 3G networks, Bluetooth.

Web Technologies: HTML, XML, client-server computing, web server, proxy server, web application development, MVC architecture, e-commerce, web services.

Distributed Systems: Characteristics, inter-process communication, distributed file systems.

MODULE IV:

Data Structures: Data Structures: Linked List, Stack, Queue, Priority Queues, Hashing, Binary trees, Tree traversal, AVL trees, Graphs- shortest paths, minimum spanning trees; Sorting algorithms.

Algorithms: Analysis, space and time complexity. Design – greedy approach, dynamic programming, divide-and-conquer, sorting and searching, complexity classes – P, NP, NP-hard, NP-complete.

Programming Concepts in C: Operators and expressions, Control statements, Storage types, Functions, Arrays, Strings, Structures, Pointers and dynamic memory management, File Handling

MODULE V:

Database Management System - Keys, E-R Model, Normalization – 1NF to 5NF; Relational Algebra, SQL, Aggregate functions, Nested Sub queries, Views, Joined Relations, Transaction- ACID properties; Concurrency Control, triggers, stored procedures

Web Technology: Two and three-tier client server architectures, web servers, HTML & XML, Style Sheets, client side scripting-java script and VB script; Server Side Scripting php, JSP and ASP.NET programming for creating dynamic web pages using database, forms and session; AJAX and Signal-R.

Object Oriented Programming through C++/Java – Data Abstraction, Encapsulation, classes, constructors and destructors, Classes, and dynamic memory allocation, Inheritance, Polymorphism, generic classes, exception handling and File processing. Java applets, Java features, Byte codes, Internet classes, wrapper classes, multithreading support classes, vector, stack, interface observer, stream tokenizer, GUI classes, Java I/O, classes, The Applet class, applet architecture, applet display methods and repainting.

Software Engineering – System modeling, system engineering process, life cycle models, design and implementation, validation, evolution, automated, process support - software requirements, SRS, feasibility studies - elicitation and analysis - validation - management - system models, context models, behavior models, data models, object models, object oriented design, design evolution, real-time software design, critical systems specifications - critical system development, software testing.