

ANDHRA PRADESH

RECRUITMENT OF LECTURER IN RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES

SYLLABUS FOR THE SCREENING TEST

RGUKT INFORMATION TECHNOLOGY (IT)

SUBJECT CODE – 92

1. Mathematical Foundations: Mathematical

Logic Propositional Logic, First Order Logic; Probability: Conditional Probability, Mean, Median, Mode and Standard deviation: Random Variables: Distributions - Uniform, Normal, Exponential, Poisson, Binomial. Set Theory and Algebra: Sets, Relations, Functions, Groups, Partial Orders, Lattices, Boolean Algebra, Combinatorics: Permutations, Combinations, Counting, Summation, Generating Functions, Recurrence Relations.

2. Programming: Programming in C, C++ and Java: Object Oriented Programming Concepts including Classes: Polymorphism: Inheritance and Programming in C, C++ and Java.

3. Data and File Structures:

Data structure-Definition, Arrays, stacks, queues, linked lists, trees, graphs, priority queues and heaps. File Structures - Fields, records and files, Sequential, direct, index-sequential and relative files, Hashing, inverted lists and multi-lists B trees and B+ trees.

4. Design and Analysis of Algorithms: Asymptotic notation, Notations of Space and Time complexities, Worst and Average case analysis; Design: Greedy Approach. Dynamic Programming. Divide and Conquer, tree and Graph traversals, connected components, spanning trees, shortest paths; Hashing. Sorting. Searching. Asymptotic analysis (best, worst and average cases) of time and space, upper and lower bounds.

5. Computer Organization:

Machine instructions and addressing modes, Main Memory Organization, CPU Organization. I/O Organization, Micro-programmed Control, Cache Memory, Secondary Storage.

- 6. Operating Systems and Unix:**

Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock. CPU scheduling. Memory management and virtual memory, File systems. I/O systems, Unix System - File system, process management, bourne shell. Shell variables, command line Protection and security. Filters and Commands - Pr. head, tail, cut, paste, sort, uniq, tr. join, etc.. grep, egrep, fgrep, programming.etc., sed, awk, etc.. System Calls (like) - Creat, open, close, read, write, lseek, link, unlink, stat, fstat, umask chmod, exec. fork, wait, system.
- 7. Relational Database Design and SQL**

ER diagrams and their transformation to relational design, normalization 1NF. 2NF. 3NF. BCNF and 4NF. Limitations of 4NF and BCNF.

SQL Data Definition language (DDL), Data Manipulation Language (DML), Data Control language (DCL) commands. Database objects like-Views, indexes, sequences, synonyms, data dictionary. Transaction Management, concurrency control and system recovery.
- 8. Software Engineering:**

Software Characteristics. Software Process Models, Analysis, Design, Coding. Testing, and Software Quality Assurance, Software Metrics
- 9. Computer Graphics:**

Line Drawing, Graphic Primitives and Polygons, 2D Transformations. Windowing and Clipping. 3-D Graphics, Curves and Surfaces.
- 10. Computer Networks:**

ISO/OSI stack, LAN technologies. (Ethernet and Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and Sockets, IP (v4). Application layer protocols (icmp, dns, smtp, pop. ftp. http).
- 11. Data Warehousing and Mining:**

Data Warehousing Concepts and Architectures, OLAP, Data Pre-processing. Data Cube Technology, Data mining Functionalities, Primitives, Data Characterization, Association Mining. Classification and regression, Clustering and Outlier Analysis.

- 12. Web Technologies:**
HTML, XML, Basic Concepts of Client Server computing, Static, Dynamic and Active Web pages, Client and Server Side Scripting.

- 13. E Commerce and Security:**
Electronic Commerce Framework. Media Convergence of Applications, Consumer Applications, Organisation Applications. Electronic Payment Systems Digital Token, Smart Cards, Credit Cards, Risks in Electronic Payment System. Designing Electronic Payment Systems. Electronic Data Interchange (EDI) Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardization and EDI, EDI Software Implementation, EDI Envelope for Message Transport, Internet-Based EDI. Cryptography Fundamentals of Cryptology. Cipher Methods, Cryptographic Algorithms, Cryptographic Tools. Protocols for Secure Communication. Attacks on Crypto systems. Security Technologies - Firewalls, Intrusion Detection and Prevention Systems, VPNs.

- 14. Theory of Computation and Compiler Design:**
Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines. Undecidability. Compiler Design: Lexical analysis. Parsing, Syntax directed translation. Runtime environments, Intermediate and target code generation, Basics of code optimization.

- 15. Cryptography and Network Security:**
Data Encryption and Decryption, Symmetric Key algorithms like DES, IDEA and AES, Public Key Cryptography, RSA algorithm, Digital Signatures & Authentication, Firewalls and VPN.

- 16. Artificial Intelligence:**
AI Approach to problem solving, State Space Search, Problem Characteristics, Production System Model, Breadth First and Depth First Search. Heuristic Search Techniques, Predicate Logic and Resolution for Theorem Proving. Knowledge representation using Rules, Frames, Semantic Nets, Script, and CD Diagrams, Uncertain reasoning Techniques, TMS, Linear and Nonlinear Planning.