# RAYALASEEMA UNIVERSITY:: KURNOOL (A.P.)

# M.Phil., / Ph.D., Written Examination Syllabus

## Sub: COMPUTER SCIENCE

## Paper –I Research Methodology in Computer Science and Technology

**UNIT – I:**

Logic Circuits – Basic Logic Functions, Synthesis of Logic using AND, OR NOT Gates, Minimization of Logic Expression, Synthesis with NAND and NOR Gates, Flip-Flops Register and Shift Registers, Counters, Decoders, Multiplexer, Sequential Circuits. Addressing Methods – Addressing Modes, Assembly Language, Basic1/O operations, Stacks and Queues, Subroutines Processing Unit: Execution of a complete instruction, Hardwired Control, Signed Addition, Subtraction and Multiplication, Arithmetic and Branching Conditions, Integer Division, Floating-Point Numbers

Operating Systems concepts – Computing Environments – Operating System Services, System Calls – Process Scheduling, Cooperating Process, Inter Process Communication Multithreading Models, Threading Issues, P threads CPU Scheduling – Scheduling Algorthins – Critical – Section Problem, Semaphores, Classic Problems of Synchronization. Critical Regions Monitors Deadlocks – Memory Management – paging, Segmentation – Segmentation with Paging. Virtual Memory – Demand Paging, Page Replacement, Thrashing

**UNIT – II**

Abstract Data Types- Linked Lists, Doubly and Circularly Linked Lists, Linked List Implementation- Array Implementation of Stacks. Queue- Array implementation, Application of Queues. Graphs & Trees: Topological sort, shortest path algorithms, Minimum spanning trees. Binary Search Trees and their Construction. Hash Function- Open Hashing- Closed Hashing- Rehashing- Extendible Hashing. Selection Sort, Bubble Sort, Insertion Sort, Shell Sort, Heap Sort, Merge Sort, Quick Sort – Complexities. Linear Search, Binary Search Searching in Tables.

**UNIT – III**

Computer Networks And The Internet Principles of Application Layer Protocols, HTTP, FTP. Electronic Mail in the Internet, DNS Transport- Layer Services and Principles, Multiplexing and De-multiplexing Applications, Connectionless Transport, Connection-Oriented Transport-Network Service Models, Routing Principles, Routing algorithms The Data Link Layer-Services, Error Detection and Correction Techniques, Multiple Access Protocols and Protocols and LAN's, LAN Addresses and ARP, Ethernet- IEEE 80.11 LANs The Point-to-Point Protocol, Asynchronous Transfer Mode (ATN), X.25 and Frame Relay

**UNIT – IV**

Conventional Encryption Classical Techniques – Conventional Encryption Modern Techniques: The Block Cipher Principles, The Data Encryption, Differential and Linear Crypt analysis,, Block Cipher Design Principles, Block Cipher Modes of Operation.
Conventional Encryption Algorithms – Triple DES, International Data Encryption Algorithm, Blowfish, RC5, CAST, RC2, Traffic Confidentiality, Random Number Generation. Public- Key Cryptography- The RSA Algorithm, Diffie- Hellman Key Exchange, Elliptic Curve Cryptography Message Authentication And Hash Functions – Digital Signatures, Authentication Protocol, Digital Signature Standard.

**UNIT – V**

Schema Refinement and Normal Forms : Schema Refinement – Functional dependencies – Reasoning about Functional dependencies – Normal forms – Decompositions – Normalization – other kinds of dependencies -  Disk Storage -  Disk Technologies and Redundancy Maintenance -  buffering of blocks -  Heaps files and sorted files. Indexing – primary Indexes, Clustering Indexes, Secondary Indexes, Multilevel Indexes, Indexed Sequential Access -  Transaction Management : The Concept of  a Transaction -  Transactions and Schedules -  Concurrent execution of Transactions-  Lock- Based Concurrency Control Introduction to Crash Recovery-Security Issues -  Discretionary Access Control-  Mandatory access  Control -  Role- based control.

**Text Books:**

1. V.C.Hamacher : Computer Organization, 4<sup>th</sup> Edition (Tata McGraw Hill)

2. Abraham Silberchartz, Peter Baer Galvin & Greg Gagne : Operating Concepts, 6<sup>th</sup> Edition, (John Wiley & Sons)

3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms"

4. Mark Allen Weiss : Data Structures & Algorithm Analysis in C++ 2<sup>nd</sup> Ed. (Addison-Wesley)

5. James F. Kurose ND Kejth W.Ross : COMPUTER NETWORKING A Top –Down Approach

6. William Stallings "Cryptography and Network Security" Pearson Education, 2002,

7. Rahhu Ramakrishna/Johannes Gehrke, " Database Management Systems" McGraw-Hill International Editions, 2000

8. Remez Elmasri & Shamkanth B.Navathe: Fundamentals of Database System. 4<sup>th</sup> Ed. (Pearson Education)