2. COMPUTER SCIENCE AND ENGINEERING / INFORMATION TECHNOLOGY

Digital Logic: Boolean Algebra and Logic gates, Combinational Logic, Synchronous and Asynchronous Sequential Logic, Memory and Programmable Logic

Computer Architecture: Instruction Set Architecture, Arithmetic for Computers, Processor Design, Datapath and Control, Pipelining hazards, Instruction Level Parallelism, Memory and I/O.

C Programming and Data Structures: C Programming: Control structures, functions, arrays, and strings, pointers, structures, and basic file handling. Data Structures: Arrays and linked lists, Stack and queue, Recursion, Binary Search Tree, Sorting and Searching.

Design and Analysis of Algorithms: Divide and conquer, Dynamic Programming, Greedy Algorithms, Backtracking, Branch and bound, Time and space complexity analysis, NP Completeness.

Operating Systems: Processes and Threads, Process Management and Synchronization, Memory Management, Storage Management.

Database Management Systems: Relational Model, Relational Database Design, Transactions and Recovery, Query Processing.

Computer Networks: Application Layer, transport layer, Network layer, routing protocols, Data link layer.

Compiler Design: Lexical Analysis, Syntax Analysis, Type checking and Runtime environments, Intermediate Code generation, Code Generation, Code Optimization.

Software Engineering: Software Process Models, Software Project Management, Requirement Analysis, Software Modelling and Design, Coding, Testing and Maintenance.

Artificial Intelligence and Machine Learning: Intelligent Agents, Search Strategies, Constraint Satisfaction Problems (CSP), Supervised Learning, Unsupervised Learning, Reinforcement Learning, Multi Layer Perceptron (MLP).

Cryptography and Cyber Security: Symmetric and Asymmetric Cryptography, Authentication Algorithms, Message Authentication – Reconnaissance - Intrusion Detection, Intrusion Prevention - Access Control and Security.