COMPUTER SCIENCE & ENGINEERING

ENGINEERING MATHEMATICS

Set Theory, Boolean algebra, Group theory, Graph theory, Complex variables, Power series. Grammar and Predicate calculus, Elementary configurations, Search Procedure, Interpolation and application, Numerical integration , Numerical Methods , Introduction to probability, Theoretical distributions, Statistical Quality Control (X-chart, R-chart, p-chart, np-chart), Reliability & Availability – MTBF, MTTF, MTTR. Random Sampling distributions, Parameter Estimation, and Testing of hypothesis. Stochastic Process, Markov Chains.

DATA STRUCTURES

Introduction, Contiguous Data Structures, Stacks, Queues, Non-Contiguous Data Structures. Trees, Application of trees and symbol tables, Expression Trees, Search trees, Hash tables, Graphs, Sorting and Searching.

OBJECT ORIENTED PROGRAMMING WITH C++

- The Basic Language, The Data types, Expressions, Statements, Procedural- Based Programming, Functions, Overloaded functions, Function Templates.
- Object–Based Programming, Classes, Templates, Inheritance and IO-Stream Library,
- Inheritance, Virtual Functions and Polymorphism, the I/O-Stream Library.

DIGITAL CIRCUITS AND LOGIC DESIGN

- Logic gates and Simplification of Boolean functions, Combinational Logic, Combinational Logic and MSI and LSI, Sequential Logic.

- Integrated Circuit Logic Families, Multivibrators and Timing Circuits, Memory Devices.

APPLIED ELECTRONICS

- Special purpose diodes, FET's:, FET Circuits.
- Thyristors, OPAMPs, 555 Timer.
- Regulated Power Supply.

COMMUNICATION TECHNIQUES

- Signal model and classification, generalized Fourier series, Fourier series, Fourier transform, Properties of Fourier transform, Transmission of signals through linear system, Distortion-less transmission and signal distortion over channel. Inverse Fourier Transform, Power spectral density, Correlation and convolution.

- Amplitude modulation, Frequency modulation, Method of frequency translation, recovery of the base band signal, Amplitude modulation, Circuit analysis, Spectrum of amplitude modulated signal, double side band suppressed carrier modulation, balance modulator, Single side band modalities, Method of generation, Detection of amplitude modulated signal.

- Angle modulation, Phase and frequency modulation, Phase and frequency deviation, Spectrum of an FM Signal, FM generation and detection, Voltage controlled oscillators and phase locked loop.
- Basic principle of an AM transmitter, Block diagram, description, Mixer R.F. and IF amplifiers, Superhetrodyne concept, Practical mixer circuits, Tuned small signal RF amplifiers.
- Classification of power amplifiers, Ideal Class-A power amplifier, Class-B, Class-AB, and Class-C amplifier.

MICROPROCESSORS AND PERIPHERAL DEVICES

- Introduction To Microprocessors, Introduction to 8085, Programming in 8085, Introduction To 8086.

- Hardware Details of 8086, Memory System Design And I/O System Design, Introduction to Peripheral Devices, Introduction to 80286, 80386 and Motorala 68000 Microprocessors.

DATABASE MANAGEMENT SYSTEMS

➢ Introduction, Data Modelling, Database Design.
➢ Database Query Languages, Transaction Processing, Concurrency Control And Backup & Recovery Mechanisms.

COMPUTER GRAPHICS

➢ Introduction, Overview of Graphics systems, Output Primitives.
➢ Attributes of output primitives, Two Dimensional Transformations, Windowing and Clipping,
➢ Segments, Interactive Input Methods, Modelling Methods.
➢ Three Dimensional Concepts, 3-D viewing, Hidden Surface & Hidden line removal.

DESIGN AND ANALYSIS OF ALGORITHMS

➢ Algorithms , Mathematical preliminaries, Recurrences and Divide and Conquer, Sorting Algorithms and their analysis, Dynamic Programming.
➢ Greedy Method, Graph Algorithms, Applications, NP Completeness.

COMPUTER ORGANIZATION AND ARCHITECTURE

➢ Basic Organization of the Computer, Memory Organization, Input / Output, The Processing Unit.
➢ Arithmetic, Fundamentals of Processor Design, Pipelined Processor Architecture.

ADVANCED PROGRAMMING IN THE UNIX/LINUX ENVIRONMENT

➢ Introduction, File I/O, Files and Directories, Standard I/O Library.
➢ System Data Files and Information, the Environment of a Unix Process, Process Control, Process Relationships, Signals.

SYSTEM PROGRAMMING

➢ Introduction, General Machine Structure and Machine Language, Assemblers ,Macros.
➢ Loaders, Language Processor, Compilers.

SOFTWARE ENGINEERING

➢ Introduction, Software Life Cycle, Software Project Management, Requirements Analysis and Specification, Software Design, Function-Oriented Software Design.
➢ Object Modeling Using UML, Object-Oriented Software Development, User Interface Design
➢ Coding and Testing, Software Reliability and Quality Management, Computer Aided Software Engineering, Software Maintenance, Software Reuse.

FORMAL LANGUAGES AND AUTOMATA THEORY

➢ Introduction, Finite Automata, Regular Expressions and Regular Languages, Properties of Regular Languages, Context Free Grammars and Languages.
➢ Pushdown Automata and Context Free Languages, Turing Machines, Recursively Enumerable Languages, Undecidability, Language Learning.

DATA COMMUNICATIONS

➢ Overview, Physical Layer, Data Transmission, Multiplexing, Transmission Media and Switching.
➢ Switching Methods, Data Link Layer, Multiple Access, Case Study of Popular LANs.

COMPILER DESIGN

➢ Compiler Structure, Lexical Analysis, Syntax Analysis, Syntax Directed Translation.
➢ Type Checking, Run Time Environments, Intermediate Code Generation, Code Generation.

OPERATING SYSTEMS

- ➢ **Introduction, Process Management.**
- ➢ **Process Coordination, Memory Management.**
- ➢ **File Systems, Case Studies: Linux/Unix/Windows.**

COMPUTER NETWORK
- ➢ **Network Layer, Routing Protocols for Wired Network, Routing Protocols for Mobile Wireless Network.**

- ➢ **Transport Layer, Application Layer, Domain Name Systems, Network Security, Cryptography, Symmetric Key Algorithms.**

SYSTEM SIMULATION AND MODELING
- ➢ **Introduction to Simulation, Simulation Examples, General Principles and Modeling Complex Systems, Statistical Models in Simulation, Queueing Theory.**
- ➢ **Random Number Generation, Building Valid, Credible, and Appropriately Detailed Simulation Models, Selecting Input Probability Distributions, Output Data Analysis for a Single System,**
- ➢ **Introduction to Experimental Design.**

BASIC KNOWLEDGE ABOUT THE FOLLOWING RECENT COMPUTER SCIENCE FIELDS.

XML Application, VLSI Design, Mobile Computing, Digital Signal Processing, Server Side Programming, Real Time System, Data Ware Housing, Cryptography, PARAM Architecture, Multimedia, Image Processing, Object Oriented Modeling, Simulation and Modeling, Operations Research, Functional Programming, Distributed System, Parallel Computing, Advanced Computer Architecture, Fault Tolerant System, Theory of Compilers.