SYLLABUS

Semester 1

COMPUTER CONCEPTS AND PROGRAMMING IN C
Semester 1 Syllabus

MODULE 1

Introduction to components of a computer system: *Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker.*

Idea of Algorithm: *Representation of Algorithm, Flowchart, and Pseudo code with examples, From algorithms to programs, source code.*

Programming Basics: *Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language. Standard I/O in C, Fundamental data types, Variables and memory locations, Storage classes.*

Arithmetic expressions and precedence: *Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and Associativity.*

MODULE 2

Conditional Branching: *Applying if and switch statements, nesting if and else, use of break and default with switch. Iteration and loops: use of while, do while and for loops, multiple loop variables, use of break and continue statements.*

Functions: *Introduction, types of functions, functions with array, passing parameters to functions, call by value, call by reference, recursive functions.*

Arrays: *Array notation and representation, manipulating array elements, using multi-dimensional arrays. Character arrays and strings, Structure, union, enumerated data types, Array of structures, Passing arrays to functions.*

MODULE 3

Pointers: *Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free), Use of pointers in self-referential structures, notion of linked list (no implementation).*

File handling: *File I/O functions, Standard C pre processors, defining and calling macros, command-line arguments.*

BASICS OF ARTIFICAL INTELLIGENCE
Semester 1 Syllabus

MODULE 1

- ***Introduction to Artificial Intelligence (AI):*** *definition, foundation and history of AI, types of AI, intelligent agents, structure of intelligent agents, introduction to soft computing, introduction and operations on fuzzy sets, nature inspired computing and algorithms.*

MODULE 2

- *AI terminologies & basic concepts, searching for solutions, search strategies: informed and uninformed, local and global search algorithms for optimistic problems, adversarial search, searching techniques for games, Alpha Beta pruning.*

MODULE 3

- *Knowledge representation and reasoning, propositional logic, theory of first order logic, inference mechanism in first order logic, forward and backward chaining, probabilistic reasoning, utility theory, Bayesian Networks.*

- *Applications and future of Artificial Intelligence, ethical issues, impact of AI on public life: understanding application of AI in Healthcare, Gaming, Finance, Data Security, Social Media, Travel & Transport, Automotive Industry, Robotics, AI in Entertainment, Agriculture, E commerce and Education.*

BASIC ELECTRICAL ENGINEERING
Semester 1 Syllabus

MODULE 1

Electric Circuit: *Introduction to linear and nonlinear circuits, circuit elements, various sources and source transformation, Star delta transformation, solution of D.C. circuits using Kirchhoff's laws- Mesh Analysis and Nodal Analysis, Signal wave forms, Passive elements specifications.*

Basic theorems: *Thevenin, Norton, Maximum Power, Superposition, Millman's Theorem, Tellegen's Theorem applied to DC networks.*

MODULE 2

A. C. Circuits: *A.C. voltage and currents, average and r.m.s. values, Form factor and peak factor, Phasor representation of sinusoidal quantities, phasor in polar, rectangular and exponential forms.*

Analysis of single phase series, parallel and series-parallel circuits, Active & reactive and apparent power, p.f., Volt-amperes, frequency response and Q-factor. Analysis of balanced three phase a.c. circuits, Introductory concept, voltage, current and power in three phase balanced circuits. Star-delta connections. Measurement of three phase power by Wattmeter Method.

MODULE 3

Measuring Instruments & Electromagnetic and Transformer: *Types of instruments, construction, working principles & applications, PMMC, MI, Single phase dynamometer, Ammeter, Voltmeter, Wattmeter, Induction type Energy meter, Use of shunt and multiplier. Magnetic circuit concept, B-H curves characteristics of magnetic materials, Practical magnetic circuits. Magnetic circuits with D.C. and A.C. excitation, Hysteresis and eddy current losses, Magnetic force. Self and mutual inductances, Faraday`s laws, Lenz`s Law, Statically and dynamically induced emfs, Energy stored in magnetic fields. Principle of Transformer operation, emf equation, Equivalent circuit of transformer, Losses and efficiency, Introduction of Auto Transformer and its applications.*

MODULE 4

Electrical Machines: *Basic concepts of rotating electric machines, DC machines (motor and generator), working principle, types, EMF and torque equations characteristics and application of DC motor. Three phase induction motors, types, principle of operation, applications. Single phase induction motors, principle of operation, starting methods, applications. Synchronous machines (motor and generator), principle of operation and applications.*

MATRICES AND CALCULUS
Semester 1 Syllabus

MODULE 1

Matrices: *Type of Matrices, Elementary row and column transformation, Rank of a matrix, Linear dependence, Consistency of a linear system of equations and their solution, Characteristic equation, Cayley-Hamilton theorem, Eigen values and Eigen vectors, Application of matrices to engineering problems.*

MODULE 2

Differential Calculus: Leibnitz theorem, Partial differentiation, Euler's theorem, Expansion of function of several variables. Jacobian, Extrema of functions of several variables, Lagranges method of multipliers (Simple applications).

MODULE 3

Multiple Integrals: *Double and triple integral, Change of order, Change of variables, Beta and Gamma functions, Applications to area, volume, Dirichlet integral and applications.*

MODULE 4

Vector Calculus: *Point function, Gradient, Divergence and curl of a vector and their physical interpretations, Line, surface and volume integrals, Statement and problems of Green's, Stroke's and Gauss divergence theorems (without proof).*

ENGINEERING CHEMISTRY
Semester 1 Syllabus

MODULE 1

Atomic Structure and Chemical Bonding: *Significance of Quantum numbers, Molecular Orbital theory and its Applications in Homonuclear and Heteronuclear diatomic molecules.*

Reaction Kinetics: *Rate equation, Order and Molecularity of reaction. Theories of reaction rates, Integrated rate equations.*

Electrochemistry: *EMF of the cell, Electrode Potential, Nernst equation and its importance.*

Allotropes of Carbon: *Structure and applications of Fullerenes and Graphite.*

Nanomaterials: *Types of Nanomaterial, Synthesis (Sol gel method), Carbon Nanotube and its application.*

Solid State: *Space lattice, Types of unit cell (cube), Density of unit cell, Defects in crystal.*

Liquid Crystal: *Liquid crystal and its application.*

MODULE 2

Stereochemistry: *Concept and Types of Isomerism, Optical isomerism: Molecular chirality, optical activity, chiral and achiral molecules with two stereogenic centers, Properties of Enantiomers and Diasteroisomers. Relative and absolute configuration: R& S-systems of nomenclature.*

- **Geometric isomerism:** *E & Z system of nomenclature using CIP Rules.*
- **Conformational isomerism:** *Conformational analysis of n Butane.*

Green Chemistry: *Introduction of Green Chemistry and its 12 principles.*

MODULE 3

Principles of Polymer Chemistry

Introduction of Polymer: *Classification of Polymers, Mechanism of addition polymerization, Thermoplastic and Thermosetting resins, Molecular weight of polymers. Natural Rubber, New Innovations: Bio-composites, Bio plastics, Degradability, Dioxin, Furan, Persistent Organic Pollutants (POPs) and Endocrine Disrupting Chemicals (EDCs). Synthetic Fibers: Nylon-6, Nylon-6, 6, Kevlar, Dacron, Bakelite, PTFE. Organic Conducting polymers: Polyacetylene, Polythiophene, Polypyrrole, Polyaniline. Biodegradable polymers, Plastics and Polymers safety aspects and usage, Particulate Matters (PM_{25} and PM_{200}).*

MODULE 4

Analytical techniques

Ultraviolet Spectroscopy (UV): *Types of Transition, Chromophores and Auxochromes, Bathochromic and Hypsochromic Shift.*

Classical and Hybrid Analytical Techniques (State of Art): *Principles and Operation of High Performance Liquid Chromatography (HPLC).*

Water Technology: *Sources and impurities of water, Hardness of water, Techniques for water softening: Zeolite process. Monitoring and Management of Water and safe water supply.*

- ***BIS (Bureau of Indian Standards)*** *and regulatory norms (IS:10500, IS 14543, IS 13428), ISO/IEC17025:2017.*
- ***Biofuels*** *and its importance.*

COMMUNICATIVE ENGLISH
Semester 1 Syllabus

MODULE 1

Communication Theories (Definitions, process, types, flows, barriers and 7C's of communication)

- *Interview, Group Discussions, Ice Breaking (Definition, process, types and barriers).*
- *Listening Strategy (Types, process and barriers).*
- *E-mail and telephone mannerisms.*

MODULE 2

Creativities in Communication

- *Word formation.*
- *Report, letter, application, resume writing strategies.*
- *Reading comprehensions, Subject-Verb Agreement.*

MODULE 3

Presentation

- *Verbal Presentation.*
- *Non-Verbal Presentation.*