# B.E. IT Semester 3 Syllabus

## Engineering Mathematics-III

**UNIT-I: Ordinary differential equations:** Complete solution, Operator D, Rules for finding complementary function, the inverse operator, Rules for finding the particular integral, Method of variation of parameters, Cauchy's and Legendre's linear differential equations.

**UNIT-II: Laplace Transform:** Definition, standard forms, properties of Laplace transform, inverse Laplace transform, Initial and final value theorem, Convolution theorem, Laplace transform of impulse function, Unit step function, Laplace transforms of periodic function.

**UNIT-III: a) Applications of Laplace Transform:** Solution of Linear equations, Simultaneous differential equation by Laplace transform method.

**b) Fourier Transform:** Definition, standard forms, Fourier transforms, properties of Fourier transforms, Convolution theorem, Fourier sine and Fourier cosine transforms and integrals, inverse Fourier transforms.

**UNIT-IV: a) Partial differential equation** of first order of following form:- (i) $f(p,q) = 0$; (ii) $f(p,q,z) = 0$; (iii) $f(x, p) = g(y,q)$; (iv) $Pp + Qq = R$ (Lagranges Form); (v) $z = px + qy + f(p,q)$ (Clairauts form). **b) Statistics** Curve fitting: Least Square Method, Coefficient of Correlations, Lines of Regression.

**UNIT-V: Complex Analysis:** Functions of complex variables, Analytic function, Cauchy- conditions, Harmonic function, Harmonic conjugate functions, Milne's Method, conformal mappings (translation, rotation, magnification and bilinear transformation), Expansion of function in Taylor's and Laurent's series.

**UNIT–VI: Vector Calculus:** Scalar and vector point functions, Differentiation of vectors, Curves in space, Gradient of a scalar point function, Directional derivatives, Divergence and curl of a vector point function and their physical meaning, expansion Formulae (without proof), line, surface, volume integrals, irrotational Solenoidal Vector fields.

# Syllabus

## Analog & Digital Electronics

**UNIT I: Introduction to Analog Circuits:** Transistor as an amplifier. Need of biasing, Potential divider bias circuit, Faithful amplification of CE amplifier, Transistor as an electronic switch, Construction and working of JFET.

**UNIT II: Operational Amplifier:** Block diagram of Op-Amp, ideal Op-Amp parameters. Applications of op-amp: Inverting & Non-Inverting Amplifier, Voltage follower, Summing Amplifier, Subtractor, Comparator.

**UNIT III: Wave Generators:** Transistorized Oscillators: Barkhausen Criterion, R-C Phase Shift Oscillator, Transistor crystal oscillator Timer IC 555: Block diagram, working, Astable multivibrator, Monostable multivibrator.

**UNIT IV: Introduction to Digital Circuits:** Logic gates, Standard logic expression forms, SOP, POS, Logic expression realization & minimization using K-map (upto 4 variables only). Half Adder, Full Adder, Half subtractor, Full subtractor.

**UNIT V: Logic Circuits:** Difference between Combinational and Sequential circuits, Code convertors (BCD, Excess-3 and Gray), Multiplexers, De-multiplexers and Decoders. Flip Flops: SR flip-flop, JK flip-flop, D flip-flop and T flipflop.

**UNIT VI: Sequential Circuits:** Difference between Asynchronous & Synchronous sequential circuits, Asynchronous counters, Mod counter, Up-Counter, Down Counter. Working of shift Registers, SISO, SIPO, PISO and PIPO. Application of Shift Register as a Ring Counter.

# Syllabus

## Assembly Language Programming

**Unit I:** Microprocessor 8086 architecture-BIU and EU, pin configuration, Software model of 8086 microprocessor. Memory addresses space and data organization. Data types. Segment registers, memory segmentation. IP & Data registers, Pointer, Index registers. Memory addresses generation.

**Unit II:** 8086 Instruction set overview, addressing modes. 8086 instruction formats. 8086 programming: Integer instructions and computations: Data transfer instructions, Arithmetic instructions and their use in 8086 programming.

**Unit III:** 8086 instructions: logical instructions, Shift and rotate instructions 8086 programming: 8086 flag register and Flag control instructions control flow and jump instructions, Loops & loop handling instructions. 8086 programming using these instructions.

**Unit IV:** Stack and Subroutines, 8086 stack segment and stack related instructions. 8086 I/O Address space, Subroutines and related instructions, parameter passing, Concept of Macros, Status saving on stack. Concept of recursion at assembly Program level. 8086 programming using subroutines, recursion and macros.

**Unit V:** 8086 I/O: Types of input output, isolated I/O interface, input output data transfers, I/O instructions and bus cycles. Programmable Peripheral Interface 8255 PPI: pin diagram, internal organization, modes of operation.

**Unit VI:** 8086 Interrupt Mechanism, types and priority, Interrupt vector table, Interrupt Instructions, External hardware-interrupt interface signals & interrupts sequence. Programmable Interrupt Controller 8259: Block & pin diagram, internal architecture, Software interrupts, Non maskable interrupt, Internal Interrupt functions.

# Syllabus

## Discrete Structure & Graph Theory

**UNIT I: Mathematical Logic:** Statements & Notation, Connectives, Normal forms, The Theory of Inference for the Statement Calculus, Predicate Calculus, The Inference Theory of the Predicate Calculus.

**UNIT II: Set Theory:** Basic concepts of Set Theory, Representation of Discrete Structure, Relation and ordering, Functions, Recursion.

**UNIT III: Algebraic Structures:** Algebraic Systems, Semi groups and Monoids, Grammars and Languages, Polish expression & their compilation, Groups, Semi groups, Application of Residue Arithmetic to Computers.

**UNIT IV: Lattice & Boolean Algebra:** Lattices as Partially Ordered Sets, Boolean Algebra, Boolean Functions, Representation of Boolean Functions, Minimization of Boolean Functions.

**UNIT V: Graph Theory:** Basic concepts of Graph Theory, Paths, Reachability & Connectedness, Matrix representation of graphs, Storage Representation and Manipulation of Graphs, Coloring Graphs.

**UNIT VI: Tree:** Trees, Tree Searching, Minimal spanning trees, Simple Precedence Grammars, Rooted tree, Expression tree, B tree, Distance between spanning trees of a graph. PERT and Related Techniques.

# Syllabus

## Object Oriented Programming

**Unit I: Introduction to Object Oriented Programming:** Introduction, Need of OOP, Principles of Object-Oriented Languages, Procedural Language Vs OOP, Application of OOP, Java Virtual Machine, Java features, Program Structures. Java Programming Constructs: Variables, Primitive data types, Identifier, Literals, Operators, Expressions, Precedence Rules and Associativity, Primitive Type Conversion and Casting, Flow of Control.

**Unit II: Classes and Objects:** Classes, Objects, Creating Objects, Methods, Constructors, Cleaning up Unused Objects, Class Variable and Methods, this keyword, Arrays, Command Line Arguments.

**Unit III: Inheritance:** Inheritance vs. Aggregation, Polymorphism, Method Overloading Method Overriding, super keyword, final keyword, Abstract class. Interfaces, Packages and Enumeration: Interface, Packages, java.lang package, Enum type.

**Unit IV: Exception:** Introduction, Exception handling Techniques, User-defined exception, Exception Encapsulation & Enrichment. Input/Output: The java.io.file Class, Reading and Writing data, Randomly Accessing a file, Reading and Writing Files using I/O Package.

**Unit V: Applets:** Introduction, Applet Class, Applet structure, Applet Life cycle, Common Methods used in displaying the output, paint (), update () and repaint (), More about applet tag, get Document Base () and get Code Base() methods.

**Unit VI: Event Handling:** Introduction, Event delegation Model, java.awt.event Description, Sources of events, Event Listeners, Adapter classes, Inner Classes. Abstract Window Toolkit: Introduction, Components and Containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Text field and Textarea, Container Class, Layouts, Menu, Scrollbar.