

COURSE CONTENT:

SIGNALS: Introduction, Representation of Discrete-time Signals: Graphical Representation, Functional Representation, Tabular Representation, Sequence Representation. Elementary Signals: Unit Step Function, Unit Ramp Function, Unit Parabolic Function, Unit Impulse Function, Sinusoidal Signal, Real Exponential Signal, Complex Exponential Signal, Rectangular Pulse Function, Triangular Pulse Function, Signum Function, Sinc Function, Gaussian Function. Basic Operations on Signals: Time Shifting, Time Reversal, Amplitude Scaling, Time Scaling, Signal Addition, Signal Multiplication. Classification of Signals: Deterministic and Random Signals, Periodic and Non-periodic Signals, Energy and Power Signals, Causal and Non-causal Signals, Even and Odd Signals.

FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS: Introduction, Representation of Fourier Series, Existence of Fourier Series, Trigonometric Form of Fourier Series: Evaluation of Fourier Coefficients of the Trigonometric Fourier Series, Cosine Representation (Alternate Form of the Trigonometric Representation), Wave Symmetry: Even or Mirror Symmetry, Odd or Rotation Symmetry, Half Wave Symmetry, Quarter Wave Symmetry. Exponential Fourier Series: Determination of the Coefficients of Exponential Fourier Series, Trigonometric Fourier Series from Exponential Fourier Series, Exponential Fourier Series from Trigonometric Fourier Series, Cosine Fourier Series from Exponential Fourier Series. Properties of Continuous-Time Fourier Series: Linearity Property, Time Shifting Property, Time Reversal Property, Time Scaling Property, Time Differentiation Property and Time Integration Property.

DIODE AND ITS CIRCUITS: Introduction to Semiconductor theory: Classification of materials- Insulators, conductors and semiconductors and their Energy Bands, Types of semiconductors- Intrinsic, Extrinsic. PN Junction Diode: Biasing and operation of PN Diode, V-I characteristics, Limiting Values of PN Diode, Breakdown in PN Diode, Applications of PN Diode. Zener Diode: V-I Characteristics, Applications of Zener Diode. Rectifier Circuits: PN Diode as a Rectifier, Half Wave Rectifier, Full Wave Rectifier, Full Wave Bridge Rectifier, Clipping Circuits, Clamper Circuits.

NUMBER SYSTEMS: Introduction, Binary Number System, Octal Number System, Decimal Number System, Hexadecimal System, Conversions: Binary to Decimal conversion and vice-versa, Octal to Decimal Conversion and vice versa, Hexadecimal to Decimal Conversion and vice-versa, Binary to Hexadecimal Conversion and vice-versa, Octal to Decimal and vice-versa, Octal to Hexadecimal and vice- versa. Complements: One's Complement, Two's Complement, Nine's Complement, Ten's Complement. Binary Arithmetic (addition, subtraction, multiplication, division), Octal Arithmetic, Hexadecimal Arithmetic, Signed Numbers, Floating Numbers, Codes.

BOOLEAN ALGEBRA AND LOGIC GATES: Introduction, Definitions, Principle of Duality, Basic Theorems, Applications of Boolean Algebra, Boolean Functions, Complement of Boolean Function.

Logic Gates (Symbol, Truth Table, Logic Diagram): And, OR, NOT, NAND, NOR, XOR, XNOR. Universal Gates: NAND Gate and NOR Gate implementation, Realization of other Logic Operations using NAND/NOR. Buffer, Negative and Positive Logic, Mixed Logic.

EVALUATION

Evaluation will be continuous an integral part of the class followed by final examination.

REFERENCES

Hwei P. Hsu, Schaum's Outline of Signals and Systems, McGraw-Hill.

A.V. Oppenheim, A.S. Willsky, S Hamid Nawab, Signals and Systems, PHI. A Anand Kumar, Signals and Systems, PHI.

Basics of Electronics Engineering, Wiley India Pvt. Ltd.