BASIC ELECTRONICS SYLLABUS

Module 1: Electronic Components, Sources, and Measuring Equipment

- Evolution of Electronics
- Impact of Electronics in Industry and Society
- Familiarization with:
    - Resistors, Capacitors, Inductors
    - Colour Coding
    - Mechanical Components
    - Relay and Contactors
    - Generator
- Measuring Equipment:
    - Multimeter
    - CRO (Cathode Ray Oscilloscope): Types and Specifications
    - Electro-Regulated Power Supply
    - Function Generator

Module 2: Junction Diodes

- Intrinsic and Extrinsic Semiconductors
- Doping
- PN Junctions:
    - Formation of Junction
    - Physical Operation of Diode
    - Barrier Potential
    - I-V Characteristics
- Rectifiers
- Zener Diode:
    - I-V Characteristics
    - Zener Diode as a Voltage Regulator

Module 3: Transistors

- Bipolar Junction Transistor (BJT):
    - Device Structure and Physical Operation
    - CB (Common Base), CE (Common Emitter), CC (Common Collector) Configurations
    - Transistor as a Switch
- Metal-Oxide Field Effect Transistor (MOSFET):
    - Device Structure
    - Mode of Operation and Characteristics
    - MOSFET Configurations (CS, CD, CG)

Module 4: Amplifiers and Oscillators

- BJT as an Amplifier (CE Configuration)
- MOSFET as an Amplifier (CS Configuration)
- Feedback Concept
- Oscillators:
    - Barkhausen's Criteria for Sustained Oscillation
    - RC Phase Shift Oscillator
    - LC Oscillator

Module 5: Digital Logics

- Number Systems
- Conversion of Bases
- Boolean Algebra
- Logic Gates
- Concept of Universal Gate
- Simplification and Implementation of Boolean Functions

Module 6: Principles of Measurement and Analysis

- Units and Standards
- Errors
- Functional Elements of a Measurement System and Instruments
- Applications and Classification of Instruments
- Types of Measured Quantities
- Measures of Dispersion:
    - Sample Deviation
    - Sample Mean
- Calibration and Standards

Module 7: Sensors and Transducers

- Sensor Fundamentals and Characteristics
- General Concepts and Terminology of Measurement Systems
- Sensors and Transducers
    - Classification of Sensors
    - Static and Dynamic Characteristics
- Principles of Sensors:
    - Resistive Sensors
    - Capacitive Sensors
    - Inductive Sensors
    - Magnetic Sensors
    - Optical Sensors
    - Self-Generating Sensors