SUBJECT NO-EC21103, SUBJECT NAME- Introduction to Electronics

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Pre-requisites: None

Introduction to Electronic devices: passive devices, diode, bipolar junction transistor (BJT), metal oxide semiconductor field-effect transistor (MOSFET); Diode: basic structure and operating principle, current-voltage characteristic, large and small-signal models, iterative and graphical analysis; Diode Applications : rectifier circuits (half-wave and full-wave rectifiers, rectifiers with capacitor filter), voltage regulator (using Zener diode), clipper (limiter) circuits, clamper circuits; Bipolar Junction Transistors and their Applications: structure and modes of operation; n-p-n and p-n-p transistor in active mode, DC analysis of both transistor circuits; BJT as an amplifier, small-signal equivalent circuits, single-stage BJT amplifier (common-emitter mode); BJT as a switch; Metal Oxide Semiconductor Field-Effect Transistors and their Applications: structure and physical operation of n-type and p-type MOSFET; DC analysis of MOSFET circuits; MOSFET as an amplifier, small-signal equivalent circuits, single-stage MOSFET amplifier (common-source mode); MOSFET as a switch; Operational Amplifier (Op Amp) : ideal op amp; inverting amplifier, amplifier with a T-network, effect of finite gain, summing amplifier; non-inverting configuration, voltage follower; op amp applications like current-to-voltage converter, voltage-to-current converter, difference amplifier, instrumentation amplifier, integrator and differentiator; Feedback: basic concepts of negative feedback; four ideal feedback topologies; Oscillators: basic principles of sinusoidal oscillation; Example circuits; Digital Electronics: Boolean algebra and rules of simplification; combinational circuits like adder, decoder, encoder, multiplexer and demultiplexer; sequential circuits like flip-flops, counters and shift registers.