Basic Electronics, 3rd Semester

Unit 1.0 Semiconductor Diode

1.1 pn- Junction diode: working, formation of depletion layer, construction, symbol and equivalent circuits of pn- Junction diode.
1.2 Barrier potential voltage, forward and reverse biasing, V-I characteristics of diode
1.3 Diode current equation, Static and Dynamic resistance, Diode capacitance
1.4 Symbol, working and characteristic of other diodes like: LED, Photodiode, Varactor diode

Unit 2.0 Rectifiers and Filters

2.1 Need for rectification, rectifier Parameters, PIV, Ripple factor, Efficiency, Peak Inverse Voltage(PIV),Transformer utilization actor(TUF) of rectifiers
2.2 Types of rectifier: Half Wave Rectifier, Full Wave rectifier, Center taped and Bridge type full wave rectifier
2.3 Filter Circuits: L –filter, C–filter, LC- filter, CLC filter.

Unit 3.0 Diode Circuits

3.1 Zener diode: working, construction and equivalent circuits of Zener diode
3.2 Zener and avalanche breakdown phenomenon, Zener diode as voltage regulator
3.3 Clipper: Function of clipper circuit, types of clipper : positive and negative clipper circuits
3.4 Clamper: Function of clamper, types of clamper, positive and negative clamper circuits

Unit 4.0 Bipolar Junction Transistor (BJT) and Field effect transistor (FET)

4.1 BJT: Working, types of BJT ; NPN and PNP, construction and operation of NPN and PNP transistor.
4.2 Modes of operation : active, saturation and cutoff, current amplification factor β and α
4.3 Transistor biasing: need for biasing, types of biasing, thermal runaway
4.4 Transistor configurations: Common Emitter(CE), Common Base(CB) and Common collector configuration circuit , working and input and output characteristics.
4.5 Field Effect Transistor(FET): Working, construction, input and output characteristics, drain current, pinch-off voltage.

Unit 5.0 Introduction to Operational Amplifier(OpAmp)

5.1 Basics of differential amplifier, Working principle, input and output characteristics.
5.2 Basics of Op-Amp: OP-AMPIC-741, functional block diagram, virtual ground, configurations of working :inverting and non inverting, parameters : I/O resistance, gain, slew rate, bandwidth, power.
5.3 Applications op-amp : Summing, multiplier, and divider amplifier, integrator and differentiator, Log and Anti-Log amplifier.