RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
New Scheme Based On AICTE Flexible Curricula
Electronics & Communication Engineering III-Semester
EC-303 Electronic Devices

Unit-1 Semiconductor Material Properties: Elemental & compound semiconductor materials , Bonding forces and Energy bands in intrinsic and extrinsic silicon, Charge carrier in semiconductors , carrier concentration, Junction properties, Equilibrium condition, biased junction, Steady state condition, breakdown mechanism (Rectifying Diodes, Zener Diodes), Metal Semiconductor Junction.
Special diodes: Tunnel diodes, Varactor diodes, Schottky diode, Photo diodes, Photodetector, LED, solar cell.

Unit-2 Diode circuits: Ideal and Practical diode, Clipper, Clamper.
Power Supply: Rectifiers-Half wave, Full wave, Bridge rectifier, filter circuits, Voltage regulation using shunt & series regulator circuits, Voltage regulation using IC.

Unit-3 Fundamentals of BJT: Construction, basic operation, current components and equations,CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier. Ebers-Moll model, Power dissipation in transistor (Pd, max rating), Photo transistor. Transistor biasing circuits and analysis: Introduction, various biasing methods: Fixed bias,Self bias, Voltage Divider bias, Collector to base bias, Load-line analysis: DC and AC analysis, Operating Point and Bias Stabilization and Thermal Runaway. Transistor as a switch.

Unit-4 Small Signal analysis: Small signal Amplifier,Amplifier Bandwidth, Hybrid model,

analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier,

Boot-strapping Technique, Darlington amplifier and cas-code amplifier, Coupling methods in **multistage amplifier, Low and high frequency response, Hybrid πmodel, Current Mirror circuits.**

Large Signal analysis and Power Amplifiers: Class A,Class B,Class AB, Class C, Class D, Transformer coupled and Push-Pull amplifier.

Unit-5 FET construction- JFET: Construction, n-channel and p-channel, transfer and drain characteristics, parameters, Equivalent model and voltage gain, analysis of FET in CG, CS and CD configuration. Enhancement and Depletion MOSFET drain and transfer Characteristics. Uni-junction Transistor (UJT) and Thyristors: UJT: Principle of operation, characteristics, UJT relaxation oscillator.

Text/Reference Books:
1. Millman & Halkias, “Electronic Devices And Circuits”, TMH.
2. Salivahanan, Kumar & Vallavaraj, “Electronic Devices And Circuits”, TMH.
3. Boylestad & Neshelsky, “Electronic Devices & Circuits”, PHI.
4. Schilling & Belove, “Electronic Circuits , Discrete & Integrated”, TMH.
5. Chattopadhyay & Rakhshit, “Electronic Fundamentals & Applications”, New Age
6. Adel S. Sedra & Kenneth C. Smith, “Microelectronic Circuits”, OUP.
7. R. A. Gayakwad, “Op-Amps And Linear Integrated Circuits”, PHI
8. Theodore F. Bogart, Jeffrey S. Beasley, “Guillermo Rico Electronic Devices & Circuits”.
9. Allen Mottershead, “Electronic Devices & Circuits”.

ELECTRONIC DEVICES LAB

1. Diode Characteristic
a) pn junction diode Characteristics and Static & Dynamic resistance measurement from graph.

b) To plot Zener diode Characteristics curve.

2. Clipper Clamper
a) To plot the Characteristics curve of various clamper circuits.
b) To plot the Characteristics curve of various clamper circuits.

3. Half wave, full wave & bridge rectifier
a) To measure Vrms, Vdc for half wave, full wave & bridge rectifier.
b) To measure ripple factor, ratio of rectification for full wave & half wave rectifier.

4. Voltage regulation using zener diode shunt regulator and transistor series voltage regulator in the following cases
a) Varying input
b) Varying load

5. Characteristic of BJT
a) To plot the input & output Characteristics curve in CB & CE configuration
b) To find & and Q point from the above curve.
c) To plot the Characteristics curve of various clipper circuits.

6. h- Parameter

7. Multi Stage Amplifier

a) To plot the Characteristics curve for Direct Coupled Amplifier.
b) To plot the Characteristics curve for RC Coupled Amplifier.
c) To plot the Characteristics curve for transformer Coupled Amplifier.

8. FET Characteristic

a) To plot the Characteristics curve for n channel – JFET in CS configuration.
b) To find out pinch off voltage from the above characteristics curve

9 UJT Characteristic

a) To plot the Characteristics curve for UJT.
b) To determine intrinsic stand off ratio.