Department of Electronics and Telecommunication Engg.

Lecture Plan for EC 25XXX, B.Tech. II year

ELECTRONIC DEVICES

Session: June – Dec' 2024

| Lecture No. | Topic Covered | Remark |
|---|---|---|
| 1. | **Unit1**: Introduction to semiconductor Physics, Bohr's atomic structure, | |
| 2. | E-K diagrams, Periodic Lattice, energy bands in Intrinsic and Extrinsic semiconductor, equilibrium carrier concentration | |
| 3. | Direct and indirect band-gap semiconductors carrier transport, drift and diffusion current, mobility and resistivity | |
| 4. | Generation & recombination of carrier, Poisson & continuity equation | |
| 5. | Transient and diffusion capacitances, Switching time, Hall effect | |
| 6. | **Unit 2.** Small signal switching model of P-N junction diode, Avalanche and Zener breakdown | |
| 7. | Zener diode application as a voltage regulator | |
| 8. | PN junction diode circuits and applications: clipper | |
| 9. | Clamper and voltage multipliers | |
| 10. | Rectifiers, construction, working, characteristics and applications: LED, photodiode | |
| 11. | construction, working, characteristics and applications: tunnel diode | |
| 12. | Schottky diode, Solar cell, thermistors | |
| 13. | **Unit 3.** Charge transport in BJT, Minority carrier distribution and terminal currents | |
| 14. | Base width modulation, Ebers Moll model | |
| 15. | I-V characteristics for CB, CE and CC configurations, concept of loadline | |
| 16. | Transistor Biasing circuit design: Fixed biased configuration, Emitter-bias configuration, Voltagedivider bias configuration, collector feedback configuration, Emitter follower configuration | |
| 17. | Stabilityconcepts. Thermal runaway | |
| 18. | Transistor based regulated power supply design | |
| 19. | **Unit 4.** Construction & characteristics of p-channel, n-channel FET/JFET | |
| 20. | Constructions, characteristics of Depletion type MOSFET, MOS Capacitance | |
| 21. | Constructions, characteristics of Enhancement type MOSFET | |
| 22. | CMOS: constructions, characteristics and applications | |
| 23. | Source follower, common-gate. Channel length modulation | |
| 24. | JFET Biasing: Fixed-bias, Self-bias, voltage divider | |
| 25. | **Unit 5.** Concepts of Integrated circuits and their fabrications | |
| 26. | Introduction of Surface mount devices (SMDs) | |
| 27. | Silicon controlled rectifiers: construction, operation, characteristics | |
| 28. | SCR applications; DIAC: construction, operation, characteristics | |
| 29. | TRIAC, UJT: construction, operation, characteristics | |
| 30. | Construction, operation, characteristics of Phototransistor; Opto-isolator | |
| 31. | Seven segments- common anode, common cathode and Liquid Crystal Displays. | |