Approval: 1st Convocation Adhoc Meeting

Course Name : Solid State Devices
Course Code : EE 308
Credits :3-0-0-3
Prerequisites:

Course Contents:

Valence band and Energy band models of intrinsic and extrinsic semiconductors. Thermal equilibrium carrier concentration. Carrier transport by drift, resistivity. Excess carriers, lifetime, carrier transport by diffusion, Continuity equation. Quantitative theory of PN junctions : Steady state I-V characteristics under forward bias, reverse bias and illumination. Dynamic behavior under small and large signals. Qualitative theory of breakdown mechanisms. Quantitative theory of bipolar junction transistors having uniformly doped regions. Static characteristics in active and saturation regions. Emitter efficiency, transport factor, transit time, (and their calculation as functions of frequency. Charge control description. Theory of Field Effect Transistors : Static characteristics of JFETs. Analysis of MOS structure. Calculation of threshold voltage. Static I-V characteristics of MOSFETs.

Text books:

1. 'Solid State Electronic Devices' by Ben G. Streetman and Sanjay Banerjee, Prentice Hall International, Inc.
2. 'Semiconductor Devices Physics and Technology' by S.M.Sze, John Wiley & Sons.
3. 'Semiconductor Devices Modelling and Technology' by Nandita Das Gupta and Amitava Das Gupta, Prentice Hall of India Pvt. Ltd.

References:

1. 'Physics of Semiconductor Devices' by S.M. Sze, John Wiley and Sons.
2. 'Introduction to Semiconductor Materials and Devices' by M.S. Tyagi, John Wiley and Soks.