Subject Code : RACSY19C

APPLIED PHYSICS – ALLIED COURSE III

Unit I – Semiconductor Physics

Theory of Energy bands in crystals – distinction between conductors, insulators and semiconductors – Intrinsic and Extrinsic semiconductors – Hall effect in semiconductors – Zener diode Tunnel diode Backward diode Breakdown voltage – avalanche Breakdown

Unit II - Transistors

PNP and NPN transistors DC Characteristics of CE and CB configuration – Hybrid parameters – Functions of Transistors as an amplifier and oscillator – FET – N – channel and P-Channel FET performance Characteristics FET amplifier

Unit III – Lasers and Masers

Basic concepts of stimulated emission – Population inversion and Meta stable state – Ammonia maser – Ruby laser and He Ne laser production – Advantages

Unit IV – Opto Electronic Devices

LED: Radiation transition Emission spectra Luminent efficiency – Method of Excitation – Visible LED – Materials for LED – LED configuration and performance – Photo conduction – photo diode – Photo transistor – electronic watches – Seven segment displays – LCD

Unit V – Operational Amplifiers

The basic operational amplifier – Inverting and Non inverting operational amplifier – Differential Operational amplifier – CMRR – Basic uses of Operational amplifier as sign and scale changer phase shifter integrator. Differtiator and adder D/C – Binary weighted method – R-2R ladder method – A/C Successive approximation and counter methods – OpAmp as a comparator

Books for Study:

1. Microelectronics – Jacob Millman – MCGraw Hill
2. The fundamentals of solid state physics – Theraja Sultan Chand & Co., Delhi
3. Pulse and Digital electronics – G.K Mithal and Vanvasi – Khanna Publication – Delhi
4. Functional Electronics – Ramanan – TMH, 1994
5. Electronic devices and Circuits – Millman & Halkias – TMH1991