

B. Sc. II: Semester III

Unit I : Mathematical background and Electrostatics :

Gradient, divergence and curl of a vector fields and their physical significance, line surface and volume integral. Gauss divergence theorem, Stokes theorem. Work done on charge in electrostatic field, flux of electric field, force on moving charge, Lorentz force equation and definition of B. Ampere's force law, Ampere's Law and its applications.

Unit II : Magnetostatics and Maxwell's Equations :

Faraday's Law, Integral and differential form of Faraday's law, displacement current and Maxwell's Equation, wave Equation satisfied by E and B. Plane electromagnetic wave in vacuum, Poynting vector and Poynting theorem.

Unit-III : Solid State Electronics Devices-I :

Physics of semiconductors : Introduction to semiconductors ; Charge carriers & electrical conduction through semiconductors ; Doping, extrinsic semiconductors ; Fermi level & energy level diagrams ; Drift current in semiconductor, mobility, conductivity ; Hall effect, Hall coefficient, Semiconductor diode & its biasing, LED, Varactor diode.

Unit-IV : Solid State Electronics Devices-II :

Introduction to BJT ; working of BJT ; modes of operation; Current gains α and β , their relation ; CB & CE characteristics ; JFET- construction & working, characteristics of FET ; Basic concept of Difference amplifier, IC-OP AMP, electrical parameters of OP AMP, inverting & noninverting modes ; OP AMP as adder, subtractor, differentiator & integrator.

Unit: V : Special Theory of Relativity :

Postulates of Special Theory of Relativity, Lorentz transformations, Length contraction, Time dilation, relativistic addition of velocities, relativity of mass, Einstein's Mass - energy relation, Numericals.

Unit: VI : Atmosphere and Geophysics :

Structure of earth - The crust, mantle, core. Part of the earth - As a planet; The Atmosphere, The lithosphere, The Hydrosphere Composition of Atmosphere Earthquakes - Causes, terminologies associated with earthquakes. Type of earthquakes scale of intensity, recording of earthquakes. Radiation in the atmosphere, Propagation of energy through vacuum, Intensity of radiation, Scattering, absorption and reflection of solar radiation by the atmosphere. Moisture and clouds: mechanism that produces clouds, Cloud produced by mixing and by cooling.

Practical : 3 S

1. To determine characteristics of CB transistor
2. To determine characteristics of CE transistor
3. Measurement of magnetic field by Hall probe method
4. To study variation of gain of CE amplifier with load

5. To study Zener regulated power supply
6. To determine characteristics of FET
7. To study FET as a voltmeter
8. To study Weins bridge oscillator
9. To study phase shift oscillator
10. To study Wein's bridge oscillator
11. To study p-n diode as a rectifier
12. To determine characteristics of p-n junction.
13. Study of OP AMP as an inverting amplifier
14. Study of OP AMP as noninverting amplifier
15. Study of OP AMP as an adder
16. Study of OP AMP as subtractor
17. Study of OP AMP as differentiator
18. Study of OP AMP as an integrator
19. To determine characteristics of Phototransistor
20. Measurement of field strength its variation in a solenoid.
21. To draw the BH curve of iron by using a Solenoid and to determine the energy loss due to Hysteresis.

Reference Books:--

1. Solid state Electronics Devices- B.G.Streetman (PHI)
2. Electronics Devices & Circuits - A. Mottershead (PHI)
3. Integrated Electronics – J.Millman ; C.Halkias (TMH)
4. Electronics Devices & circuits - Sanjeev Gupta (Dhanpat Rai Pub.)
5. Electronics Devices & circuits-I & II - Godse & Bakshi (Tech. Pub. , Pune)
6. Solid State Devices & Electronics – Kamal Singh & S.P.Singh (S. Chand & Co.)
7. Electromagnetic theory and holography - satya parakash
8. A text book of geology - G.B. mahapatra
9. Engineering and general geology - parbin singh.
10. The atmosphere - Richard A. Anthes, Hans A. Panotsky, Jhon J Cahir, Albert Rango.
11. Relativity – Goyal and Gupta
12. Text book of Physics --- V. K. Sewane
13. Elements of Special theory of relativity – S.P.Singh and M.K.Bagde
14. A course in Electromagnetic field by S.W.Anwane, B.P.B. Publication, New Delhi