

2000-2001

SSP-S 303

SYLLABUS

ANDHRA UNIVERSITY
DEPARTMENT OF PHYSICS
II M.Sc. PHYSICS, II M.Sc.(Tech.) ELECTRONICS &
III SEMESTER

P303: CLASSICAL ELECTRO DYNAMICS
(Common for II M.Sc. SPACE PHYSICS - SP.303)

UNIT - I

1. Plane Waves in a non-conducting medium. Linear polarization, circular polarisation and Stokes parameters. 4 Hrs.
Reflection and refraction of electromagnetic waves at a plane interface between dielectrics. Polarisation by reflection and total internal reflection. Wave in a conducting medium. 8 Hrs.
Frequency dispersion characteristics of Dielectrics. Conductors and plasmas. Kramers - Kronig dispersion relations. Concepts of phase velocity and group velocity. 6 Hrs.
Chapter. 7. Sections. 7.1 to 7.8 and 7.10. J.D.Jackson. II Edition.
2. Radiation from a dipole. Multipole radiation. 4 hrs.
Chapter. 9. Page No. 391 to 401. J.D.Jackson.
3. Radiation reaction force. Abraham - Lorentz evaluation of self - force. 4 hrs.
Chapter. 17. Page No. 780 to 791. J.D.Jackson.

UNIT - II

4. Retarded and Advanced potentials, Lienard - Wiechert potentials and the electric and magnetic fields for an arbitrarily moving point charge. Larmor's formula and its relativistic generalization. Angular distribution of radiation emitted by point charges. 8 hrs.
Chapter. 14. Sections. 14.1 to 14.3. J.D.Jackson.
5. Thomson Scattering, Rayleigh Scattering. 4 hrs.
Sections. 14.7, 9.6, J.D.Jackson.
6. Four vectors and covariant electrodynamics. Transformation of electric and magnetic fields. Transformation of Lorentz force. Relativistic Lagrangian and Hamiltonian. Motion of charged particles in plasma in a uniform static electric and magnetic field. 8 hrs.
Section. 11.9, 11.10, 12.1.
7. Motion in combined electric and magnetic fields. Adiabatic Invariance of flux through the orbit of a particle. 4 hrs.
Section. 12.1, 12.3, 12.4 and 12.6 J.D.Jackson.

TEXT BOOKS:

1. "Classical Electrodynamics" by J.D.Jackson. IInd Edition (1993).

REFERENCE:

1. "Classical Electrodynamics" J.B.Marion.
2. "Introduction to Electromagnetic Theory" - D.J.Griffiths.