**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.**

**B. Sc. IIIrd year Physics Syllabus**

**(Semester-V and VI)**

**Revised syllabus from June 2015**

**B.Sc. IIIrd year Physics (Semester-V)**

**Electrodynamics**

**Course code PHY-302**

**Paper-XVI**

**Period-45 Marks-50**

**Chapter 1. Electrostatics [12]**

**Introduction :** Electric field lines , electric flux and Gauss law, the divergence of

E, Curl of E, Application of Gauss law: i) Electric field due to a uniform charged

sphere ii) Electric field due to charged cylinder, Gaussian pillbox, Poisson’s

equation, Laplace’s equation, Uniqueness theorem ( First and Second)

**Chapter 2. Time varying field [10]**

Faraday’s Law of Electromagnetic induction, Lenz’s law, Self-Induction, Mutual Induction, equation of continuity, Maxwell’s displacement current, Maxwell’s equation (Derivation, Differential form)

**Chapter 3. Electromagnetic waves III [15]**

Origin of electromagnetic waves, characteristics of electromagnetic wave, electromagnetic wave equations in a conducting medium, transverse nature of electromagnetic wave, plane polarized electromagnetic wave, The Poynting Vector, Poynting theorem, Polarization of Electromagnetic waves

**Chapter 4. Interaction of Electromagnetic waves with matter [08]**

Boundary condition for the electromagnetic field vector –**B,E,D and H** at the

interface between the two media, reflection and refraction at the boundary of two

non conducting media.

**Reference Books:**

1. Introduction to Electrodynamics-David J. Griffiths, Third Edition.
2. Mechanics and Electrodynamics - Brijlal N. Subrahmanyam, JivanSeshan
3. Classical Electrodynamics – S.P. Pure
4. Electrodynamics- B.B. Laud
5. Electrodynamics-Gupta, Kumar and Singh, Pragati Prakashan, Meerut
6. Electromagnetic waves and fields –R.N.Singh

**B.Sc. IIIrd year Physics (Semester-V)**

**Practical**

**Course code PHY-303**

**Paper-XXI**

**Period-45 Marks-50**

**List of experiments**

1. Measurement of the focal length of a given convex lens using laser
2. Spectral response of photoconductor (LDR)
3. Diffraction of grating using laser beam
4. e by Millikan’s oil drop method
5. Study of thermocouple (Fe-Cu) and to find inversion temperature
6. Refractive Index R.I. of Optical fiber
7. constant of B.G. by standard condenser method
8. study of absorption spectra of iodine and determination of its wavelength using grating

**Note :-** At least Six experiments should be performed.

**B.Sc. IIIrd year Physics (Semester-V)**

**Practical**

**Course code PHY-304**

**Paper-XXII**

**Marks-50**

**List of experiments**

1. Beam divergence of a diode laser
2. Determination of the diameter of a thin wire using laser
3. To study the interference of light using optical fibers
4. Determination of wavelength of He-Ne laser by transmission grating and reflection grating
5. Y by Koenig’s method
6. Edser’s A pattern
7. e/m by Thomson methods by Excel
8. Surface tension by Ripple’s method

**Note :-** At least Six experiments should be performed.

**B.Sc. IIIrd year Physics (Semester-VI)**

**Non-conventional energy sources and Optical fiber**

**Course code PHY-306**

**Paper-XX**

**Period-45 Marks-50**

**Chapter1. Non-conventional energy sources (12)**

Introduction, Biomass, wind energy, tidal energy/Ocean energy, geothermal energy, biogas hydro energy, wind energy, solar energy

Biogas plant-fixed dome type

**Wind energy:** Introduction to wind energy, terms and definition: wind, wind farm, wind turbine, vertical axis wind turbine (VAWT), horizontal axis wind turbine (HAWT), propeller (wheel), wind mill,types of wind turbines generator units, monoblade HAWT, twin blade HAWT, merits and limitation of wind energy.

**Chapter 2. Solar Photovoltaic Systems: (10)**

Introduction to photovoltaic systems, Solar Cell fundamentals: i) Semiconductor, ii) P-N junction, iii) Generation of electron-hole pair by photon absorption, iv) I\_V characteristics of solar cell

**Electrical storage:** Lead acid battery, basic battery theory

**Chapter 3. Introduction of optical fiber (10)**

Introduction, importance of optical fiber, classification of optical fiber- stepped index fiber, stepped index monomode fiber, Disadvantages of monomode fiber, plastic fiber, latest developed types of optical fibers- HPSUV; HPSIR; Halide; Tapered.

**Chapter4. Fiber cables and fabrication (13)**

**Fiber fabrication:** Classification of fiber fabrication techniques; external chemical vapour deposition (external CVD), axial vapour deposition (AVD), internal chemical vapour deposition (internal CVD)

**Fiber Cables:** Construction, Strength members, cable tensile loading, minimum bend radius losses incurred during installation of cables or during subscriber service testing of cable, selection criteria, optical cable fiber laying in telephone.

**References:**

1. Optoelectronics; R. A. Barapate (Tech-Max Publication, Pune)
2. Principles of Solar Cells, LEDs and Diodes: The role of the PN junction; ADRIAN KITAI (2011 John Wiley & Sons, Ltd)
3. Light Sources: Technologies and Applications; Spiros Kitsinelis (CRC Press Taylo & Francis Group, FL 33487-2742) - 2011
4. Energy technology (non-conventional, renewable, and conventional) - S. Rao, Dr. B.B. Parulekar, Khanna Publishers.
5. Non-conventional energy resources- B.H. Khan, G.D. Rai, R.P. Khare, IInd edition, McGraw Hill Education (India) Private Limited, New Delhi.
6. Non-conventional Energy Sources- G.D. Rai, Khanna Publisher
7. Solar energy and Rural development- S.H. Pawar, C.D. Lokhande& R.N. Patil
8. Solar energy, Fundamentals and applications- Garg, Prakash Tata McGraw Hill
9. Fiber Optics and Optoelectronics – R.P. Khare, Oxford University Press.

**B.Sc. IIIrd year Physics (Semester-VI)**

**Practical**

**Course code PHY-307**

**Paper-XVII**

**Marks-50**

**List of experiments**

1. Thermal conductivity by Forb’s method
2. Rydberg constant
3. B-H curve using magnetometer
4. Determination of Debye’s temperature (e.g. Tin)
5. Determination of dielectric constant of liquid/solid
6. Resistance measurement of semiconductor by Vaders Pau’s method
7. I-H Curve by Excel
8. Rydberg constant Excel

**Note:-** At least Six experiments should be performed.

**B.Sc. IIIrd year Physics (Semester-VI)**

**Practical**

**Course code PHY-308**

**Paper-XVIII**

**Marks-50**

**List of experiments**

1. Temperature coefficient of resistance of semiconductor
2. Measurement of thickness of thin film by gravimeter/optical/electrical method
3. Temperature of sodium flame
4. Hartmann’s dispersion formula
5. Maxwell’s bridge (measurement of inductance using impedance at different frequency)
6. λ by grating (normal incidence)
7. Transistorized Regulated power supply using Zener diode.
8. Bridge Rectifier

Note:- At least Six experiments should be performed.

**B. Sc. I Semester**

**Physics paper III (Phy103)**

**List of experiment**

* 1. Determination of acceleration due to gravity by Kater’s pendulum.
  2. Y by bending of a beam loaded at center.
  3. Determination of Y by Cantilever (Oscillation method)
  4. η by Maxwell’s needle.
  5. M.I. by bifilar suspension.
  6. Determination of Y and  of the material of a flat spiral spring.
  7. S.I. by Jaeger’s method.
  8. Determination of coefficient of viscosity by Poisseuille’s method.

**Note**: - At least six experiments should be performed.

**B.Sc. II Semester**

**Physics Paper VI (Phy106**)

**List of experiment**

* 1. Y by Searle’s apparatus.
  2. M.I. of fly wheel.
  3. Thermal conductivity of bad conductor by Lee’s disc method.
  4. Study of CRO

(Measurement of frequency and voltage sensitivity AC/DC.)

* 1. Field along axis of circular coil.
  2. I-H curve.
  3. Calibration of spectrometer.
  4. Dispersive power of prism.

**Note**: - At least six experiments should be performed.