SAURASHTRA UNIVERSITY

Accredited by NAAC With ‘A’ Grade
[3rd Cycle]

Faculty of Science
Syllabus
for
B.Sc. / M.Sc. (Applied Physics) Integrated Semester – IV
Revised syllabus
Effective From

June 2020 onwards

Under
Department of Nano science
&
Advanced Materials

Saurashtra University,
University Road, University Campus
Rajkot- 360005
Gujarat, India
SEMESTER IV: PAPER XIII - MODERN COMPUTATIONAL TECHNIQUES AND PROGRAMMING (Revised)


Page Nos 1-39

Unit II: Computer Codes and Arithmetic: Introduction, Decimal system, Binary system, Hexadecimal system, Octal system, Conversion of Numbers, Representation of Numbers, Computer Arithmetic, Errors in Arithmetic, Laws of Arithmetic.

Page Nos 40-60


Page Nos 121-151

Unit IV: Roots of non-linear Equations II - Secant method, fixed point method, determining all possible roots, systems of nonlinear equations, roots of polynomials, multiple roots by Newton’s method, complex roots by Bairstow method, Muller’s method.

Page Nos 151-205

Text Book: Numerical methods By E. Balagurusamy (TMH pub)
Unit I: Particle Detectors and Particle accelerators

Ionization chamber, Geiger Counter, Scintillation counter, Semiconductor junction detector, Cloud Chamber, Bubble chamber, other detectors, Van-de-graph generator, Cyclotron, Synchrocyclotron, Synchrotron, linear Accelerator

Books: Page Nos: 382-393
- Modern Physics By G. Aruldhas, P. Rajagopal, PHI, New Delhi
- Modern Physics By Murugesan, S. Chand Publications

Unit II: Elementary Particles

Leptons, Hadrons, Quarks, Color, Flavor, Field Bosons, The Standard Model, Conservation laws

Books: Page Nos: 531, 535, 541, 545, 546, 548, 550
- Concepts of Modern Physics By A. Beiser, S. Mahajan, S. R. Chaudhary
- McGraw Hill Publications

Books: Page Nos: 1415-1422
- Modern Physics By S.L. Kakani and SubhraKakani, Viva Books Pvt. Ltd.

Unit III: Applications of Nuclear Energy

Mossbauer Spectroscopy, Positron Emission Tomography, Magnetic Resonance Imaging (MRI), Gamma Knife, Environmental Impact

- Basics of Nuclear Physics By Hari Agrawal, PHI Pvt. Ltd.

Unit IV: Cosmology

The Big Bang, Dark Matter and Dark energy, Elementary Particles and their applications, Van Allen belt, Evolution of Stars, Cosmic rays

Books: Page Nos: 563-573
- Concepts of Modern Physics By A. Beiser, S. Mahajan, S. R. Chaudhary
- McGraw Hill Publications

Books: Page Nos: 420-424
- Modern Physics By G. Aruldhas, P. Rajagopal, PHI, New Delhi
SEMESTER IV: PAPER XV FUNDAMENTALS OF MATERIALS SCIENCE

(Revised)


By V. Raghavan (Eastern Economy Edition, PHI Publication)

Page Nos 01-33 : Callister’s Materials Science & Engineering
By Balasubramanian (Wiley India Publication)


By V. Raghavan (Eastern Economy Edition, PHI Publication)

Page Nos 170-193 : Callister’s Materials Science & Engineering
By R. Balasubramanian (Wiley India Publication)


By V. Raghavan (Eastern Economy Edition, PHI Publication)

Page Nos 229-240 : Callister’s Materials Science & Engineering
366-378 By R. Balasubramanian (Wiley India Publication)


Books: Page Nos 431-460 : Callister’s Materials Science & Engineering
By R. Balasubramanian (Wiley India Publication)
SEMESTER IV:  PAPER XVI ELECTRODYNAMICS & PLASMA PHYSICS (Revised)

Unit I: Coulomb’s law and field intensity, Field due to continuous charge distributions, electric flux density, Gauss’s Law- Maxwell’s Equation, Electrical Potential, Relationship between E and V – Maxwell’s Equation, Concepts of An electric dipole and energy density in electrostatic fields Convention and Conduction currents, conductors, polarization in dielectrics, dielectric constant and strength, continuity equation, Boundary Conditions Poisson’s and Laplace’s equations

Book  Page nos. 104-146  :  Elements of Electromagnetics by Matthew N. O. Sadiku  
Page nos. 162-182:  Oxford University Press

Unit II: Biot Savart's law, Ampere’s circuit law, Magnetic Flux density, Maxwell’s equations for static EM fields ,Concept of Magnetization in materials, magnetic boundary conditions, Magnetic Energy, Maxwell’s Equations: Faraday’s law, Transformer and Motional EMF’s, Displacement current, Maxwell’s Equation in Final Forms, Power and the pointing vector, Concept of Reflection of a plane wave at Normal and oblique incidence

Book  Page nos. 263-283  :  Elements of Electromagnetics by Matthew N. O. Sadiku  
Page nos. 323,330,339  Oxford University Press  
Page nos. 369-384,435-451

Unit I & II REFERENCE BOOKS :  
1. Introduction to Electrodynamics by David J. Griffiths, PHI publication  
2. Engineering Electromagnetics by William H. Hyat, TMH Publication  
3. Electromagnetics with applications by Kraus/Flesich, McGraw Hill publication

Unit III:  Definition of PLASMA, Occurrence of PLASMA, concept of Temperature, Production of PLASMA, Debye Shielding, PLASMA parameters, Criteria for PLASMA, Properties of PLASMA, Applications of PLASMA

Books:  Page Nos 1-17  :  Introduction to Plasma Physics & Controlled Thermonuclear Fusion  
By F.F.Chen Plenum Press (N.Y.)  
BY Saxena, Gupta, Saxena Pragati Publication, Meerut

Unit IV: Charge Particle Motion under - uniform B, nonuniform B, Curved B, grad B // B (magnetic mirror effect), Plasma as Fluid, Plasma waves/Oscillations in Plasma (Concept & Physical interpretation)

By F.F.Chen Plenum Press (N.Y.)  
Page Nos 60-84  :  Textbook of Plasma Physics, By Suresh Chandra CBS Publishers