

**SHIVRAJ COLLEGE OF ARTS, COMMERCE AND
D. S. KADAM SCIENCE COLLEGE, GADHINGLAJ.
DEPARTMENT OF PHYSICS**

B.Sc. (Physics)

• **Program Specific Outcomes**

After successful completion of three year graduate level degree program in Physics a student should be able to;

1. Understand the core theories and principles of Physics.
2. Learn the concepts of Physics through classical and quantum phenomena.
3. Think methodically, independently and draw a logical conclusion of scientific problem.
4. Use basic mathematics to describe and analyze physical phenomena.
5. Enhance the learning abilities through development of simple laboratory experiments.
6. Develop the practical skills and techniques to tackle the scientific problems.

• **Course Outcomes**

After successful completion of relevant course in Physics a student should be able to attain following outcomes;

B.Sc.I/Semester I

1. Mechanics I (DSC-1-A)

- A. Knowledge and applications of vector algebra in Physics.
- B. Understanding of basic ordinary differential equations.
- C. Concept of Newton's laws of motion and their applications.
- D. Basic concept of rotational motion.

2. Mechanics II (DSC-2-A)

- A. Understand law of Gravitation.
- B. Use of Satellite in Global Positioning System (GPS).
- C. Concept of elasticity and its use in day to day life.
- D. Differentiation of hydrophilic and hydrophobic surfaces.

B.Sc.I/Semester II

1. Electricity Magnetism I (DSC-1-B)

- A. Knowledge and applications of vector calculus in Physics.
- B. Understanding of vector integrals.

- C. Conceptual clarity of electrostatics.
- D. Concept of polarization in dielectrics.

2. Electricity Magnetism II (DSC-2-B)

- A. Qualitative analysis of AC circuits.
- B. Magnetism and magnetostatics.
- C. Concept of electromagnetic induction.
- D. Idea of Maxwell's equations of electromagnetic waves.

B.Sc.II/Semester III

1. Thermal Physics and Statistical Mechanics-I (DSC-1-C)

- A. Highlight of different velocities of gas molecules.
- B. Knowledge of Maxwell's distribution of gas molecules.
- C. Merits and drawbacks of thermometers.
- D. Basic thermodynamic processes and application to heat engine.

2. Waves and Optics –I (DSC-2-C)

- A. Knowledge of superposition of harmonic oscillators.
- B. Theory of coupled oscillations.
- C. Understanding the ultrasonic waves and their applications.
- D. Basics of sound in context of acoustics of buildings.

B.Sc.II/Semester IV

1. Thermal Physics and Statistical Mechanics-II (DSC-1-D)

- A. Conceptual clarity of thermodynamic functions and Claussius-Clapeyron equation.
- B. Understanding the black body radiation spectrum.
- C. Planck's law of radiation.
- D. Preliminary knowledge of classical and quantum statistical mechanics.

2. Waves and Optics –II (DSC-2-D)

- A. Cardinal points and their graphical representation.
- B. Rayleigh criterion and resolving power of prism and grating.
- C. Qualitative study of polarization of light.
- D. Study of interference for determination of wavelength of light.

B.Sc.III/Semester V

Paper IX -Mathematical and Statistical Physics

- A. Curvilinear coordinates and coordinate systems.
- B. Understanding of basic partial differential equations.
- C. Basic concepts in statistical mechanics
- D. Idea of classical and quantum statistical mechanics.

Paper X - Quantum Mechanics

- A. Study motion of particles in one and three dimensions
- B. Study quantum mechanical behavior of the particle
- C. Differentiation between Classical and Quantum mechanics
- D. Study different operators in quantum mechanics

Paper XI - Classical Mechanics

- A. Understanding conservation laws of mechanics of system of particles.
- B. Lagrange's equations and their applications.
- C. Hamilton's principle and techniques of calculus of variation
- D. Understanding the rigid body dynamics.

Paper XII - Atomic & Molecular Spectra, Astronomy & Astrophysics

- A. Optical spectral lines: selection and intensity rules.
- B. Understanding doublet fine structure.
- C. Concept of Raman Effect.
- D. Milky Way Galaxy and Solar system.

B.Sc.III/Semester VI**Paper XIII - Nuclear and Particle Physics**

- A. Construction and working of different types of nuclear accelerators.
- B. Construction and working of different types of nuclear detectors.
- C. Understanding basic nuclear reactions and models.
- D. Introductory elementary particles.

Paper XIV - Energy Studies and Material science

- A. Knowledge on different types of renewable energy resources.
- B. Study of wind energy and its generation by wind turbine.
- C. Study of solar energy and its generation by solar panel.
- D. Synthesis of nanoparticles.

Paper XV - Electrodynamics and Electromagnetic Waves

- A. Motion of charged particles in fields.
- B. Understanding the basic laws in electrostatics and magnetostatics.
- C. Deriving the Maxwell's equations of electromagnetic waves.
- D. Propagation of electromagnetic waves in free space.

Paper XVI - Solid State Physics

- A. Models of different crystal structures
- B. Analysis of X-ray diffraction patterns
- C. Applications of IC-555 as different multivibrators
- D. Difference between metals, semiconductors and insulators