

Mahatma Gandhi Vidyamandir's
Smt. Pushpatai Hiray Mahila Mahavidyalya, Malegaon, Dist. Nashik.

Department of Physics

Programme outcomes: B. Sc. Physics

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| Programme outcomes | After successful completion of Three-year B. Sc. Physics Course, students should be able to: <ol style="list-style-type: none">1. Understand, demonstrate and solve basic as well as major concepts in all disciplines of physics.2. Solve the problem independently and draw a logical conclusion.3. Apply critical thinking and the scientific knowledge to design, carry out, record and analyze the results of Physics experiments.4. Acquire awareness of the impact of Physics on the society and development outside the scientific community.5. To inculcate the scientific temperament in the non-scientific community.6. Use modern techniques, decent equipment and software |
| Programme-Specific outcomes | <ol style="list-style-type: none">1. Acquire the knowledge of Physics through theory as well as practical components.2. Understand good laboratory practices and safety awareness.3. Develop research-oriented skills.4. Make aware and handle the sophisticated electrical and electronic instruments/equipments. |

Programme Outcomes: F.Y. B.Sc. Physics

The syllabus of Physics for First year has been redesigned for Choice based Credit System (CBCS) to be implemented from 2019-2020.

Course code and title: PHY-112 Physics Principles and Applications

Learning Outcomes:

On successful completion of this course students will be able to do the following:

1. To understand the general structure of atom, spectrum of hydrogen atom.
2. To understand the atomic excitation and LASER principles.
3. To understand the bonding mechanism and its different types.
4. To demonstrate an understanding of electromagnetic waves and its spectrum.
5. Understand the types and sources of electromagnetic waves and applications.
6. To demonstrate quantitative problem-solving skills in all the topics covered.

Course code and title: PHY-122 Electricity and Magnetism

Learning Outcomes:

On successful completion of this course students will be able to do the following:

- 1) To understand the concept of the electric force, electric field and electric potential for stationary charges.
- 2) Able to calculate electrostatic field and potential of charge distributions using Coulomb's law and Gauss's law.
- 3) To understand the dielectric phenomenon and effect of electric field on dielectric.
- 4) To Study magnetic field for steady currents using Biot-Savart and Ampere's Circuital laws.
- 5) To study magnetic materials and its properties.
- 6) Demonstrate quantitative problem-solving skills in all the topics covered.

Syllabus of S.Y.B.Sc. Physics Choice Base Credit System (CBCS) has been implemented from June 2020.

SEMISTER-III (S.Y.B.Sc.)

After the completion of this course students will be able to:

| Courses | Outcomes |
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| PHY-231: Mathematical Methods in Physics-I | <ul style="list-style-type: none">• Understand the complex algebra useful in physics courses.• Understand the concept of partial differentiation.• Understand the role of partial differential equations in physics.• Understand vector algebra useful in mathematics and physics.• Understand the concept of singular points of differential equations. |
| PHY-232: Electronics | <ul style="list-style-type: none">• Apply different theorems and laws to electrical circuits.• Understand the relations in electricity.• Understand the parameters, characteristics and working of transistors.• Understand the functions of operational amplifiers.• Design circuits using transistors and applications of operational amplifiers.• Understand the Boolean algebra and logic circuits. |
| PHY-233: Practical Course (Laboratory 2A) | <ul style="list-style-type: none">• Use various instruments and equipment.• Design experiments to test a hypothesis and/or determine the value of an unknown quantity.• Investigate the theoretical background of an experiment.• Setup experimental equipment to implement an experimental approach.• Analyze the data, plot appropriate graphs and reach conclusions from data analysis.• Work in a group to plan, implement and report on a project/experiment.• Keep a well-maintained and instructive laboratory logbook. |

SEMISTER-IV (S.Y.B.Sc.)

| Courses | Outcomes |
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| PHY-241: | <ul style="list-style-type: none">• To study underlying principles of oscillations and its scope in development. |

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| Oscillations, Waves, and Sound | <ul style="list-style-type: none"> • To understand and solve the equations / graphical representations of motion for simple harmonic, damped, forced oscillators and waves. • To explain oscillations in terms of energy exchange with various practical applications. • To solve numerical problems related to undamped, damped, forced oscillations and superposition of oscillations. • To study characteristics of sound, decibel scales and applications. |
| PHY-242: Optics | <ul style="list-style-type: none"> • Acquire the basic concept of wave optics. • Describe how light can constructively and destructively interfere. • Explain why a light beam spread out after passing through an aperture • Summarize the polarization characteristics of electromagnetic wave • Understand the operation of many modern optical devices that utilize wave optics • Understand optical phenomenon such polarization, diffraction and interference in terms of the wave model • Analyze simple example of interference and diffraction. |
| PHY-243: Practical Course (Laboratory 2B) | <ul style="list-style-type: none"> • Use various instruments and equipment. • Design experiments to test a hypothesis and/or determine the value of an unknown quantity. • Investigate the theoretical background of an experiment. • Setup experimental equipment to implement an experimental approach. • Analyze the data, plot appropriate graphs and reach conclusions from data analysis. • Work in a group to plan, implement and report on a project/experiment. • Keep a well-maintained and instructive laboratory logbook. |

Course outcomes B. Sc. Physics (2013-Pattern) Semester-III

| Course | Outcomes |
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| PH-331: Mathematical Methods in Physics-II | <p>After completing the three-year B. Sc. Course, students should be able to:</p> <ol style="list-style-type: none"> 1. Explain the Cartesian, spherical polar and cylindrical co-ordinate systems and hence generalize them to General and orthogonal co-ordinate system. 2. Understand gradient, divergence, curl and Laplacian of functions. 3. To understand the Special Theory of Relativity. 4. Discuss the Michelson- Morley Experiment. 5. To obtain the series solution for Legendre, Hermite and Bessel's Differential Equations by Frobenius method. 6. Study the Generating function for Legendre, Hermite and Bessel's polynomials. |
| PH-332: Solid State Physics | <ol style="list-style-type: none"> 1. Know different lattice structures and the principles of structure determination by diffraction. 2. To understand the principles and techniques of X-rays diffraction. 3. Know the fundamental principles of semiconductors and be able to estimate the charge carrier mobility and density. 4. To acquire an extended knowledge about magnetic properties like diamagnetic, paramagnetic, ferromagnetic, ferrites and superconductors |
| PH-333: Classical | <ol style="list-style-type: none"> 1. Understand Newton's Laws of motion and their applications to projectile and |

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| Mechanics | <ul style="list-style-type: none"> rocket motion. 2. Understand motion in central force field. 3. Classify elastic and inelastic scattering. 4. Know the difference between Laboratory and center of mass system. 5. Understand Lagrangian and Hamiltonian formulation and Solve the problems using them. |
| PH-334: Atomic and Molecular Physics | <ul style="list-style-type: none"> 1. To know the Rutherford Experiment of atom. 2. To understand molecular spectra of atom. 3. To study the Raman spectra. 4. To study the Zeeman Effect. 5. To understand the Quantum Numbers. |
| PH-335: Computational Physics | <ul style="list-style-type: none"> 1. Write algorithm and flow chart for c-programming language. 2. To use of iterative, decision making and the jump statement. 3. Understand the concept of arrays and pointers. 4. Study of user defined functions and program structures. |
| PH-336B: Elements of Materials Science | <ul style="list-style-type: none"> 1. To study the Mechanical, Electrical and Thermal Properties of material. 2. To discuss the type of Phase Diagrams and know the solid solution and its types. 3. Understand Point, Line Defect and study Diffusion Mechanism. 4. Know the difference between Elastic and Plastic Deformations. 5. Understand the Polymer Vulcanization of rubber and AX-type crystal structures |
| Course outcomes B. Sc. Physics Semester-III | |
| PH-341: Classical Electrodynamics | <ul style="list-style-type: none"> 1. Explain electrical charges, image charge, Polarization, Electric Displacement and associated vectors. 2. Know basics about magnetic induction, Intensity and Magnetization vectors and relationship between them. 3. Able to apply Biot-Sawart's law and Ampere's law to various current loops, know Hysteresis and B-H curve. 4. Understand Maxwell's equations and their applications. 5. Study wave equations in free space and Poynting vector. |
| PH-342: Quantum Mechanics | <ul style="list-style-type: none"> 1. Understand De-Broglie hypothesis and Uncertainty principle. 2. Derive Schrodinger's time dependent and independent equations 3. Solve the problems using Schrödinger's steady-state equation. 4. Understand different operators in Quantum Mechanics. |
| PH-343: Thermodynamics and Statistical Physics | <ul style="list-style-type: none"> 1. Studykinetic theory of Gases. 2. StudyMaxwell Relations and their Applications. 3. Know the elementary concept of statistics. 4. Understand statistical distribution of particles. 5. Studystatistical ensembles and classical statistics. 6. StudyQuantum statistics. |
| PH-344: Nuclear Physics | <ul style="list-style-type: none"> 1. Know the properties of nucleus. 2. Understandthe concept of radioactivity and decays law. 3. StudyNuclear Models and their limitations. 4. Extendknowledge about nuclear reactions i.e., nuclear fission and fusion. 5. Understandbasic concept of elementary Particles. |

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| PH-345: Electronics | <ol style="list-style-type: none"> 1. Know the special purpose Diodes. 2. Study Transistor Amplifier. 3. Understand FET, MOSFET. 4. Study OpAmp and their applications. 5. Know Timer IC- 555 and its classifications. 6. Study Regulated Power supply. 7. Understand Logic Circuits and their applications. |
| PH-346: LASERs | <ol style="list-style-type: none"> 1. Know the history of LASERs and its basic concepts. 2. Understand basic principles and working of different lasers. 3. Know the applications of lasers in various fields. 4. Understand the characteristics of LASERs. 5. Learn safety precaution and measures while handling LASERs. |
| PH-347: Lab.-I | <ol style="list-style-type: none"> 1. Find out constants such as Young's modulus, Viscosity, Surface Tension etc. of various materials. 2. Calculate RP of grating. 3. RI of different liquids. 4. Thermal conductivity by various methods. 5. Study GM tube and evaluate Planck's constant. |
| PH-348: Lab.-II | <ol style="list-style-type: none"> 6. Study characteristics of ICs 723, 741 and 555 and their applications. 7. Study Diffraction, interference of light. 8. Study applications of LASERs. 9. Perform experiments on computational Physics and Computer aided programs. |
| PH-349: Lab.-III Project | <ol style="list-style-type: none"> 1. Able to develop experimental/practical skills through project work intended to be based on basic principles in Physics. 2. Promote better understanding of basic concepts in physics and bring out creativity in the students. 3. Develop interview and presentation skills. |