GOVERNMENT JAJWALYADEV NAVEEN GIRLS COLLEGE JANJGIR (C.G.)

DEPARTMENT OF PHYSICS

PROGRAMME OUTCOMES, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

PROGRAMME OUTCOMES

(UNDERGRADUATE COURSE)

PO - 1. Student will develop the understanding of Mathematical tools and concepts for solving a Physical problem encountered in Physics.

PO - 2. Student will develop a foundation of basic Physics with learning Classical Mechanics, Electromagnetic Theory, Quantum Mechanics, Statistical Mechanics, Thermodynamics, Optics, Electronics and Solid-State Physics, which will enable them to analyse different Physical phenomena observed during 20^{th} century.

PO - 3. Students will develop Laboratory practices and skills, which will enable them to perform in any Physical Laboratory, also to analyse the measurements of any experiment and through this draw valid conclusions and inferences.

PO - 4. Students will develop communication skills of oral and written Scientific temperament, so that they can think and perform critically and work independently in any broad area of Physics.

PROGRAMME SPECIFIC OUTCOMES

(UNDERGRADUATE COURSE)

PSO - 1. Understanding of the core concept of different branches of Physics.

PSO - 2. Acquiring Analytical and Logical skills for higher education in Physics.

PSO - 3. To excel in Theoretical and Experimental Physics.

PSO - 4. To get trained to take up jobs in Applied and Allied fields in Physics.

PSO - 5. To be Confident to participate in any Competitive exams for higher education or job in Physics.

COURSE OUTCOMES

(UNDERGRADUATE COURSE)

B. Sc. Part 1

Subjects – Mechanics, Oscillations and Properties of Matter, Electricity, Magnetism and Electromagnetic Theory.

Outcomes – After throughout the course student must be able to understand,

i) Laws of motion and their applications to various dynamical situations, motion of inertial frames and concept of Galilean invariance.
ii) The analogy between translational and rotational dynamics.
iii) Phenomena of collisions and idea about centre of mass and Laboratory frames and their correlations.
iv) Principles of elasticity through the study of modulus of rigidity.
v) Simple principles of fluid flow and equations governing fluid dynamics and the phenomena of simple harmonic motion and the properties of systems executing such motions.

vi) The Laboratory course, the student shall perform experiments related to mechanics (compound pendulum), rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity) and fluid dynamics (Verification of Stoke's law and Searle method) etc.
vii) Gauss law, Coulomb's law for the electric field and apply it to systems of point charges as well as line, surface and volume distributions of charges.
viii) Electric current, resistance and capacitance in terms of electric field and electric potential.
ix) The dielectric properties, magnetic properties of materials and the phenomenon of electromagnetic induction.
x) Kirchhoff's rules to analyse AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.
xi) The Laboratory course, the student will get an opportunity to verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction and working of various measuring instruments.

B. Sc. Part 2

Subjects – Thermodynamics, Kinetic theory and Statistical Physics, Waves, Acoustic, Optics and LASER.

Outcomes – After throughout the course student must be able to understand,

i) Basic concepts of Thermodynamics, the first and the second law of Thermodynamics, the concept of entropy and the Thermodynamic potentials and their Physical interpretations.
ii) About Maxwell's Thermodynamics relations.
iii) The basic aspects of Kinetic theory of gases, Maxwell-Boltzmann distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion.
iv) The Maxwell, Bose-Einstein and Fermi-Dirac Statistics.
v) The Laboratory course, the students are expected to do some basic experiments in thermal Physics, viz; determinations of Stefan's constant, coefficient of thermal conductivity, temperature coefficient of resistance etc.
vi) A Mathematical Oscillator equation, Wave equation and derive these equations for certain systems.
vii) Basic Principles and theories about the behaviour of light and the Physical environment to conduct experiments. Use the principles of wave motion and superposition to explain the Physics of polarization, interference and diffraction.
viii) The working of selected optical instruments like biprism, interferometer, diffraction grating.
ix) The different types of aberrations and achromatism.
x) The use of different types of eyepieces according to their applications.
xi) The Basics of LASER Physics.
xii) The Laboratory course, the students will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Laser beam. Resolving power of prism and grating etc.

B. Sc. Part 3

Subjects – Relativity, Quantum Mechanics, Atomic, Molecular and Nuclear Physics, Solid-State Physics and Electronics.

Outcomes – After throughout the course student must be able to understand,

i) The basic concept of Reference System.
ii) The Inadequacies of Classical Mechanics in explaining microscopic phenomena, Quantum theory formulation is introduced through Schrödinger equation.
iii) The Behaviour of quantum particle encountering a (i) barrier, (ii) potential, the student gets exposed to solving non-relativistic hydrogen atom for its spectrum and Eigen functions.
iv) The Ground state properties of nucleus and know about the nuclear model, nuclear reaction and the process of radioactivity.

v) About Crystalline and Amorphous substances, about lattice, unit cell, Miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystalline materials.
vi) The n-type and p-type semiconductors, mobility, drift velocity, fabrication of P-N junctions; forward and reverse biased junctions.
vii) The Application of P-N junction for different types of rectifiers and voltage regulators.
viii) The NPN and PNP transistors and basic configurations namely common base, common emitter and common collector, also about current and voltage gain.
ix) The Biasing and equivalent circuits, coupled amplifiers and feedback in amplifiers and oscillators.
x) To Characterize various devices namely P-N junction diodes, LEDs, Zener diode, Solar cells, PNP and NPN transistors. Also construct amplifiers and oscillators using discrete components.