Course outcome B Sc Physics (NM and Computer Science)

Semester I-

Paper: PH-101 Classical Mechanics and theory of relativity

- Describe various conservations laws and their applications in every-day life.
- Provide knowledge about applications and limitations of Newton's Laws of motion in inertial and non-inertial frames of references.
- Explain Einstein's theory of relativity as well as special theory of relativity and changes associated with length, time and mass.

Paper: PH-102 Electricity Magnetism and Electromagnetic Theory

- Explain mathematical theorems linked with concepts of divergence, curl and gradient of electric field and their co-relation with various physical phenomena in nature.
- Introduce the concept of magnetism and classification of materials based upon their response to external magnetic field and heat losses during cycle of magnetism (hysteresis loop).
- Describe electromagnetic waves, their properties and their propagation through a medium as well as space.
- Explain the working of LC, RC, LCR resonant circuits and significance of resonance in series and parallel resonant circuits.

Semester II

Paper: PH-201 Properties of Matter and Kinetic Theory of Gases

- Calculate the moment of inertia of rigid bodies with different shapes.
- Introduce the terms like elasticity, rigidity, stress, strain and explain various methods to find the elastic constants for different materials.
- Understanding of kinetic theory of gases by exercising ideal gas equation as well as Vander Waal's equation.
- Understanding the process of diffusion of gases by studying the Maxwell law of speed distribution.

Paper: PH -202 Semiconductor Devices

- Introduce the world of semiconductors by presenting diodes (Zener diode, light emitting diodes, photo diodes), Solar cell and half-wave/ full-wave rectifiers.
- Emphasis on usage of semiconductors in constructing transistors, amplifiers, Cathode Ray Oscilloscope (CRO) and other electronic instruments.

Semester III

Paper: PH -301 Computer Programming and Thermodynamics

- Introduce the computational physics through basic knowledge about computer hardware and software and its applications.
- Learning the FORTRAN programming and motivating to use it in solving complex mathematical problems and its further use in research work.
- Understanding Carnot heat engine and use this information to understand the working of refrigerators used at homes.
- Describe basic laws of thermodynamics and various energy exchange processes in our surroundings.
- Application of laws of thermodynamics in heaters, refrigerators, coolers, turbines etc. and hence find their efficiency.

Paper: PH- 302 Wave and Optics –I

- The students are able to understand about various optical phenomena related to light with applications in daily life.
- Understanding the phenomena of interference and diffraction and hence explaining many natural phenomena like formation of rainbow, colour in soap bubbles, colour of thin films etc.

Semester IV

Paper: PH - 401 Statistical Physics

- Explain the postulates of Maxwell-Boltzmann Statistics, Fermi-Dirac Statistics and Bose-Einstein Statistics.
- Understanding the theory of specific heats of solids through Dulong and Petit law, Einstein theory and Debye theory.

Paper: PH - 402 Wave and Optics II

- Understanding the concepts of polarization and explanation of principle and working of polarimeter along with the techniques to produce and detect circularly and elliptically polarized light.
- Understanding Fourier theorem and to derive Fourier series for different types of waveforms.

Semester V:

Paper: PH - 501 Quantum and Laser Physics

- Helps the students to understand the base and fundamental concepts of quantum mechanics in terms of its evolution and applications.
- It throws light on the co-existence of particle and wave nature of material particles and their applications in photoelectric effect and Compton effect.
- It explains the meaning of uncertainty in physics and how it can be applied to explain various phenomena like existence of protons and neutrons and non existence of electrons in nucleus.
- The course explains the behavior of a free and bound particle in terms of Schrodinger equation and explains the role of potential by way of applications such as particle in a box. It makes the students understand the concept of tunneling, reflection and transmission probabilities at different energies of the particle.
- Makes the students familiar with optical phenomena and different concepts related to laser physics.
- Helps in understanding the qualitative understanding of basic lasing mechanism, types of Lasers, characteristics of Laser Light
- Helps to understand and appreciate the applications of Lasers in developing LED, Holography, in materials processing, in Medicine, Industry and Military.
- The students develop the idea of optical fibres, their properties and applications of optical fibres.

Paper: PH -502 Nuclear Physics

- Describe the structure of nuclei and its properties by using different methods for the determination size, mass and binding energy.
- Explain radiation decay like alpha-decay, Beta-decay, gamma-decay and their respective spectra.
- Understanding the interaction of different nuclear radiations with matter and understanding the role of nuclear accelerators and nuclear detectors in accelerating and detecting charged as well as uncharged particles.

Semester VI

Paper: PH -601 Solid State and Nano Physics

- Introducing the basic terms like unit cell, primitive cell and understanding the crystal structure by X-ray diffraction methods and effect of different symmetry operations on the crystal structure.
- Explain BCS theory of Super conductivity and classification of Superconductors along with practical applications of superconductors.
- Introducing the concept of Nanoscience and understanding the techniques for the synthesis of Nanomaterials.
- Evaluation of Nanomaterials with the help of optical spectroscopy, electron microscopy, surface scanning, thermal techniques etc.
- Application of Nanomaterials in daily life and their impact on environment.

Paper: PH - 602 Atomic and Molecular Spectroscopy

- Introducing the historical background of atomic spectroscopy and explaining various theories to explain the fine structure of hydrogen spectra.
- Describing the Alkali and alkaline spectra and their comparison with hydrogen spectra.
- Explain the effect of electric and magnetic fields on atomic spectra and unfolding the important terms like Zeeman effect, Paschen Effect and Stark effect.
- Introducing rotational, vibrational and electronic transitions and hence explain the Raman effect in molecules.