::PROGRAMME OUTCOMES (POs)::

Students having Degree in B.Sc. (with Physics) should have knowledge of different concepts and fundamentals of Physics and ability to apply this knowledge in various fields of academics and industry. They may pursue their future career in the field of academics, research and industry.

::PROGRAMME SPECIFIC OUTCOMES (PSOs)::

After completing B.Sc. (with physics) the student should have

CERTIFICATE
IN BASIC PHYSICS & SEMICONDUCTOR DEVICES

After completing this certificate course, the student should have

- *Competence in the methods and techniques of calculations using Newtonian Mechanics and Thermodynamics.*
- *Students are expected to have hands on experience in modeling, implementation and calculation of physical quantities of relevance.*
- *Students are expected to have an insight in handling electrical and electronic instruments.*
- *Student should be able to handle basic electronic instruments, which are being used in electronics, telecommunication and instrumentation industry.*

DIPLOMA
IN APPLIED PHYSICS WITH ELECTRONICS

After completing this diploma course, the student should have

- *Knowledge of different concepts in electromagnetic theory, Modern Optics and Relativistic Mechanics.*
- *Knowledge of electromagnetic wave propagation, which serves as a basis for all communication systems and deals with the physics and technology of semiconductor optoelectronic devices.*
- *A deeper insight in electronics to address the important components in consumer Optoelectronics, IT and communication devices, and in industrial instrumentation.*
- *Knowledge of basic concepts of optical instruments and lasers with their applications in technology.*

DEGREE
IN BACHELOR OF SCIENCE

After completing this degree course, the student should have

- *Knowledge of different aspects of classical, quantum and statistical computational tools required in the calculation of physical quantities of relevance in interacting many body problems in physics.*
- *Develop the basic knowledge and proficiency of solid-state physics and nuclear physics, which have utmost importance at both undergraduate and graduate level.*
- *Proficiency in this area will attract demand in research and industrial establishments engaged in activities involving applications of these fields.*
- *Comprehensive knowledge of Analog & Digital Principles and Applications.*
- *Learn the integrated approach to analog electronic circuitry and digital electronics for R&D.*

Course Code: **(B010101T)**
Course title: **Mathematical Physics & Newtonian Mechanics**

Course Outcomes:

- Recognize the difference between scalars, vectors, pseudo-scalars and pseudo-vectors.
- Understand the physical interpretation of gradient, divergence and curl.
- Comprehend the difference and connection between Cartesian, spherical and cylindrical coordinate systems.
- Know the meaning of 4-vectors, Kronecker delta and Epsilon (Levi Civita) tensors.
- Study the origin of pseudo forces in rotating frame.
- Study the response of the classical systems to external forces and their elastic deformation.
- Understand the dynamics of planetary motion and the working of Global Positioning System (GPS).
- Comprehend the different features of Simple Harmonic Motion (SHM) and wave propagation.

Course Code: **(B010102P)**
Course Title: **Mechanical Properties of Matter**

Course Outcome:

- Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the mechanical properties.
- Measurement precision and perfection is achieved through Lab Experiments.
- Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

Course Code: **(B010201T)**

Course title: **Thermal Physics & Semiconductor Devices**

Course Outcomes:

- Recognize the difference between reversible and irreversible processes.
- Understand the physical significance of thermodynamical potentials.
- Comprehend the kinetic model of gases w.r.t. various gas laws.
- Study the implementations and limitations of fundamental radiation laws.
- Utility of AC bridges.
- Recognize the basic components of electronic devices.
- Design simple electronic circuits.
- Understand the applications of various electronic instruments.

Course Code: **(B010202P)**

Course Title: **Thermal Properties of Matter & Electronic Circuits**

Course Outcomes:

Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the thermal and electronic properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

Course Code: **(B010301T)**

Course title: **Electromagnetic Theory & Modern Optics**

Course Outcome:

- Better understanding of electrical and magnetic phenomenon in daily life.
- To troubleshoot simple problems related to electrical devices.
- Comprehend the powerful applications of ballistic galvanometer.
- Study the fundamental physics behind reflection and refraction of light (electromagnetic waves).
- Study the working and applications of Michelson and Fabry-Perot interferometers.
- Recognize the difference between Fresnel's and Fraunhofer's class of diffraction.
- Comprehend the use of polarimeters.
- Study the characteristics and uses of lasers.

Course Code: **(B010302P)**

Course Title: **Demonstrative Aspects of Electricity & Magnetism**

Course Outcome:

Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the electric and magnetic properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

Course Code: **(B010401T)**
Course title: **Perspectives of Modern Physics & Basic Electronics**

Course Outcomes:

• Recognize the difference between the structure of space & time in Newtonian & Relativistic
mechanics.
• Understand the physical significance of consequences of Lorentz transformation equations.
• Comprehend the wave-particle duality.
• Develop an understanding of the foundational aspects of Quantum Mechanics.
• Study the comparison between various biasing techniques.
• Study the classification of amplifiers.
• Comprehend the use of feedback and oscillators.
• Comprehend the theory and working of optical fibers along with its applications.

Course Code: **(B010402P)**
Course Title: **Basic Electronics Instrumentation**

Course Outcomes:

Basic Electronics instrumentation has the most striking impact on the industry wherever the components /instruments are used to study and determine the electronic properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

Course Code: **(B010501T)**
Course title: **Classical & Statistical Mechanics**

Course Outcomes:

1. Understand the concepts of generalized coordinates and D'Alembert's principle.
2. Understand the Lagrangian dynamics and the importance of cyclic coordinates.
3. Comprehend the difference between Lagrangian and Hamiltonian dynamics.
4. Study the important features of central force and its application in Kepler's problem.
5. Recognize the difference between macrostate and microstate.
6. Comprehend the concept of ensembles.
7. Understand the classical and quantum statistical distribution laws.
8. Study the applications of statistical distribution laws.

Course Code: **(B010502T)**
Course title: **Quantum Mechanics & Spectroscopy**

Course Outcome:

1. Understand the significance of operator formalism in Quantum mechanics.
2. Study the eigen and expectation value methods.
3. Understand the basis and interpretation of Uncertainty principle.
4. Develop the technique of solving Schrodinger equation for 1D and 3D problems.
5. Comprehend the success of Vector atomic model in the theory of Atomic spectra.
6. Study the different aspects of spectra of Group I & II elements.
7. Study the production and applications of X-rays.
8. Develop an understanding of the fundamental aspects of Molecular spectra.

Course Code: **(B010503P)**
Course Title: **Demonstrative Aspects of Optics & Lasers**

Course Outcomes:

Experimental physics has the most striking impact on the industry wherever the instruments are used to study and determine the optical properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.

Course Code: **(B010601T)**
Course title: **Solid State & Nuclear Physics**

Course Outcomes:

1. Understand the crystal geometry w.r.t. symmetry operations.
2. Comprehend the power of X-ray diffraction and the concept of reciprocal lattice.
3. Study various properties based on crystal bindings.
4. Recognize the importance of Free Electron & Band theories in understanding the crystal properties.
5. Study the salient features of nuclear forces & radioactive decays.
6. Understand the importance of nuclear models & nuclear reactions.
7. Comprehend the working and applications of nuclear accelerators and detectors.
8. Understand the classification and properties of basic building blocks of nature.

Course Code: **(B010602T)**
Course title: Analog & Digital Principles & Applications

Course Outcomes:

1. Study the drift and diffusion of charge carriers in a semiconductor.
2. Understand the Two-Port model of a transistor.
3. Study the working, properties and uses of FETs.
4. Comprehend the design and operations of SCRs and UJTs.
5. Understand various number systems and binary codes.
6. Familiarize with binary arithmetic.
7. Study the working and properties of various logic gates.
8. Comprehend the design of combinational and sequential circuits.

Course Code: **(B010603P)**
Course Title: **Analog & Digital Circuits**

Course Outcomes:

Analog & digital circuits have the most striking impact on the industry wherever the electronics instruments are used to study and determine the electronic properties. Measurement precision and perfection is achieved through Lab Experiments. Online Virtual Lab Experiments give an insight in simulation techniques and provide a basis for modeling.