UNDERGRADUATE PROGRAMME COURSE OUTCOME

Name of the Programme: B.Sc. Physics

Name of the Class	Course Code	Course Title	Course Outcomes	
SEMESTER I				
F.Y.B.Sc.	PHY-111	Mechanics and Properties of Matter	CO1	The student will be able to understand Newton's laws and apply them in calculations of the motion of simple systems.
			CO2	The student will be able to understand the concepts of energy, work, power and conservation of energy.
			CO3	The student will be able to understand the concepts of elasticity.
			CO4	The student will be able to understand the concepts of surface tension and viscosity and be able to perform calculations using them.
			CO5	The student will be able to use Bernoulli's theorem in real life problems
F.Y.B.Sc.	PHY-112	Physics Principles and Applications	CO1	The students will be able to understand the general structure of atom, spectrum of hydrogen atom.
			CO2	The students will be able to understand the atomic excitation and LASER principles.
			CO3	The learners will understand the bonding mechanism and its different types.
			CO4	The learner will understand the types and sources of electromagnetic waves and applications.
			CO5	Quantitative problem solving skills will be developed.
F.Y.B.Sc.	PHY-113	Physics Laboratory-1A	CO1	The students will be able to use various instruments and equipment.

			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background of an experiment.
			CO4	The students will be able to setup experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze the data, plot appropriate graphs and reach conclusions from data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on a project/experiment.
			CO7	The students will be able to keep a well-maintained and instructive laboratory logbook.
SEMESTER II				
F.Y.B.Sc.	PHY-121	Heat and Thermodynamics	CO1	The learner will understand the properties of and relationships between the thermodynamic properties of a substance.
			CO2	The students will understand the ideal gas equation and its limitations and the real gas equation.
			CO3	The students will be able to analyse the heat engines and calculate thermal efficiency.
			CO4	The students will be able to analyze the refrigerators, heat pumps and calculate coefficient ofperformance.
			CO5	The students will be able to understand the types of thermometers and their usage.
F.Y.B.Sc.	PHY-122	Electricity and Magnetism	CO1	The students will be able to understand the concept of the electric force, electric field and electric potential for stationary charges.
			CO2	The students will be able to calculate electrostatic field and potential of charge distributions using Coulomb's law and Gauss's law.
			CO3	The students will be able to

				understand the dielectric phenomenon and effect of electric field on dielectric.
			CO4	The learners will be able to understand magnetic field for steady currents using Biot-Savart and Ampere's Circuital laws.
			CO5	Quantitative problem solving skills will be developed.
F.Y.B.Sc.	PHY-123	Physics Laboratory-1B	CO1	The students will be able to use various instruments and equipment.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background of an experiment.
			CO4	The students will be able to setup experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze the data, plot appropriate graphs and reach conclusions from data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on a project/experiment.
			CO7	The students will be able to keep a well-maintained and instructive laboratory logbook.
SEMESTER III				
S.Y.B.Sc.	PHY-231	Mathematical Methods in Physics-I	CO1	The learners will be able to understand the complex algebra useful in physics courses
			CO2	The students will be able to understand the concept of partial differentiation.
			CO3	The learners will be able to understand the role of partial differential equations in physics.
			CO4	The learners will be able to understand vector algebra useful in mathematics and physics
			CO5	The students will be able to understand the concept of singular points of differential equations

S.Y.B.Sc.	PHY-232	Electronics	CO1	The students will be able to apply different theorems and laws to electrical circuits.
			CO2	The learners will be able to understand the relations in electricity.
			CO3	The students will be able to understand the parameters, characteristics and working of transistors
S.Y.B.Sc	PHY-232	Instrumentation	CO1	The learners will be able to understand the concept of measurement.
			CO2	The students will be able to understand the performance of measuring instruments.
			CO3	The learners will be able to design experiments using sensors.
S.Y.B.Sc.	PHY-233	Physics Laboratory-2A	CO1	The students will be able to use various instruments and equipment.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background of an experiment.
			CO4	The students will be able to setup experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze the data, plot appropriate graphs and reach conclusions from data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on a project/experiment.
			CO7	The students will be able to keep a well-maintained and instructive laboratory logbook.
SEMESTER IV				
S.Y.B.Sc.	PHY-241	Oscillations, Waves, and Sound	CO1	The learners will be able to study underlying principles of oscillations and it's scope in development.
			CO2	The students will be able to understand and solve the equations / graphical representations of motion for simple harmonic, damped, forced

				oscillators and waves.
			CO3	The learners will be able to explain oscillations in terms of energy exchange with various practical applications.
			CO4	The learners will be able to solve numerical problems related to undamped, damped, forced oscillations and superposition of oscillations.
S.Y.B.Sc.	PHY-242	Optics	CO1	The students will be able to acquire the basic concept of wave optics.
			CO2	The learners will be able to describe how light can constructively and destructively interfere.
			CO3	The students will be able to explain why a light beam spread out after passing through an aperture
S.Y.B.Sc.	PHY-243	Physics Laboratory-2B	CO1	The students will be able to use various instruments and equipment.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background of an experiment.
			CO4	The students will be able to setup experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze the data, plot appropriate graphs and reach conclusions from data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on a project/experiment.
			CO7	The students will be able to keep a well-maintained and instructive laboratory logbook.
SEMESTER V				
T.Y.B.Sc.	PHY-351	Mathematical Methods in Physics-II	CO1	The students will be able to understand the basic concepts in different co-ordinate systems.
			CO2	The students will be able to use different mathematical methods to solve differential equations related to

				Physics problems.
			CO3	The students will be able to understand the basic concepts related to special theory of relativity.
			CO4	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-352	Electrodynamics	CO1	The students will be able to understand the concepts of electrostatics and magnetostatics.
			CO2	The students will be able to understand the basics of electrodynamics.
			CO3	The students will be able to understand the production and propagation of electromagnetic waves.
			CO4	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-353	Classical Mechanics	CO1	The students will be able to understand the basic concepts in Classical Mechanics.
			CO2	The students will be able to understand the comprehensive idea on the Lagrangian and Hamiltonian formulation.
			CO3	The students will be able to understand the dynamics of scattering process and planetary motion.
			CO4	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-354	Atomic and Molecular Physics	CO1	The students will be able to understand the origin of atomic and molecular spectra.
			CO2	The students will be able to understand the basic concepts and use of different spectroscopy.
			CO3	The students will be able to understand the differences among different spectroscopic techniques.
			CO4	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-355	Computational Physics	CO1	The students will be able to develop the flowchart and algorithm related to a problem.
			CO2	The students will be able to

				understand the basic concepts and syntax of C programming.
			CO3	The students will be able to use different numerical methods used to solve Physics problems.
			CO4	Object oriented problem solving skills will be developed.
T.Y.B.Sc.	PHY-356(B)	Elements of Materials Science	CO1	The students will be able to understand various methods involved in material synthesis and characterization.
			CO2	The students will be able to understand the importance of use of different instruments for material study.
			CO3	The students will be able to understand the basic concepts about the thin film technology
			CO4	The students will be able to understand the importance of use of thin films in different application and research.
T.Y.B.Sc.	PHY-357	Physics Laboratory-3A	CO1	The students will be able to use various instruments and equipment.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background to an experiment.
			CO4	The students will be able to set up experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze data, plot appropriate graphs and reach conclusions from your data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on the experiments.
			CO7	The students will develop a habit of keeping a well-maintained and instructive laboratory logbook.

T.Y.B.Sc.	PHY-358	Physics Laboratory-3B	CO1	The students will be able to work on a computer in Linux environment.
			CO2	The students will be able to write a C code to solve scientific problems numerically.
			CO3	The students will be able to design electronic circuits for different purposes.
			CO4	The students will be able to collect data through observation and/or experimentation and visualizing and interpreting data.
			CO5	The students will be able to understand the laboratory procedures including safety and scientific methods.
			CO6	The students will be able to understand the abstract concepts and theories by experiencing and visualizing them as authentic phenomena.
			CO7	The students will be able to acquire the complementary skills of collaborative learning and teamwork.
T.Y.B.Sc.	PHY-359	Project-I	CO1	The students will be able to understand a general definition of research design.
			CO2	The students will be able to design experiments to test a hypothesis.
			CO3	The students will be able to collect and analyze data to reach conclusions related to the hypothesis.
			CO4	The students will be able to work in a group to plan, implement and document on the systematic study to solve a research problem.
			CO5	The students will become familiar with ethical issues and plagiarism related to research and documentation.
T.Y.B.Sc.	PHY-3510(G)	Python Programming	CO1	The students will be able to develop the flowchart and algorithm related to a problem.
			CO2	The students will be able to understand the basic concepts and syntax of Python programming.
			CO3	The students will be able to use

				different Python modules to solve Physics problems.
			CO4	Object oriented problem solving skills will be developed.
T.Y.B.Sc.	PHY-3511(K)	Physics Workshop Skill	CO1	The students will be able to understand the working principles of different instruments.
			CO2	The students will be able to use different mechanical and electrical measuring instruments in Physics experiments.
			CO3	The students will be able to understand the working and use of CRO.
			CO4	The students will be able to understand the working and use of signal generators.
			CO5	The students will be able to develop different Impedance Bridges and Q-Meters for electrical experiments.
SEMESTER VI				
T.Y.B.Sc.	PHY-361	Solid State Physics	CO1	The students will be able to understand the basic concepts on structures and properties of materials.
			CO2	The students will be able to understand phenomenon of superconductivity and its properties.
			CO3	The students will be able to understand different experimental techniques used for characterization of materials.
			CO4	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-362	Quantum Mechanics	CO1	The students will be able to understand the basic concepts of quantum mechanics.
			CO2	The students will be able to understand the use of quantum mechanics to understand different physical system.
			CO3	The students will be able to use the quantum mechanical operator to for different physical problems.
			CO4	Quantitative problem solving skills will be developed.

T.Y.B.Sc.	PHY-363	Thermodynamics and Statistical Physics	CO1	The students will be able to understand the fundamental laws of thermodynamics.
			CO2	The students will be able to understand the basics of kinetic theory of gases.
			CO3	The students will be able to understand the fundamentals of statistical mechanics.
			CO4	The students will be able to understand quantum statistical laws governing different particles.
			CO5	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-364	Nuclear Physics	CO1	The students will be able to understand the basic concepts nucleus and its properties and nuclear forces.
			CO2	The students will be able to understand the working and use of particle accelerators and detectors.
			CO3	The students will be able to understand the concepts of radioactivity and nuclear reactions.
			CO4	The students will be able to understand the basic concepts of energy generation using nuclear fuel.
			CO5	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-365	Electronics-II	CO1	The students will be able to understand the fundamentals of working of semiconductor and special devices made out of it.
			CO2	The students will be able to understand the characteristics of special semiconductor devices.
			CO3	The students will be able to understand the basics logic gates and Boolean algebra to understand digital electronics.
			CO4	The students will be able to understand the applications of electronic devices for daily use.
			CO5	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-366(P)	Physics of Nanomaterials	CO1	The students will be able to understand the basic concepts about

				the Nano materials.
			CO2	The students will be able to understand the different techniques to synthesize nano materials.
			CO3	The students will be able to understand the different characterization techniques to study nano materials.
			CO4	The students will be able to understand the use of nano materials in design and synthesis of novel materials.
			CO5	Quantitative problem solving skills will be developed.
T.Y.B.Sc.	PHY-367	Physics Laboratory-4A	CO1	The students will be able to understand the working and use of various advanced instruments and equipments.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an unknown quantity.
			CO3	The students will be able to investigate the theoretical background to an experiment.
			CO4	The students will be able to set up experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze data, plot appropriate graphs and reach conclusions from your data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on the experiments.
			CO7	The students will develop a habit of keeping a well-maintained and instructive laboratory logbook.
T.Y.B.Sc.	PHY-368	Physics Laboratory-4B	CO1	The students will be able to understand the working and use of various advanced instruments and equipments.
			CO2	The students will be able to design experiments to test a hypothesis and/or determine the value of an

				unknown quantity.
			CO3	The students will be able to investigate the theoretical background to an experiment.
			CO4	The students will be able to set up experimental equipment to implement an experimental approach.
			CO5	The students will be able to analyze data, plot appropriate graphs and reach conclusions from your data analysis.
			CO6	The students will be able to work in a group to plan, implement and report on the experiments.
			CO7	The students will develop a habit of keeping a well-maintained and instructive laboratory logbook.
T.Y.B.Sc.	PHY-369	Project-II	CO1	The students will be able to understand a general definition of research design.
			CO2	The students will be able to design experiments to test a hypothesis.
			CO3	The students will be able to collect and analyze data to reach conclusions related to the hypothesis.
			CO4	The students will be able to work in a group to plan, implement and document on the systematic study to solve a research problem.
			CO5	The students will become familiar with ethical issues and plagiarism related to research and documentation.
T.Y.B.Sc.	PHY-3610(U)	Scientific Data Analysis using Python	CO1	The students will be able to understand the basics of data processing.
			CO2	The students will be able to generate proper data set for analysis after cleaning and binning the big data.
			CO3	The students will be able to develop a model and test it’s validity.
			CO4	The students will be able to visualize the data for better representation.
T.Y.B.Sc.	PHY-3611(AA)	Radiation Physics	CO1	The students will be able to understand the basics concepts related to interaction of radiation with matter.

			CO2	The students will be able to measure the amount of exposed radiation using different radiation detectors.
			CO3	The students will be able to understand the different source of nuclear radiation.
			CO4	The students will be able to understand the use of radiation shielding.