Programme Objectives	Title of the Programme
➢ To impart basic knowledge in the discipline of Physics including its phenomenology, theories, concepts, general principles and techniques. ➢ To enable the students to have a thorough exposure to the different branches of Physics so as to gain a comprehensive knowledge in the subject of Physics. ➢ To understand the links of Physics to other disciplines and also to the societal issues. ➢ To bridge the gap between the plus two and post graduate levels of Physics by providing a more complete and logical framework in almost all the areas of basic Physics.	**Integrated M.Sc. Physics**
➢ The objective of the course is to create awareness in the field of Physics and cultivate scientific approach and research aptitude among the graduate students in various subjects of physics and emerging extensions of research activities. ➢ The task includes preparation, enhancement etc. of human resources in strengthening the activities for the development of basic scientific knowledge, skills and application of scientific approach. ➢ An independent project is included in the course so that the candidate knows about the flavour of research methodology in science.	**M.Sc. Physics**
➢ The objective of the course is to cultivate scientific approach and culture of research aptitude among the post-graduate students in the field of physics and other related activities. ➢ The task includes preparation, enhancement etc. of human resources in strengthening the activities for the development of basic scientific knowledge, skills, application of scientific approach etc. so as to derive the best from the same. ➢ This helps to carry out research problem independently and individually in a perfect scientific method.	**M.Phil. Physics**

Programme Specific Outcome	**1. Int. M.Sc. Physics -** To bridge the gap between the plus two and post graduate levels of Physics by providing a more complete and logical framework in almost all the areas of basic Physics
	2. M.Sc. Physics - An independent project is included in the course so that the candidate knows about the flavour of research methodology in science.
	3. M.Phil. Physics - The task includes preparation, enhancement etc. of human resources in strengthening the activities for the development of basic scientific knowledge, skills, application of scientific approach etc. so as to derive the best from the same

Course Outcome: Integrated M.Sc. Physics

S. No.	Title of Subject/Course	Course Outcome
1.	Properties of Matter and Sound	➢ To study the basics of elasticity and its importance in beams, girders, concepts of viscosity and surface tension and the various methods to determine the parameters experimentally. ➢ To study Free, damped and forced vibration and applications of sound.
2.	Mechanics and Relativity	➢ To be able analyse and explain vector nature of force, acceleration, momentum, torque and able to apply Newton's laws to physical problems. ➢ Relativity deals with motions with very high velocities comparable to the speed of light.
3.	**Practical I :** General	➢ To be able to understand the concepts of mechanics, properties of matter and sound through different experiments. ➢ To acquire the basic trouble shooting skills and appreciate Physics concepts through experiments
4.	Optics and Spectroscopy	➢ To understand the concepts of Dispersion of Light, interference, diffraction and polarization of light waves and their applications. ➢ A basic knowledge of the principles which govern optics is essential for any science graduate. ➢ To study the principles of MW, IR, Raman and Resonance Spectroscopy and its applications.
5.	Electricity and Electromagnetism	➢ To study Gauss theorem and its applications and also the principle and types of capacitors. ➢ To understand the principle of Magnetostatics, magnetic effects of electric current and their applications. ➢ To understand the principle of electromagnetic induction and ac circuits.
6.	**Practical II :** Optics	➢The learner will be able to understand a set of optical laws by using spectrometer, Interferometer etc.
7.	Basic Electronics	➢ To know the basic concepts of physics of semiconductors and basic principles of biasing and transistor amplifiers ➢ It will enable the student to design simple electronic circuits for the laboratory and home with thehelp of knowledge gained through this course
8.	**Core practical - III:** Heat and Electricity	The learner will be able to understand the thermal conductivity, specific heat and voltmeter, ammeter calibration.

9.	Thermal and Statistical Physics	➢ To provide a thorough understanding on heat, temperature, work, energy and entropy ➢ To introduce macroscopic thermodynamics to microscopic view through ideal gas, kinetic theory and natural extension to statistical thermodynamics.
10.	Core practical - IV: Electronics	➢ The learner will be able to understand the basic working of discrete components and their characteristics. ➢ To learn to construct various oscillators ➢ To learn simple digital electronic experiments with ICs.
11.	**NME- II:** Biomedical Instrumentation	➢ The principle, design and working of various biomedical instruments are dealt in a simple manner. ➢ It will stimulate the students to understand the design and functioning of various medical equipment
12.	Digital Electronics	➢ To learn various numbers systems ➢ To study and apply the knowledge in some simple combinational digital circuits ➢To know about the principle and various types of registers and counters
13.	Atomic Physics	➢ To study in detail about the atom model ➢To know about the internal structure of the atom and the electronic configuration ➢ To have a detailed knowledge about the photoelectric effect and X-rays.
14.	Classical and Quantum mechanics	➢ The subject imparts an understanding of the basic laws of classical mechanics i.e.,Physics of massed particles movement are introduced. ➢ Most of the experimentally observed phenomena in Modern Physics are explained only by Quantum mechanics. ➢ This paper deals with wave mechanics, which is one formulation of Quantum mechanics and perturbation theory.
15.	Numerical and Mathematical Methods	➢ Basic mathematical methods which are required for physics problems are introduced ➢ Introducing simple numerical method on polynomial and expose to numerical calculus.
16.	**Core practical – V:** Digital Electronics & Computer Programming In C Language	➢ The learner will be able to understand all the logic gates and operation. ➢ To be able to write programmes by using C coding
17.	Solid State Physics	➢ This paper deals with the applications of Physics applied to study of solids and the relationshipsbetween their structures and properties.

		➢ This paper serves as pre-requisite to study the optional subjects such as materials science, nanoscience, etc.
18.	Nuclear Physics	➢ Nuclear energy has got a great significance in the present scenario. ➢ This paper gives ideas about radio activity, which has got industrial, medical, research applications etc. ➢ This paper gives ideas about Elementary particles, which is the basis of High Energy Particle Physics.
19.	**SBC – II:** Electronic Devices	➢ To present the basic tools for an understanding of the fundamental electronic devices. ➢ To develop an interest in the learning of advanced devices and their designing aspects.
20.	**Elective:** Energy Physics	➢ To understand the different kinds of Energy Sources ➢ To study the basics of Renewable & Non-renewable energy sources ➢ To learn the fundamental principles and theory of Solar, Wind energy ➢ To understand the Biogas production from Biomass ➢ To study the Ocean Energy and additional alternate energy sources.
21.	Geophysics	➢ To develop an interest in the learning of geophysics. ➢ To understand about the features of geophysics from different methods such as gravity, electrical, magnetic, seismic and radiometric methods etc.
22.	Astrophysics	➢ Enrich the students with a thorough knowledge about celestial coordinate systems. ➢ To learn the stellar classification schemes and H-R diagrams, masses and radii of stars.
23.	Acoustics	➢ This paper gives ideas about sound and its wave motion. ➢ This paper serves as pre-requisite to study the applications of sound. This paper gives ideas about sound and its wave motion. ➢ This paper serves as pre-requisite to study the applications of sound.
24.	Lasers and Optics	➢ To understand the properties and characteristics of LASER, its operation. ➢ Enable the students to learn the basic principles and concepts of Fiber optics

Course Outcome: M.Sc. Physics

S. No.	Title of Subject/Course	Course Outcome
1.	Classical Mechanics	➢ To demonstrate concept and understanding of the following fundamental topics in: • the dynamics of system of particles, • motion of rigid body, • Lagrangian and Hamiltonian formulation of mechanics ➢ To represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulation of classical mechanics. ➢To develop familiarity with the physical concepts and facility through methods of classical mechanics. ➢ To understand the theory of Relativity.
2.	Mathematical Methods of Physics - I	➢ To introduce the students equip to be the basic techniques of mathematical Physics and able to solve physical problems. ➢ To identify various types of matrices and explain how one type of matrix differs from another. ➢ To develop expertise in vector differential calculus operators in order to learn Electro Magnetic Theory those are required in Physics.
3.	Quantum Mechanics – I	➢ To understand and explain the differences between classical and quantum mechanics ➢ To understand the idea of wave function ➢ To understand the uncertainty relations ➢ To solve Schrodinger equation for four simple problems.
4.	Electronics and Experimental methods	➢ To enhance comprehensive capabilities of students through understanding of electronic devices. ➢ To give clear understanding of various fabrication techniques of semiconducting devices. ➢ To understand the physical construction, working and operational characteristics of Semiconductor devices. ➢ To introduce the basic building blocks of linear integrated circuits and digital Converters.
5.	Numerical Analysis	➢ To demonstrate the understanding of common numerical methods and how they are used to obtain approximate solutions to

		otherwise intractable mathematical problems**.** ➢ Apply numerical methods to obtain approximate solutions to mathematical problems. ➢ Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
6.	**Practical I –** Optics and Lasers	➢ The students will able to extract the optical constants with spectrometer and to understand the advanced experiments using lasers.
7.	**Practical II -** ELECTRONICS	➢ To measure the OP-amp characteristics and simple experiments with it. ➢ To draw the characteristics of discrete power devices. ➢ To learn the counters and registers
8.	Mathematical Methods of Physics – II	➢ To understand the basic concepts of group theory ➢ To solve partial differential equations with appropriate initial or boundary conditions with Green function techniques ➢ To use complex analysis in solving physical problems.
9.	Quantum Mechanics – II	➢ To understand time dependent perturbation theory in quantum mechanics. ➢ Tounderstand how to apply perturbation theory to describe scattering ➢ Tounderstand the operator formulation of quantum mechanics.
10.	Electromagnetic Theory	➢ To make the student understand the principles of electrostatics and magneto statics. ➢ To enable the student to explore the field of electrodynamics ➢ Knowledge of, physical interpretation, and ability to apply Maxwell's equations to determine field waves, potential waves, energy and charge conservation conditions
11.	Microprocessors and Microcontrollers	➢ An in-depth understanding of the architecture and working of microprocessors and micro controllers has become a necessity for researchers, system developers, as well as programmers ➢ To study the Architecture of 8086 microprocessor. ➢ To learn the design aspects of I/O and Memory Interfacing circuits. ➢ To study about communication and bus

		interfacing. ➢ To study the Architecture of 8051 microcontroller.
12.	**Practical III –** Microprocessor and Microcontrollers	➢ To solve the arithmetic operations using microprocessor ➢ To explore the interfacing using the microcontroller.
13.	**Practical IV –** Atomic and Nuclear Physics	➢ To carry out experiments using GM counter ➢ To measure some physical constants such h and spectroscopic g.
14.	Thermodynamics and Statistical Physics	➢ To understand the basics of thermodynamics and Statistical systems. ➢ To understand the basic concepts in phase transition ➢ Define the concepts of heat, work, and energy. ➢ To acquire the knowledge of various statistical distributions. ➢ To comprehend the concepts of enthalpy, phase transitions and thermodynamic functions
15.	Solid State Physics	➢ This course has its give an introduction to the physical properties of solids and applications ➢ This course will empower the students in the field of research of material sciences, solid state devices etc. ➢ The course requires a pre-requisite a knowledge in the basic quantum mechanics. ➢ The students will gain a knowledge in the application and designing of solid state devices.
16.	Nuclear and Particle Physics	➢ To study the general properties of nucleus. ➢ To study the nuclear forces and nuclear reactions. ➢ To know about the theories and models of nucleus. ➢ To understand the concept of elementary particles ➢ Understanding of various particle interactions and their interrelation ➢ Relation of basic laws of particle physics and macroscopic physics phenomena
17.	Laser and Spectroscopy	➢ Identify the basic components of spectroscopic instrumentation. ➢ Demonstrate a working knowledge of mass spectroscopy (MS), Ultraviolet Visible (UV-Vis) spectroscopy, Infrared (IR)

		spectroscopy, and Nuclear Magnetic Resonance (NMR) spectroscopy. ➢ Elucidate the structures of organic molecules from spectral data. ➢ To apply and use laser spectroscopic instruments in practice.
18.	**Practical V –** Solid State Physics	➢ Learn to measure the dielectric constant of liquid & solid, resistivity, bandgap, ionic conductivity, specific heat ➢ To identify phase transition in ferroelectric materials
19.	**Practical VI –** Materials Science	➢ To learn the preparation of thinfilm ➢ To analyse the XRD pattern to get cell, grain size ➢ To the analyse the sample data from SEM, FTIR, UV-Vis spectrophotometer
20.	Materials Science	➢ To Give basic knowledge of science behind materials & physical metallurgy. ➢ Introduce the concept of structure property relations, mechanical behaviour of materials, phase diagram, heat treatment, failure of materials & their protection, applications of Recent materials. ➢ Develop intuitive understanding of the subject to present a wealth of real world engineering examples to give students a feel of how material science is useful in engineering practices.

Course Outcome: M.Phil. Physics

S. No.	Title of Subject/Course	Course Outcome
1.	Research Methodology	➢ To provide a qualitative idea on the fundamentals of research and types and methods of research. ➢ This paper will serve as an eye opener for students keen in research activities particularly in Physics ➢ To equip on publishing the research outputs adopting accepted standards
2.	Advanced Physics	➢ To apply the concepts and theories of a range of advanced topics in physics ➢ To demonstrate an understanding of the close relationship between scientific research and the development of new knowledge in a global context.
3.	Materials Science of Thin Films	➢ This course aims at developing a comprehensive understanding of thin film deposition principles and techniques. ➢ Film properties are correlated to the material used, as well as the microstructure that has been developed during the deposition process.

		➢ Students will acquire the knowledge and develop the skill to design thin film systems and select appropriate deposition techniques through materials, microstructure, property and economic considerations.
4.	Magnetism in Solids	➢To understand the source of a materials magnetic behaviour and be able to distinguish types of magnetism ➢To identify crystal lattices and their structures
5.	Energy Storage Materials	➢To introduce the basic concepts, physical/chemical principles and key materials applied in the latest technologies for energy conversion and storage processes, with focuses of developing a comprehensive understanding of materials used for energy conversion and storage devices.
6.	Physical Properties of Materials	➢ To introduce the tensor aspect of physical properties and their relation to symmetry ➢ To learn mechanical, electrical, optical, magnetic, ferroelectric, magneto optic tensor properties and their measurements.
7.	Crystal Growth and Characterization	➢To provide a qualitative idea on the fundamentals of growing crystals and characterizing the grown samples. ➢This paper will serve as an eye opener for students keen in research activities particularly in experimental physics.
8.	Nanophysics	➢The course will introduce the students to the rapidly developing field of nanoscience and technology with special focus on the methods of synthesis, characterization techniques and applications of nanomaterials with physics emphasis. ➢The course is expected to provide the necessary understanding in nanotechnology and the students must be able to perform their project works related to the synthesis and characterization of nanomaterials by direct experience.
9.	Advanced Nuclear Physics	➢The students should able to use symmetries, conservation laws and kinematical conditions in order to give physical explanations for nuclear physics process. ➢Able to calculate nuclear physics quantities and processes. ➢Describe how the structure of nuclei is related to the many-body system of interacting nucleons