

Department of Physics

BSC PHYSICS

The department offers B.Sc. Physics model 1 programme for students under choice based credit system which was revised latest in 2017 by M.G. University. The programme comprised a total of 41 courses which include 12 core courses, 10 common courses, 8 complementary courses, 6 core practical, 2 complimentary practical and 1 course of project, 1 open course and a choice based course with a total of 120 credits. The syllabus of each course is framed so as the programme is able to raise the scientific temper of the scholar and provide a firm foundation in every aspect of Physics and to explain a broad spectrum of modern trends in physics and to develop experimental, computational and mathematics skills.

Programme Outcomes

By the successful completion of the undergraduate programme, the student will be competent in

- Logical and critical thinking
- Achieving a desire for higher education and self learning
- Academic as well as extracurricular activities that will enable them to become skilled professionals.
- Developing a sensible and unbiased conclusion by gathering information from various reliable sources.
- Developing communication and coordination skills for employment and entrepreneurship.
- Growing into an accountable social reformer by igniting own scientific temper
- Acquiring awareness of environmental issues and ethics and take responsibilities that promote sustainable and green habitat.
- Attaining harmony and compassionate with different socio-cultural traditions

Programme Specific Outcomes

Through the B.Sc. Physics programme, the students will be able to

- Understand the contributions of the scientific community and to develop research aptitude and scientific temper
- Develop various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively.
- Get strong foundations in physics and develop basic experimental skills
- Acquire fundamental concepts of mathematics and chemistry
- Understand the theories behind various physical phenomena.
- Acquire skills to solve both theoretical and experimental scientific problems
- Interpret the inferences from verbal, mathematical and graphical data.
- Perform various task using their creativity, intellectual capacity, innovative thoughts and enthusiasm with precision and responsibility
- Ascertain their area of interest in academic and R&D and get prepared for competitive exams.

Course Outcomes

Outcome	
Semester 1	
PH1CRT01-Methodology and Perspectives of Physics	
CO1	Acquire an overview on the development of physics giving emphasis on the scientific contributions of the great scientists.
CO2	Introduction of different number systems and their applications in the digital era.
CO3	Introduce the vector analysis and coordinate systems with applications in different

	fields of physics
CO4	Study various measuring instruments in physics, generation and propagation of errors in an experiment.
Semester II	
PH2CRT02- Mechanics and Properties of Matter	
CO1	Provide foundations in the theory of wave motions and oscillations
CO2	Build theoretical basis of rotational mechanics and some mechanical properties of materials
CO3	Introduction of hydrodynamics and its real life applications
PH2CRP01 – Mechanics and Properties of Matter	
CO1	Acquire engineering skills in setting up of the experiment, systematic analysis of the experimental data and to estimate errors in measurement.
CO2	Provide a practical training with experiments in areas of rotational mechanics, hydrodynamics and properties of matter
Semester III	
PH3CRT03: Optics, Laser and Fiber Optics	
CO1	Provide necessary foundations in wave optics.
CO2	Understand the theoretical treatment of interference in different conditions and familiarize the principles of interferometers.
CO3	Study the successful theoretical explanations of diffraction and polarization in different conditions.
CO4	Understand the basic working principle of Laser and different types of lasers. Familiarize applications of lasers in different fields.
Semester-IV	
PH4CRT04: Semiconductor Physics	
CO1	The course is intended to give necessary fundamentals to design electronic circuits.
CO2	Introduces the principles of semiconductor components such as diodes, transistors, OPAMP, JFET etc.
CO3	Study the working of amplifiers and oscillators and different types of modulation in communication fields
PH2CRP02 – Optics and Semiconductor Physics	

CO1	Students got an experimental realization of what they learned in optics and semiconductor physics.
CO2	Students are expertise in constructing electronic circuits and familiarize themselves with the use of Cathode Ray Oscilloscope.
Semester-V	
PH5CRT05: Electricity And Electrodynamics	
CO1	Lay a sound theoretical foundation in electricity and electrodynamics
CO2	Comprehend various phenomena and applications around them related to electric and magnetic field.
CO3	Acquire practical knowledge to handle electronic gadgets and explain its working principle
PH5CRT06: Classical And Quantum Mechanics	
CO1	Understand the basic concepts of constraints and the formulation of Lagrangian and Hamiltonian.
CO2	Appreciate the historical development and origin of quantum mechanics. Understand the basic mathematical formulation of quantum mechanics.
CO3	Apply the Schrodinger equation for solving the problem of a particle in a box
PH5CRT07: Digital Electronics And Programming	
CO1	Introduction of the fundamental concepts and techniques used in digital electronics.
CO2	Design various logic gates and simplify Boolean equations.
CO3	Studying the Boolean algebra and simplification of Boolean expression using different methods.
CO4	Design basic combinational and sequential logic circuits.
CO5	Outline the basic concepts of OOPs
PH5CRT08: Environmental Physics And Human Rights	
CO1	Understand their basic rights as well as ways and means to prevent the violation of rights.
CO2	Identify different means of harnessing solar energy and its advantages
CO3	Introduction to the major environmental problems its causes and potential solutions
CO4	Introduction to various types of natural resources(renewable and non renewable), impact of humans on these resources, and general resource management practices

CO5	Provide introductory knowledge about the fundamentals and applications of remote sensing
PH5OPT01: Our Universe	
CO1	Help students to comprehend the cosmos and its origin and to develop scientific attitude and aptitude
CO2	Give introductory ideas of origin of universe, stellar evolution and solar system
CO3	Understand the different coordinate systems so as one to locate and report the position of a celestial object.
Semester-VI	
PH6CRT09: Thermal And Statistical Physics	
CO1	Define the concept of entropy and explain its physical significance.
CO2	Explain Lees Disc experiment and can calculate the thermal conductivity by experimentally.
CO3	Explain fundamental concepts of statistical mechanics
CO4	Derive Maxwell-Boltzmann, Bose - Einstein and Fermi Dirac distribution laws and compare the laws.
PH6CRT10: Relativity And Spectroscopy	
CO1	Explain special theory of relativity.
CO2	Derive Lorentz transformation equations.
CO3	Explain relativistic time dilation and length contraction. Derive Einstein's mass energy relation
PH6CRT11: Nuclear, Particle Physics and Astrophysics	
CO1	Introduction of the various properties of nucleus and the nuclear forces
CO2	Introduction of the concept of radioactivity and the theory of α , β and γ -decay in radioactivity
CO3	A brief introduction to nuclear radiation detectors and particle accelerators
CO4	Introduction to Particle Physics and Astrophysics
PH6CRT12: Solid State Physics	
CO1	Realize the importance of crystallography in solid state physics
CO2	Classify materials as metals, semiconductors and insulators based on band theory.

	Distinguish various chemical bonding in common crystal structures.
CO3	Enables one to understand basic electric and magnetic properties of solids and the theoretical framework of the same
PH6CBT02: Material Science (Choice based Course)	
CO1	Provide the basic fundamentals of material science
CO2	Students will get an insight in the relationship between structure and properties of the materials in an engineering point of view.
CO3	Apart from the conventional materials the course introduces advanced engineering materials such as LCD, metallic glasses and nanomaterials to the students
CO4	Students will empowered on the different material characterization techniques
PH6CRP03-Electricity, Magnetism and Laser	
CO1	This course offers experiments in electricity, magnetism and Laser
CO2	Students would gain practical knowledge on the working and applicability of potentiometer, galvanometer and magnetometers in different areas.
CO3	Students will be enabled to use Lasers and optics for measuring experimental parameters.
PH6CRP04-Digital Electronics	
CO1	Course expected to provide sound foundation and practical knowledge in basic digital electronics devices
PH6CRP05- Thermal Physics, spectroscopy and C++programming	
CO1	Students are trained to set up experiments using spectrometers and able to systematically acquire and analyze the data.
CO2	Students are made capable of doing programming in C++.
PH6CRP06-Acoustics,Photonics, and Advanced semiconductor physics	
CO1	Students will be capable of doing experiments with acoustics and photonics devices.
CO2	Students will design and construct electronic circuits and devices and communication systems.
Complementary Physics for Mathematics	
Semester I	
PH1CMT01-Properties of Matter and Error Analysis	

CO1	Introduction to the basic ideas of Elasticity- modulus of elasticity, beams, bending moment.
CO2	Study various measuring instruments in physics, generation and propagation of errors in an experiment.
CO3	To learn basic theories of hydrodynamics and its real life applications
Semester II	
H2CMT01-Mechanics And Astrophysics	
CO1	Introduction of gravity and experimental arrangements for measuring acceleration due to gravity at a place.
CO2	Students will understand the theories of oscillations- simple harmonic motion, damped oscillations, forced oscillations and progressive waves
CO3	Students will learn rotational dynamics -Angular momentum, torque, moment of inertia and mechanism of flywheel.
CO4	Students will become familiar with Astrophysics
Semester III	
PH3CMT01-Modern Physics and Electronics	
CO1	Students will be able to explain the history of atom models from plum pudding model to vector atom model
CO2	Students will gain basic ideas of properties of nucleus, binding energy and radioactivity
CO3	Students will get a general idea about the Physics of semiconductors and the working of diodes, rectifiers and transistors
CO4	Introduction of different types of number systems and binary arithmetic
CO5	Explain the inadequacies of classical physics and experimental evidences for quantum theory.
CO6	Obtain the Schrodinger equation and use it for solving the problem of a particle in a box
Semester IV	
PH4CMT01-Optics and Electricity	
CO1	By providing basic foundations in wave optics,students will understand phenomena like

	interference, diffraction and polarization
CO2	Introduction to varying currents - analysis of LCR Circuits
CO3	Students will gain deeper understanding in ideas of dielectrics
CO4	Understand the basic working principle of Laser and its applications.
CO5	Develop a knowledge on the theory of light propagation through fibres.
Complementary Physics for Chemistry	
Semester I	
PH1CMT02-Properties of Matter and Thermodynamics	
CO1	Students are expected to gain basic ideas of Elasticity- modulus of elasticity, beams, bending moment.
CO2	Student will learn about basic thermodynamics laws and theorems
CO3	The course gives an introduction of hydrodynamics and its real life applications
Semester II	
PH2CMT02-Mechanics and Superconductivity	
CO1	Students will acquire knowledge about waves and oscillations- simple harmonic motion, damped oscillations, forced oscillations.
CO2	The course provide understanding in rotational dynamics -Angular momentum, torque, moment of inertia, flywheel
Semester III	
PH3CMT02-Modern Physics and Magnetism	
CO1	Students will be able to explain the history of atom models from plum pudding model to vector atom model
CO2	Students will gain basic ideas of properties of nucleus, binding energy and radioactivity
CO3	Students will get a general idea about the Physics of semiconductors and the working of diodes, rectifiers and transistors
CO4	Explain the inadequacies of classical physics and experimental evidences for quantum theory. Obtain the Schrodinger equation and use it for solving the problem of a particle

	in a box.
Semester IV	
PH4CMT02-Optics and Solid State Physics	
CO1	By providing basic foundations in wave optics, students will understand phenomena like interference, diffraction and polarization
CO2	Students will get basic ideas and importance of solid state Physics
CO3	Understand the basic working principle of Laser and its applications.
CO4	Develop a knowledge on the theory of light propagation through fibres.