Department of Physics

Programme outcome for Honours

PO1 Logical thinking : A graduate Physics honours student will be capable of think and analyze logically with scientific view.

PO2 Laboratory skill : Student will be capable of applying the scientific methods to design , perform and demonstrate experiments with skill.

PO3 Communication skillts : Students will be capable of communicating scientifically and can convince any arguments logically to others.

PO4 Environmental aspects : The roots of most of the recent environmental problems are explained by the theories underlying in Physics. A physics student may be able to find out the causes of various environmental crisis to overcome the harmful situations.

PO5 Ethics : A Physics student will be able to appreciate the impact of physics in social, economical, and environmental issues

PO6 Social interactive skill : A Physics students will be able to identify, analyze and solve the various problems faced by the society in daily life which can be justified by the underlying theories of Physics.

PO7 Self improvement and lifelong learning: A Physics graduate will have confidence in his ability and will be motivated for lifelong learning.

PSO (Programme specific outcome for Physics Honours)

PSO1: Graduate Physics honours students will acquire clear knowledge in mathematics.

PSO2: Students will get clear ideas about the basic mechanism of the instruments and machines used in everyday life.

PSO3: Physics students will learn various computer languages.

PSO4: Physics students will aware of simple and complex electrical circuits and networks.

PSO5: Students will have knowledge of electronics, IC, gates etc help the Physics graduate students to establish themselves in modern smart technological world

Course outcome (Physics Department)

For the year 2018-2019,2019-2020,2020-2021

Year	Papers	Course	Outcomes
Semester 1	CC1 (Mathematical Physics I)	CO1	The topics of the course are effective for the students because • It includes basic mathematical physics. • develops required mathematical skills to solve problems in other fields of theoretical physics. • It helps the students to grow the programming skill to solve the different kind of physics problems.
	CC2 (Mechanics)	CO2	Students will get a deep understanding of • Laws of mechanics • differential equations • dynamics of cl. mechanics • the experiments relating the laws of mechanics.
Semester 2	CC3 (Electricity & Magnetism)	CO3	This course is very beneficial for the students because

			• It gives the idea of interactions of charged and magnetic materials and a fundamental understanding of electromagnetic phenomena. • Students can understand the basic mathematical concepts related to electromagnetic vector fields, functions of different circuits and networks. • Experiments with electrical circuits , network theorem and magnetism strengthen their theoretical studies.
	CC4 (Waves & Optics)	CO4	Students will acquire the concrete idea about • different types of oscillating nature and characteristics of waves. • it gives a thorough learning of functions of waves in optics.

			• The theoretical studies become strengthen by the experiments relating various phenomena of waves .

Year	Papers	Course	Outcomes
Semester 3	CC5 (Mathematical Physics II)	CO5	Students will be familiarized with different types of differential equations They will also be able to solve Fourier series and also be familiarized with some special type of integration. They will also be familiarized with computational language to solve the above equations.
	CC6 (Thermal Physics)	CO6	Students will learn • the foundation of thermal Physics. • The ideas about the systems in stable equilibrium. • Laws of thermodynamics along with entropy . • about Statistical mechanics and Kinetic theory. • about the different measuring devices which

			show variations with tempe-rature. • They also learn the process of calibration.
	CC7 (Digital Systems and Applications)	CO7	Students will get the basic idea about • technique of building integrated circuits, logic gates, Boolean algebra etc. • the constructions of combinational and sequential circuits using logic circuits and their applications in laboratory.
	SEC-A (Basic programming and Scientific word processing)	CO23	This course is very effective to the students because it includes from algorithms, flowcharts, basic programming in FORTRAN/C, to Gnuplot, introduction to LaTeX word processor, equation representation, picture environment etc.

	SEC-A (Electrical circuits and Network Skills)	CO24	Students will understand the electrical circuits, electrical drawing , theories and operations of generators, transformers etc, solid state devices and elec trical wiring . This course is very effective and beneficial for the students .
Semester 4	CC8 (Mathematical Physics-III)	CO8	Students will learn in details of complex numbers and how to solve complex integration. They will also learn the basics of probabilities and special theory of relativity. Students will learn to solve the problems studied in theory by the application through programming

	CC9 (Elements of Modern Physics)	CO9	Students will learn the history behind the development of quantum mechanics. It also develops the mathematical framework for studying quantum mechanics which has various applications in other fields of physics. The course also provides basic concept of structure of nucleus and Radioactivity phenomena. Experiments based on theoretical studies help students to get a clear concept of the course.

	CC10 (Analog systems & Applications	CO10	After the completion of the course, Students will be able to : • learn about the significance of electric components, • various devices and their operations • can analyze dc circuits and relate ac models of semiconductor devices with their physical operations • understand rectification, amplification, transistor etc. • design and analyze of electronic circuits, OPAMP, amplifiers etc.
	SEC-B (Computer Algebra System & Figure Drawing Skill)	CO25	This course helps the students to be competent with elementary symbolic computation using CAS, figure generation using drawing tools like xfig, latexdraw etc, .
	SEC-B (Renewable Energy and Energy Harvesting)	CO26	Students will get an idea about the renewal of various types of non-conventional energy sources. Students learn the energy harvesting procedure from solar energy, wind energy, ocean, geothermal ,

			hydro, piezoelectric and electromagnetic energy.

Year	Papers	Course	Outcomes
Semester 5	CC11 (Quantum Mechanics & its application)	CO11	- Students will get an idea of difference between classical & quantum mechanics. - They will be familiar with various aspects of quantum mechanical approach and its applications. - Solutions of Schrodinger wave equation for various atomic and molecular systems make the students to correlate with the theory.
	CC12 (Solid state)	CO12	In this branch of study, - students will learn to apply the methods of quantum mechanics, crystallography and electromagnetism in real crystalline systems. - They will come to know the reason underlying the interpretation of the physical properties of solids. - At the end of the course students will

			learn crystal structure, lattice dynamics, magnetic properties and superconductivity.
	DSE-A1 (Advanced Mathematical Methods-I)	CO15	• Students will acquire knowledge about the fundamental concepts of a special topic (linear Algebra) in mathematical physics. • will be familiar with basic calculus and will be able to solve the basic differential equations by computation.
	DSE-A1 (Communication electronics)	CO16	• Students will be taught to analyze and design noise-free analog and digital communication systems. • They will have a clear concept of different modulation techniques. . • They will have a clear concept of satellite communication which is currently a very important topic and idea about GPS navigation system.

	DSE-B1 (Advanced Mathematical Methods-II)	CO17	Students will get a clear knowledge about Cartesian and general tensors, transformation of coordinates, group, lie group, lie algebra etc. which help them in future in formulating various complex mathematical problems.
	DSE-B1 (Nuclear and Particle Physics)	CO18	On completing the Nuclear & Particle Physics course, students will get a clear idea about • Nuclear model, reactions and interactions of radiation with matter. • Detectors , accelerators and the concepts of particle physics and the quark model
Semester 6	CC13 (E.M Theory)	CO13	Students will be taught different coordinate systems. This course helps them to familiarize with the different concepts of electrostatic, magneto static and time varying electromagnetic systems, and their applications in practical problems. Students will have strengthened their concepts by the experiments based on e.m theory.

	CC14 (Statistical Mechanics)	CO14	Students will get the idea of • basic statistical methods and concepts. • thermodynamical parameters. • Computaion of the problems based on statistical theory and plotting functions..
	DSE-A2 (Astronomy and Astrophysics)	CO19	Students will have the basic ideas about astronomical systems, scale and distances .They will learn the techniques of observations of stellar objects, the sun and solar family, the milky way, galaxies and the expanding universe.
	DSE-A2 (Advanced Dynamics)	CO20	This Course will give the students a working knowledge of Analytical Mechanics. They will be taught how a physical system might alter or develop over time. A student studying the course will be exposed to various types of oscillations and the wonder of chaos. They will be familiar with the computational visualisation of fractal nature in logistic map

DSE-B2 (General Relativity)	CO21	Students will have the basic concepts of fundamental principles of the general theory of relativity, the equivalence principles, inertial frames, motion in the gravitational field, time dilation and frequency shifts, etc. Students can apply the mathematical and physical ideas of the theory of general relativity for the study of various systems in astrophysics and cosmology.
DSE-B2 (Nano Materials & Applications)	CO22	After completing this course students will be able to: • learn about the background on Nano science, • understand the synthesis of nanomaterials, their applications and the impact of nanomaterials on environment. understand the basic electronic and optical nanomaterial properties and application in various electronics devices.

Mapping of PO AND CO

PO1 Logical thinking	PO2 Laboratory skill	PO3 Communication skill	PO4 Environmental aspects	PO5 Ethics	PO6 Social interactive skill	PO7 Self improvement and lifelong learning

CO1	C01	C023	CO26	CO18	CO2	CO1
CO5	CO2	CO24	CO19	CO9	CO3	CO3
CO7	CO3	CO25	CO22	CO4	CO4	CO7
CO8	CO4	CO26	CO13	CO3	CO6	CO5
CO10	CO5	CO16	CO9	CO6	CO9	CO8
CO15	CO6		CO3	CO26	CO13	CO10
CO17	CO7		CO4		CO18	CO15
	CO8				CO22	CO16
	CO9					CO17
	CO10					CO19
	CO11					CO20
	CO12					CO21
	CO13					CO22
	CO14					CO23
	CO20					CO24
						CO25