

Holy Cross College (Autonomous), Nagercoil
Kanyakumari District, Tamil Nadu.
Accredited with A⁺ by NAAC - IV cycle – CGPA 3.35

Affiliated to
Manonmaniam Sundaranar University, Tirunelveli



Semester I & II

POs, PSOs & COs

DEPARTMENT OF PHYSICS



2023-2026

(With effect from the academic year 2023-2024)

DEPARTMENT OF PHYSICS



PG PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Upon completion of M. Sc. Physics Programme, the graduates will be able to:	Mapping with Mission
PEO1	apply scientific and computational technology to solve social and ecological issues and pursue research.	M1, M2
PEO2	continue to learn and advance their career in industry both in private and public sectors.	M4 & M5
PEO3	develop leadership, teamwork, and professional abilities to become a more cultured and civilized person and to tackle the challenges in serving the country.	M2, M5 & M6

PG PROGRAMME OUTCOMES (POs)

POs	Upon completion of M.Sc. Physics Degree Programme, the graduates will be able to:	Mapping with PEOs
PO1	apply their knowledge, analyze complex problems, think independently, formulate and perform quality research.	PEO1 & PEO2
PO2	carry out internship programmes and research projects to develop scientific and innovative ideas through effective communication.	PEO1, PEO2 & PEO3
PO3	develop a multidisciplinary perspective and contribute to the knowledge capital of the globe.	PEO2
PO4	develop innovative initiatives to sustain ecofriendly environment	PEO1, PEO2
PO5	through active career, team work and using managerial skills guide people to the right destination in a smooth and efficient way.	PEO2
PO6	employ appropriate analysis tools and ICT in a range of learning scenarios, demonstrating the capacity to find, assess, and apply relevant information sources.	PEO1, PEO2 & PEO3
PO7	learn independently for lifelong executing professional, social and ethical responsibilities leading to sustainable development.	PEO3

PROGRAMME SPECIFIC OUTCOMES (PSOS)

PSO	Upon completion of M.Sc. Physics Degree Programme, the graduates of Physics will be able to:	Mapping with POs
PSO-1	have well-defined knowledge on theoretical concepts and experimental methods of advanced physics.	PO1 & PO2
PSO-2	acquire skills in performing advanced physics experiments and projects using modern technology and numerical simulations.	PO3, PO4 & PO5
PSO-3	develop and communicate analytical skills ranging from nuclear to cosmology to progress in the expanding frontiers of physics.	PO6
PSO-4	apply and interpret physics principles in various physical observations. Demonstrate proficiency in analyzing, applying and solving Scientific problems.	PO1, PO7
PSO-5	use the techniques, skills, and modern technology necessary to communicate effectively with professional and ethical responsibility. Understand the impact of Physics in a global, economic, environmental, and societal context.	PO7

Strong -S (3), Medium – M (2), Low – L (1)

PO-PSO mapping

POs	PSO1	PSO2	PSO3	PSO4	PSO5
PO 1	S	S	M	S	M
PO 2	S	S	S	S	M
PO 3	S	S	S	M	S
PO 4	M	M	M	M	S
PO 5	S	S	M	M	S
PO 6	M	M	M	M	M
PO 7	S	S	M	M	S

Course Outcomes

SEMESTER – I

CORE COURSE I: MATHEMATICAL PHYSICS

Course Code: PP231CC1

On the successful completion of the course, student will be able to:		
CO1	understand use of bra-ket vector notation and explain the meaning of complete orthonormal set of basis vectors, and transformations and be able to apply them.	K1, K2
CO2	able to understand analytic functions, do complex integration, by applying Cauchy Integral Formula. Able to compute many real integrals and infinite sums via complex integration.	K2, K3
CO3	analyze characteristics of matrices and its different types, and the process of diagonalization.	K4
CO4	solve equations using Laplace transform and analyze the Fourier transformations of different function, grasp how these transformations can speed up analysis and correlate their importance in technology	K4 , K5
CO5	to find the solutions for physical problems using linear differential equations and to solve boundary value problems using Green's function. Apply special functions in computation of solutions to real world problems	K2, K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6– Create

SEMESTER – I

CORE COURSE II: CLASSICAL MECHANICS AND RELATIVITY

Course Code: PP231CC2

Upon completion of this course the students will be able to:		
CO1	understand the fundamentals of classical mechanics.	K2
CO2	apply the principles of Lagrangian mechanics to solve the equations of motion of physical systems.	K3
CO3	apply the principles of Hamiltonian mechanics to solve the equations of motion of physical systems.	K3
CO4	analyze the small oscillations in systems and determine their normal modes of oscillations.	K2, K4
CO5	understand and apply the principles of relativistic kinematics to the mechanical systems.	K2, K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6– Create

SEMESTER – I

CORE COURSE III: LINEAR AND DIGITAL ICS AND APPLICATIONS

Course Code: PP231CC3

On the successful completion of the course, student will be able to:		
CO1	remember the basic concepts for the circuit configuration for the design of linear integrated circuits and develops skill to solve problems	K1 & K2
CO2	develop skills to design linear and non-linear applications circuits using Op-Amp and design the active filters circuits.	K2 & K3
CO3	apply knowledge about PLL, and develop the skills to design the simple circuits using IC 555 timer and can solve problems related to it.	K2& K5
CO4	analyze about various techniques to develop A/D and D/A converters.	K4 & K5
CO5	evaluate and to create the knowledge about the CMOS logic, combinational and sequential circuits	K3& K6

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create

SEMESTER – I

ELECTIVE COURSE I: a) ENERGY PHYSICS

Course Code: PP231EC1

On the successful completion of the course, students will able to:		
CO1	to identify and understand the various forms of renewable and non-renewable energy sources	K1 & K2
CO2	understand the principle of utilizing the oceanic energy and apply it for practical applications	K2 & K3
CO3	discuss the working of a windmill and analyze the advantages of wind energy.	K4
CO4	evaluate the aerobic digestion process from anaerobic digestion.	K5
CO5	understand the components of solar radiation, their measurement and apply them to utilize solar energy	K2 & K3

K1 - Remember; **K2** – Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER – I

ELECTIVE COURSE I: b) CRYSTAL GROWTH AND THIN FILMS

Course Code: PP231EC2

On the successful completion of the course, student will be able to:		
CO1	acquire the Basic Concepts, Nucleation and Kinetics of crystal growth	K1
CO2	understand the Crystallization Principles and Growth techniques	K2, K4
CO3	study various methods of Crystal growth techniques	K3
CO4	understand the Thin film deposition methods	K2
CO5	apply the techniques of Thin Film Formation and thickness Measurement	K3, K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6– Create

SEMESTER – I

ELECTIVE COURSE I: c) MATERIAL SCIENCE

Course Code: PP231EC3

On the successful completion of the course, students will able to:		
CO1	acquire knowledge on optoelectronic materials	K1
CO2	be able to prepare ceramic materials	K3
CO3	be able to understand the processing and applications of polymeric materials	K2& K3
CO4	be aware of the fabrication of composite materials	K5
CO5	be knowledgeable of shape memory alloys, metallic glasses and nanomaterials	K1

K1 - Remember; K2 – Understand; K3 - Apply; K4 - Analyze; K5 – Evaluate

SEMESTER – I

CORE LAB COURSE I: ADVANCED PHYSICS LAB I

Course Code: PP231CP1

On the successful completion of the course, students will able to:		
CO1	understand the strength of material using Young's modulus.	K2
CO2	acquire knowledge of thermal behaviour of the matetials.	K1
CO3	understand theoretical principles of magnetism through the experiments.	K2
CO4	acquire knowledge about the applications of laser	K1
CO5	improve the analytical and observation ability in Physics experiments	K4
CO6	analyze various parameters related to operational amplifiers.	K4

CO7	understand the concepts involved in arithmetic and logical circuits using IC's	K2
CO8	acquire knowledge about Combinational Logic Circuits and Sequential Logic Circuits	K3
CO9	analyze the applications of counters and registers	K4

K1 - Remember; **K2** – Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER I
SPECIFIC VALUE ADDED COURSE
COMPUTER MAINTENANCE
Course Code: PP231V01

COs	Upon completion of this course, students will be able to:	
CO- 1	understand the basic components of a computer	K1
CO- 2	install different types of operating systems	K2
CO- 3	to assemble and disassemble a personal computer	K3
CO- 4	to troubleshoot the problems	K3

SEMESTER – I
LIFE SKILL TRAINING – I ETHICS
Course Code: PG23LST1

Course Outcomes	On completion of this course the student will be able to	
CO1	understand deeper insight of the meaning of their existence.	K1
CO2	recognize the philosophy of life and individual qualities	K2
CO3	acquire the skills required for a successful personal and professional life.	K3
CO4	develop as socially responsible citizens.	K4
CO5	create a peaceful, communal community and embrace unity.	K3