

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)

Programme Educational Objectives (PEOs)

PEOs	Upon completion of B.A/B.Sc. degree programme, the graduates will be able to	Mission addressed
PEO 1	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.	M1& M2
PEO 2	inculcate practical knowledge for developing professional empowerment and entrepreneurship and societal services.	M2, M3, M4 & M5
PEO 3	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.	M3, M4, M5 & M6

Programme Outcomes (POs)

POs	Upon completion of B.Sc. Degree Programme, the graduates will be able to:	Mapping with PEOs
PO1	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.	PEO1
PO2	create innovative ideas to enhance entrepreneurial skills for economic independence.	PEO2
PO3	reflect upon green initiatives and take responsible steps to build a sustainable environment.	PEO2
PO4	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.	PEO1 & PEO3
PO5	communicate effectively and collaborate successfully with peers to become competent professionals.	PEO2 & PEO3
PO6	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	PEO2 & PEO3
PO7	participate in learning activities throughout life, through self-paced and self-directed learning to improve knowledge and skills.	PEO1 & PEO3

Programme Specific Outcome (PSOs)

PSOs	Upon completion of B.Sc. Physics Degree Programme, the graduates of Physics will be able to:	Mapping with POs
PSO - 1	understand the core theories and principles of physics which include mechanics, thermodynamics, electronics, material science etc.	PO1
PSO - 2	develop extensive comprehension of fundamental and diverse applications of Physics.	PO2 & PO3
PSO - 3	apply knowledge of principles, concepts in Physics and analyze their local, national and global impact. Apply the critical reasoning and computing skills to analyze and solve problems in physics.	PO4 & PO5
PSO - 4	analyze the observed experimental data and relate the results with theoretical expectations. Communicate appropriately and effectively, in a scientific context using present technology.	PO6
PSO - 5	develop entrepreneurial skills, empowered according to the professional requirement and become self-dependent. Understand the professional, ethical, legal, security, social issues and responsibilities.	PO5 & PO7

Mapping of PO'S and PSO'S

POs	PSO1	PSO 2	PSO3	PSO4	PSO5
PO 1	S	S	S	S	S
PO 2	M	S	S	S	S
PO 3	M	M	M	S	S
PO4	M	M	S	S	S
PO5	M	M	S	S	S
PO6	M	M	S	S	S
PO7	S	S	S	S	S

Course Outcomes

SEMESTER – I

CORE COURSE -I: PROPERTIES OF MATTER AND ACOUSTICS

Course Code : PU231CC1

On the successful completion of the course, student will be able to:		
1	relate elastic behaviour in terms of three moduli of elasticity and working of torsion pendulum.	K1 & K2
2	appreciate concept of bending of beams and analyze the expression, quantify and understand nature of materials.	K2 & K3
3	explain the surface tension and viscosity of fluid and support the interesting phenomena associated with liquid surface, soap films provide an analogue solution to many engineering problems.	K2 & K3
4	analyze simple harmonic motions mathematically and apply them. understand the concept of resonance and use it to evaluate the frequency of vibration. Set up experiment to evaluate frequency of ac mains.	K1 & K3
5	understand the concept of acoustics, importance of constructing buildings with good acoustics. Also, to apply their knowledge of ultrasonics in real life, especially in medical field and assimilate different methods of production of ultrasonic waves.	K2 & K3

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER – I

CORE COURSE LAB – I: GENERAL PHYSICS LAB I

Course Code : PU231CP1

On the successful completion of the course, students will able to:		
1.	understand the strength of material using Young's modulus.	K2
2.	acquire knowledge of thermal behaviour of the materials.	K1
3.	analyze the physical principle involved in the various instruments	K4
4.	understand the scientific method and an ability to apply the scientific method in practice.	K2

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

K6– Create

SEMESTER – I
ELECTIVE COURSE –I: ALLIED PHYSICS FOR MATHEMATICS – I
Course Code : PU231EC1

On the successful completion of the course, student will be able to:		
1	acquire knowledge on elementary ideas of waves, properties of matter, electricity and magnetism, electronics	K1 & K2
2	analyze the concepts of ultrasonics, surface tension and study their applications in the medical field.	K3
3	interpret the real-life solution using concepts of electricity, magnetism, and electronics in Digital India.	K2
4	apply their depth knowledge of Physics in day today life.	K3
5	develop their knowledge to carry out the practical by applying these concepts of Physics	K3

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER – I
ELECTIVE LAB COURSE I: ALLIED PHYSICS PRACTICAL FOR
MATHEMATICS – I
Course Code : PU231EP1

On the successful completion of the course, student will be able to:		
1	understand the basic principles of Physics through experiments.	K2
2	measure and determine the various physical parameters.	K3
3	develop an idea about the handling of various instruments.	K2
4	get an idea about basic Scientific knowledge and implications of its broad working principle	K2 & K3
5	analyze, interpreting and evaluate data.	K3 & K4

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

K6– Create

SEMESTER – I

NON MAJOR ELECTIVE NME I: PHYSICS FOR EVERYDAY LIFE

Course Code : PU231NM1

On the successful completion of the course, student will be able to:		
1	understand the knowledge of basic scientific principles and fundamental concepts in motion of bodies.	K2
2	understand the basic laws of physics in domestic appliances	K2
3	recall the physics notions applied in various optical instruments	K1
4	comprehend the utilization of solar energy in everyday life activities	K2
5	know about the various physicists contribution towards science and technology	K2

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER I

FOUNDATION COURSE: INTRODUCTORY PHYSICS

Course Code : PU231FC1

On the successful completion of the course, student will be able to:		
1	apply concept of vectors to understand concepts of Physics and solve problems	K2 & K3
2	interpret different forces present in Nature while learning about phenomena related to these different forces.	K1 & K2
3	describe energy in different process and relate momentum, velocity and energy	K1 & K2
4	differentiate different types of motions they would encounter in various courses and understand their basis	K1 & K2
5	relate various properties of matter with their behavior and connect them with different physical parameters involved.	K2 & K3

K1 - Remember; **K2** - Understand; **K3** - Apply

SEMESTER I
SPECIFIC VALUE-ADDED COURSE: PHOTOSHOP
Course Code : PU231V01

On the successful completion of the course, student will be able to:		
CO 1	use photoshop confidently and effectively.	K3
CO 2	gain the skills and abilities to use photoshop that make them employable	K6
CO 3	create and edit images	K6
CO4	use a range of tools and filters in <i>photoshop</i>	K3

SEMESTER – II
CORE COURSE -II: HEAT, THERMODYNAMICS AND STATISTICAL PHYSICS
Course Code : PU232CC1

On the successful completion of the course, student will be able to:		
1.	acquires knowledge on how to distinguish between temperature and heat, and explain practical measurements of high temperature as well as low temperature physics.	K1 & K2
2.	derive the efficiency of Carnot's engine and discuss the implications of the laws of Thermodynamics in diesel and petrol engines	K1 & K3
3.	analyze performance of thermodynamic systems viz efficiency by problems and gets an insight into thermodynamic properties like enthalpy, entropy	K2 & K3
4.	study the process of thermal conductivity and apply it to good and bad conductors.	K2 & K3
5.	interpret classical statistics concepts such as phase space, ensemble, Maxwell-Boltzmann distribution law, Bose-Einstein and Fermi-Dirac .	K2 & K3

K1 - Remember; K2 - Understand; K3 - Apply

SEMESTER – II

CORE LAB COURSE - II: GENERAL PHYSICS LAB II

Course Code : PU232CP1

On the successful completion of the course, students will able to:		
1.	understand the strength of materials using physical experiments.	K2
2.	acquire knowledge of thermal behaviour of the materials.	K1
3.	analyze the physical principle involved in the various instruments such as sonometer and Melde's String.	K4
4.	understand the scientific method and an ability to apply the scientific method in practice.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze

SEMESTER - II

ELECTIVE COURSE –II: ALLIED PHYSICS FOR MATHEMATICS – II

Course Code : PU232EC1

On the successful completion of the course, student will be able to:		
CO1	explain the concepts of interference, diffraction and rephrase the concept of polarization	K1 & K2
CO2	outline the basic foundation of different atom models and relate the importance of theoretical models	K1 & K2
CO3	understand the properties of nuclei, nuclear forces, structure of atomic nucleus and nuclear models and interpret nuclear processes like fission and fusion.	K2& K3
CO4	describe the basic concepts of relativity like equivalence principle, inertial frames and Lorentz transformation.	K3 & K4
CO5	summarize the working of semiconductor devices like diodes, transistors, USB chargers and EV charging stations.	K4& K5

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

SEMESTER – II
ELECTIVE LAB COURSE - II : ALLIED PHYSICS PRACTICAL FOR
MATHEMATICS II
Course Code : PU232EP1

On the successful completion of the course, students will able to:		
1.	understand the nature of monochromatic light and its diffraction and interference phenomenon.	K2
2.	able to design simple logic circuits	K3
3.	analyze the physical principle involved in the various instruments	K4
4.	understand the scientific method and an ability to apply the scientific method in practice.	K2

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

SEMESTER – II
NON MAJOR ELECTIVE: NME II: PHYSICS OF MUSIC
Course Code : PU232NM1

On the successful completion of the course, student will be able to:		
1.	understand the principles and basic scientific concepts in sound waves	K2
2.	understand the various phenomena of simple vibrating systems.	K1
3.	comprehend the various musical notes and its production	K2
4.	apply the knowledge of recording music in day to day life activities.	K3
5.	know the scientific concepts of music	K2

K1 - Remember; K2 - Understand; K3 - Apply

SEMESTER – II
SKILL ENHANCEMENT COURSE SEC-I - DIGITAL PHOTOGRAPHY
Course Code : PU232SE1

On the successful completion of the course, student will be able to:		
1	describe the principle of image formation in Photography	K2
2	apply the parameters for controlling the images	K3
3	identify different types of camera	K4
4	explain the image formation in Digital Photography	K2
5	illustrate the digital image – postproduction procedures	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

SEMESTER I & II
Life Skill Training I: Catechism
Course Code: UG232LC1

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values

SEMESTER I & II
Life Skill Training I: Moral
Course Code: UG232LM1

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values