

Hajee Karutha Rowther Howdia College

(Autonomous)

Uthamapalayam 625 533, Theni District.



Department of Physics

Programme Specific Outcomes (PSOs)

Programme Outcomes (POs)

Course Outcomes (COs)

B.Sc. Physics

Programme Specific Outcomes (PSOs):

PS01: Students will have successful professional careers in academics as well as in the public/ private sectors in the field of physics, mathematics and environmental sciences

PS02: The students will be capable enough to acquire basic and specialist science skills, their use and incorporation to boost their confidence and faith, for effective personal and professional development

PS03: Student will be able to gain holistic knowledge about the environment that is essential for being a responsible citizen to protect nature

PS04: Students will be equipped with a lifelong learning process for self-sustainability, employability and leadership roles in our dynamic society

PS05: Students will be provided with value-based ethical leadership in professional and social life

Programme Outcomes (POs):

PO1: Identify key concepts, principles and fundamental laws that are central to the study of various areas of physics, define and describe them with clarity

PO2: Be able to communicate the physics contents effectively both in oral and written form.

PO3: Explain the mathematical foundation of the underlying physics principles, concepts and laws

PO4: Plan and execute an experiment through careful observations and precise measurements for the proper designing of the next level experimental physics

PO5: Recognize the need for and have an ability to present a brief lecture, writing scientific reports, projects, dissertation and engage in debates and discussions

Course Outcomes (COs):

Course Code: 20UPHC11	Course Title: Mechanics and Relativity
Course Outcomes (COs): CO1: Know the basic concept of motion of bodies through Newton's laws of motion and collision theory CO2: Understand theorems and its applications to rotational motion CO3: Apply Kepler's laws of planetary motion for the study of earth. CO4: Knowing the applications of rocket principles and various frames of reference CO5: Apply various concepts and its applications of special theory of relativity	

Course Code: 20UMAA11	Course Title: Mathematics-I
Course Outcomes (COs): CO1: Find the nature of the roots of an equation CO2: Solve higher degree equations using various methods CO3: Explain statistical data to find measures of central tendency, dispersion and location. CO4: To solve the correlation coefficient for a Bivariate frequency distribution CO5: Apply Probability methods in real world problem	

Course Code: 20UPHC21	Course Title: Electricity and Magnetism
Course Outcomes (COs): CO1: Know the basic concept of charges and its field and potential CO2: Understand methods of storage of electrical charges CO3: Study the motion of charges and its applications CO4: Knowing the magnetic effects of moving charges CO5: Apply various concepts and its applications of alternating currents	

Course Code: 20UPHC2P	Course Title: Major Practical-I
Course Outcomes (COs): CO1: Estimate the value of Young's modulus of a given wooden scale, the value of Rigidity modulus of a given wire and determine acceleration due to gravity. CO2: Estimate the viscosity of a given liquid and Comparison of capacitances using B.G and Owen's bridge CO3: Calibration experiments using Potentiometer CO4: Experiments related to optics and sound CO5: Experiments related to heat transport phenomena	

Course Code: 20UMAA21

Course Title: Mathematics-II

Course Outcomes (COs):

CO1: Extend the concept of differentiation in vector algebra

CO2: Find the complete solution of a differential equation with constant coefficients by variation of parameters

CO3: Solve linear differential equations with constant coefficients using Laplace transform.

CO4: Classify and appropriate methods to solve the first order non-linear partial differential equations.

CO5: Explain Proposition and argument. To solve propositional connectives.

Course Code: 20UPHC31

Course Title: Heat and Thermodynamics

Course Outcomes (COs):

CO1: Recall the basic knowledge on Kinetic theory of gases.

CO2: Discuss the transport phenomena of the gas

CO3: Categorize the fundamental laws of thermodynamics

CO4: Survey the concept of entropy and its physical significance.

CO5: Analyse the basic principles of thermodynamic potential and applications of Maxwell's relations

Course Code: 20UPHC32

Course Title: Optics

Course Outcomes (COs):

CO1: Recall the laws of reflection, refraction and the terminology of lenses

CO2: Appraise the phenomena of Dispersion

CO3: Describe the optical interference mechanism

CO4: Acquire the knowledge on creating the optical diffraction phenomena

CO5: Apply the phenomena basic concepts of Polarization

Course Code: 20UCHA11

Course Title: Organic, Inorganic and Physical
Chemistry - I

Course Outcomes (COs):

CO1: Recall the preparation and properties of hydrides, oxides, hardness of water and its implications.

CO2: Classify the colloidal states of matter and its applications

CO3: Demonstrate the reactions of glucose, fructose and sucrose and relate their uses

CO4: Explain the concept of enantiomers, diastereoisomers and geometrical isomers

CO5: Identify the properties, classification and functions of proteins and dyes

Course Code: 20UPHC41

Course Title: Modern Physics

Course Outcomes (COs):

CO1: Students will understand various Atomic models

CO2: Appraise the origin and uses of X-rays

CO3: Describe the dual nature of particles

CO4: Acquire the knowledge on Quantum Mechanics

CO5: Apply objects Quantum Mechanics in various micro

Course Code: 20UPHC42

Course Title: Mathematical Physics

Course Outcomes (COs):

CO1: Describe the mathematical basis of vectors and their application in physics problems.

CO2: Explain the concept of eigen vectors and eigen values and their physical meaning.

CO3: Demonstrate the application of tensors in physics

CO4: Comprehend the theorems of complex analysis.

CO5: Describe the usefulness of Fourier series in solving problems associated with periodicity.

Course Code: 20UPHC4P

Course Title: Major Practical-II

Course Outcomes (COs):

CO1: Estimate the value of Young's modulus of a given wooden scale, the value of Rigidity modulus of a given wire and determine acceleration due to gravity.

CO2: Estimate the viscosity of a given liquid and Comparison of capacitances using B.G and Owen's bridge

CO3: Calibration experiments using Potentiometer

CO4: Experiments related to optics and sound

CO5: Experiments related to heat transport phenomena

Course Code: 20UCHA21

Course Title: Organic, Inorganic and Physical Chemistry - II

Course Outcomes (COs):

CO1: Analyze the physical concepts of photochemistry

CO2: Explain the basic terms, isomerism and theories involved in coordination compound

CO3: Apply the column, thin layer and paper chromatographic techniques to separate and identify the components present in a mixture

CO4: Recall about chemotherapy and classify the drugs as sulpha, antimalarials, antibiotics and arsenical drugs

CO5: Identify the concepts of thermodynamics and its significance

Course Code: 20UCHA2P

Course Title: Volumetric Analys

Course Outcomes (COs):

CO1: Build basic quantitative skills in volumetric analysis with the use of burette, pipettes and standard flasks

CO2: Apply acidimetric and alkali metric method for the quantitative volumetric estimation of acids and bases

CO3: Estimate the amount of inorganic compounds permanganometrically

CO4: Demonstrate the quantitative estimation of Potassium dichromate iodometrically

CO5: Plan the laboratory hygiene and safety

M.Sc. Physics

Programme Specific Outcomes (PSOs):

PSO1: Physics Post Graduates are expected to be well prepared for pursuing successful careers on Academics (Government, PSU & Private sector) in one or more of the areas of Basic and applied sciences

PSO2: They are expected to be prepared to become academicians, team leaders and decision makers in their organizations and shall contribute effectively to the growth and development of their respective organizations.

PSO3: They are expected to specialize in physics and its various specializations or interdisciplinary studies of their interest to develop and enhance their own stature for effective contribution to the profession and society at large.

PSO4: Students will be equipped with the lifelong learning process for self-sustainability, employability and leadership roles in our dynamic society

PSO5: They are expected to be prepared to be a researcher and shall contribute effectively to the growth and development of the nation.

Programme Outcomes (POs):

PO1: Identify key concepts, principles and fundamental laws that are central to the study of various areas of physics, define and describe them with clarity

PO2: Be able to communicate the physics contents effectively both in oral and written form.

PO3: Explain the mathematical foundation of the underlying physics principles, concepts and laws

PO4: Plan and execute an experiment through careful observations and precise measurements for the proper designing of the next level experimental physics

PO5: Recognize the need for and have an ability to present a brief lecture, write scientific reports, projects, dissertations and engage in debates and discussions

Course Outcomes (COs):

Course Code: 20PPHC11

Course Title: Mathematical Physics – I

Course Outcomes (COs):

CO1: Describe the mathematical basic of vectors and their application in physics problems

CO2: Explain the concept of vectors and Eigen values and their physical meaning.

CO3: Explain the beta gamma and special functions

CO4: Solve the basic concepts on Fourier transform.

CO5: Evaluate the differential equations.

Course Code: 20PPHC12

Course Title: Classical Dynamics

Course Outcomes (COs):

CO1: Gain solid foundation in the mechanics of particles and its extension to lagrangian function

CO2: Analyse the concept of hamiltonian equation and its physical significance

CO3: Apply the concept of canonical transformation and to gain knowledge on lagrange and poisson brackets

CO4: Evaluate the moment of inertia of rigid bodies

CO5: Analyse the concept of hamiltonian equation its physical significance

Course Code: 20PPHC13

Course Title: Advanced Electronics

Course Outcomes (COs):

CO1: Analyse the performance of semiconductor devices

CO2: Analyse performance of IC 741 and IC555 and able to design oscillator circuit using IC741

CO3: Design Binary counters and registers

CO4: Classify different memory and storage devices

CO5: Analyse different Programmable logic devices

Course Code: 20PPHC1P

Course Title: Practical – I

Course Outcomes (COs):

CO1: Understand the basic applications of Op-Amp

CO2: Analyze the characteristics of Transistors

CO3: Experiments related to heat and light

CO4: Estimate the Self-inductance of coil using Anderson's bridge

CO5: Analyze the characteristics of Solar cell and LDR

Course Code: 20PPHE11

Course Title: Crystal Growth And Thin Film Techniques

Course Outcomes (COs):

CO1: Understand the nucleation mechanisms and the various factors of nucleation for crystal growth

CO2: Acquire the knowledge on the concepts of various growth techniques

CO3: Understand the different thin film deposition techniques.

CO4: To familiarize with physics and techniques involved in the measurement and characterization of thin films.

CO5: Analyze the crystal structure and morphology using different characterization techniques.

Course Code: 20PPHE12

Course Title: Fibre Optics Communication

Course Outcomes (COs):

CO1: Understand the optical fibre communication, propagation and transmission.

CO2: Classify the types of optical fibre and different fibre fabrication techniques

CO3: Explore the properties of semiconductors and its applications

CO4: Familiar with construction and characteristics of optical sources and Power launching coupling methods.

CO5: Analyze the losses (Attenuation) in fibre and Splicing techniques

Course Code: 20PPHC21

Course Title: Mathematical Physics II

Course Outcomes (COs):

CO1: Instruct about basic properties of complex functions and related theorems.

CO2: Inculcate about basic properties of complex variables and related theorems

CO3: Develop knowledge on the basic concepts on Laplace transform

CO4: Describe the properties and usage of special functions in physics and elucidate the characteristics of orthogonal polynomials.

CO5: Recognise to apply the mathematical concepts to solve the problems

Course Code: 20PPHC22

Course Title: Electromagnetic Theory

Course Outcomes (COs):

CO1: Understand the concepts on electrostatics and to use Gauss's law in various applications.

CO2: Analyze the theory of magnetostatics - viz Biot- Savart's law, Ampere's circuital law and magnetic vector potential.

CO3: Derive Maxwell's equation in differential and integral form, propagation of EM waves through different media.

CO4: Acquire the knowledge of the various modes of propagation of EM waves in wave guides.

CO5: Discuss about Retarded potentials, the Lienard - Wiechert potentials and Electric - Magnetic dipole radiation.

Course Code: 20PPHC23	Course Title: Quantum Mechanics I
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Course Outcomes (COs):

CO1: Compare classical mechanics and Quantum mechanics. Basic concepts of wave function

CO2: Understand the Uncertainty, Expectation values, and Ehrenfest's theorem, schrodinger equation and concept of wave function.

CO3: Comprehend about the Observables and various operators (Hermitian, dirac function, Eigen function)

CO4: Learn about square well potential and linear Harmonic oscillator (schrodinger and linear operator methods)

CO5: Elaborate interaction between the particles, spin properties and quantum analysis of particles (deuteron)

Course Code: 20PPHC2P	Course Title: Practical II
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Course Outcomes (COs):

CO1: Analyze the basic applications of Op-amp

CO2: Demonstration of interference patterns

CO3: Understand the characteristics of Photo diode and photo transistors

CO4: Study of the charge of electron through optics

CO5: Experiments related to heat transport phenomena

Course Code: 20PPHE21	Course Title: Quantitative Aptitude and Reasoning
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Course Outcomes (COs):

CO1: Understand the basic knowledge about H.C.F & L.C.M.

CO2: Solve problem on percentage, profit & loss, ratio & proportion and partnership.

CO3: Solve area and time related problems.

CO4: Familiar with verbal reasoning and mathematical operations.

CO5: Recognise the analytical reasoning and other logical non-verbal reasoning.

Course Code: 20PPHE22	Course Title: Microprocessors
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Course Outcomes (COs):

CO1: Discuss the internal architecture and resources of 8085 microprocessor

CO2: Understand the programming techniques

CO3: Know about counters and time delay functions

CO4: Analyze the code conversions and the interrupts

CO5: Explore the interfacing data convertors (DAC& ADC)

Course Code: 20PPHC31	Course Title: Quantum Mechanics – II
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Course Outcomes (COs):

CO1: Describe the Degenerate and non degenerate case

CO2: Explain the concept of Approximation Methods

CO3: Explain the symmetric and anti symmetric functions

CO4: Solve the Problems on three dimensional problem

CO5: Understand the concepts of Relativistic equation

Course Code: 20PPHC32	Course Title: Condensed Matter Physics – I
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Course Outcomes (COs):

- CO1:** Understand the basic properties of Crystal structures
- CO2:** Analyze the inner structures of crystal
- CO3:** Understand the nature of bonding
- CO4:** Understand the crystal vibration
- CO5:** Analyze the characteristics of conductivity

Course Code: 20PPHC3P	Course Title: Practical – III
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Course Outcomes (COs):

- CO1:** Understand the basic applications of Op – Amp
- CO2:** Understand about solar spectrum and Planck's constant
- CO3:** Know about IC 555 timer
- CO4:** Know about interference and diffraction pattern
- CO5:** Know the dielectric parameters

Course Code: 20PPHE31	Course Title: Thermodynamics and Statistical Mechanics
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Course Outcomes (COs):

- CO1:** Understand the fundamental laws of thermodynamics
- CO2:** Understand the concept of gases and its phase transition using thermodynamical laws.
- CO3:** Understand the basic concepts of statistical mechanics.
- CO4:** Knowledge about types of distributions
- CO5:** Acquainted with the advanced topics where related to quantum theory.

Course Code: 20PPHE32	Course Title: Cosmophysics
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Course Outcomes (COs):

- CO1:** List Astro physically relevant radiation mechanisms, and identify them based on their spectral properties.
- CO2:** Understand the concept of time and types of telescopes.
- CO3:** Understand the concept of aura and solar flares.
- CO4:** Qualitatively discuss the structure of a star and its properties. Experimental support for the existence of darkmatter and dark energy.
- CO 5:** Understand the properties and evolution of different types of galaxies.

Course Code: 20PPHC41	Course Title: Condensed Matter Physics - II
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Course Outcomes (COs):

- CO1:** Understand the natures of semiconductors
- CO2:** Analyze the characteristics of dielectric materials
- CO3:** Analyze the optical properties of semiconductor
- CO4:** Understand the magnetic properties
- CO5:** Know the applications of superconductivity

Course Code: 20PPHC42	Course Title: Nuclear, Particle and Astrophysics
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Course Outcomes (COs):

CO1: Describe the different types radioactive decays and their properties.

CO2: Evaluate the life time of α -decay β -decay and express the properties of nuclear energies.

CO3: Understand the classifications of elementary particles.

CO4: Gain the basic information about the stars and clusters

CO5: Understand the concept of solar activity and other celestial objects

Course Code: 20PPHC4P	Course Title: Practical IV
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Course Outcomes (COs):

CO1: Determine the susceptibility of diamagnetic materials using Quincke's method and Guoy's method.

CO2: Determine the Hall Voltage of given semiconductor.

CO3: Design and construct 4bit up-down binary counters and Shift registers using flip flops.

CO4: Estimate the viscosity of liquid using meyer's oscillation method.

CO5: Determine the velocity of sound and adiabatic of compressibility of liquid by ultrasonic studies.

Course Code: 20PPHE41	Course Title: Molecular Spectroscopy
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Course Outcomes (COs):

CO1: Explain the classification and interaction of molecules.

CO2: Know the basic properties of diatomic molecule.

CO3: Understand the theory of Raman Scattering.

CO4: Discuss the basic concept of vibrational analysis and its properties.

CO5: Explain the magnetic properties of nuclei.

Course Code: 20PPHE42	Course Title: Computer Oriented Numerical Methods
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Course Outcomes (COs):

CO1: Understand the basic methods of iteration.

CO2: Learn about the The Gauss – Seidal iterative method.

CO3: Find roots using interpolation and ability to use least squares.

CO4: Understand and ability to find roots using simpson's rule and to solve differential equations by numerical methods.

CO5: Write code to find roots using C language for various numerical methods.