



IDHAYA COLLEGE FOR WOMEN

(Accredited with 'B' Grade by NAAC)

(Recognized Under Section 2(f) & 12(B) of the UGC ACT 1956)

(Affiliated to Alagappa University, Karaikudi)

Arockia Nagar, Sarugani, Sivagangai Dt. - 630 411.

Department of Physics

Programme: Physics

PO No.	Programme Outcomes Upon completion of the B.Sc., Degree Programme, the graduate will be able to
PO-1	Mathematical (analytical and numerical) methods are experimental methods for physics.
PO-2	Applying general experimental and measurement skills with prescribed procedures;
PO-3	Applying appropriate scientific programming skills
PO-4	Reporting the solutions to physics problems, experimental or project studies their orally or in written format.
PO-5	Identifying the key issues and attempting different methods in dealing with general problems.

*Use words that show the outcomes will be fulfilled following the completion of the Programme.

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO - 1	Students are also expected to develop a written and oral communication skills in communicating physics-related topics.
PSO - 2	Students will develop the proficiency in the acquisition of data using a variety of laboratory instrument and in the analysis and interpretation of such data.
PSO - 3	Students will realize and develop an understanding of the impact of physics and science on society.

PSO - 4	Apply conceptual understanding of the physics to general real-world situations.
PSO - 5	Students should learn how to design and conduct an experiment (or series of experiment) demonstrating their understanding of the scientific method and processes.

Course Name	MECHANICS AND RELATIVITY
CO Code	Course Outcomes
C01	Understand the terminology used in mechanics
C02	Concepts connect the mathematical and mechanics both in static and dynamic motion of the system.
C03	To improve the knowledge about the time, length and mass relative to their motion.
C04	Help to improve the knowledge about inertial and non-inertial frame.
Course Name	PROPERTIES OF MATTER AND ACOUSTICS
CO Code	Course Outcomes
C01	Study the elastic behaviour and working of torsional pendulum.
C02	Study of bending behaviour beams and analyse the expression for young's modulus.
C03	Understand the surface tension and viscosity of fluid.
C04	Analyse waves and oscillations.
THERMAL AND STATISTICAL PHYSICS	<ul style="list-style-type: none"> Identify and describe the statistical nature of concept and laws in thermodynamics in particular entropy, temperature, chemical potential, free energies, partition function. Use the statistical physics methods such as boltzman

	<p>distribution, hibbs function, Fermi-dirac and bose-einstein distribution to solve the problem in some physical system.</p> <ul style="list-style-type: none"> • Apply the concept of black body radiation to analyze radiation phenomenon in thermodynamic system. • Apply the concept of thermodynamic to solve the problem in thermodynamic system such as gases, heat engine, refrigerators etc.,
<p>ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM</p>	<ul style="list-style-type: none"> • Understanding the relationship between electric charge, electric field, electric potential and magnetism. • Be able to use electromagnetic theory and principle in Wide range of application. • Be able to learn about the production and transmission of EM waves. • Learn a variety of advanced mathematical methods to solve the problem.
<p>OPTICS AND SPECTROSCOPY</p>	<ul style="list-style-type: none"> • Define and explain the propagation of light in conducting and non-conducting media. • Apply wave optics and diffraction theory to range of problems. • Define and explain the physics governing laser behaviour and light matter interaction. • Calculate properties of and design modern optical fibres.
<p>ATOMIC AND NUCLEAR PHYSICS</p>	<ul style="list-style-type: none"> • Describe the atomic spectra of one and two valence electron atoms. • Explain the change in behavior of atoms is external applied electric and magnetic field. • Explain the rotational, vibration, electronic and raman spectra Of molecules. • Describe electron spin and nuclear magnetic resonance spectroscopy and their application.
<p>ANALOG ELECTRONICS</p>	<ul style="list-style-type: none"> • Understand the basic of diode and working of rectifier circuits and characteristics. • Analyse the characteristics of transistor and transistor biasing

	<p>circuits.</p> <ul style="list-style-type: none"> • Perform the procedures for the working of single stage and multi stage amplifier. • Analyse the relationship between amplifier and oscillators.
COMPUTER PROGRAMMING IN C	<ul style="list-style-type: none"> • Illustrate the flow chart design an algorithm for a given problem and to develop c programmes using operators. • Develop conditional and iterative statement to write c programs • Write c programs using operators, pointers, access arrays and functions. • Exercise user defined data types including structuring and unions to solve problem.
MATHEMATICAL PHYSICS	<ul style="list-style-type: none"> • Learn about gradient, divergence and curl in orthogonal curvilinear and their typical application in physics. • Learn about special types of matrices that are relevant in physics and then learn about tensor. • Get introduced to special function like gamma function, beta function, legendary, laugur, Bessel, hermits functions and their recurrence. • Learn different ways of solving second order differential equations and the fundamental applications of fourier series, fourier, laplace transforms and their inverse transforms etc.,
NON-CONVENTIONAL ENERGY SOURCES	<ul style="list-style-type: none"> • Identify energy demand and relate with available energy sources. • Analyze harnessing of solar energy. • Analyze harnessing of wind energy. • Analyze magneto hydrodynamics fuel cell technology.
LASER AND FIBRE OPTICS	<ul style="list-style-type: none"> • Understand the basic principle of laser and characteristic. • Understand the theory of types of lasers. • Perform the procedures into applications oriented one. • Understand the basic concepts of optical fibres.
COMMUNICATION	<ul style="list-style-type: none"> • Fundamentals of analog and digital integrated circuits

ELECTRONICS	<ul style="list-style-type: none"> • Aim is to identify the functions of different components • Learn about theoretical and represent a digital signal using several modulation methods. • Draw the signal compute spectra of modulated signals and applying communication.
SOLID STATE PHYSICS	<ul style="list-style-type: none"> • Understand basic concept and mathematical methods and solid state physics. • Explore important connections between theory, experiment and current application. • Develop basic studies about the structure of crystals.
ELEMENTS OF THEORETICAL PHYSICS	<ul style="list-style-type: none"> • Tackle a wide range of topics using powerful analytical tool, including formal method, in classical and quantum physics. • Evaluate complex problems and formulate solutions, identifying the role of theory, hypothesis and experiment in the scientist. • Apply classical and quantum theoretical techniques in research. • Plans carry out and report a theoretical physics based investigations.
DIGITAL ELECTRONICS	<ul style="list-style-type: none"> • Describe how analog signals are used to represent digital values in different logic families, including characterization of the noise margins. • Draw a circuit diagrams for a sequential logic circuit and analyze its timing properties (input setup and hold times, minimum clock period, output propagation delays) • Discuss how to interface digital circuits with analog components(ADC,DAC,sensors,etc.,) • Properly incorporate synchronous and asynchronous memories into a circuit design.
MICROPROCESSOR	<ul style="list-style-type: none"> • The analyzed the properties of microprocessor and micro-controllers. • Train the practical knowledge through laboratory experiment.
COMPUTER PROGRAMMING IN C++	<ul style="list-style-type: none"> • Use the characteristics of an object-oriented programming

	<p>language in a program</p> <ul style="list-style-type: none"> • The learn basic object-oriented design principles in computer problem solving. • Program with advanced features of the c++ programming languages. • Develop programs in the UNIX programming environment.
FUNDAMENTAL OF NANO SCIENCE	<ul style="list-style-type: none"> • Applied the students the essential roll of nanoscience. • Understand the principles and characterization techniques • Understand the principles and fabrication

M.SC., PHYSICS

TITLE OF THE COURSE	COURSE OUTCOMES
MATHEMATICAL PHYSICS I & II	<ul style="list-style-type: none"> • Learn a broad foundational knowledge of concept of vector and scalar fields • Learn different ways of solving second order differential equations and the fundamental applications of fourier series, fourier, laplace transforms and their inverse transforms etc., • Learn about gradient, divergence and curl in orthogonal curvilinear and their typical application in physics. • Learn about special types of matrices that are relavent in physics and then learn about tensor. • Get introduced to special function like gamma function, beta function, legendary, laugur, Bessel, hermits functions and their recurrence.
CLASSICAL DYNAMICS AND RELATIVITY	<ul style="list-style-type: none"> • Wave a deep understanding of Newton's laws. • Be able to solve the Newton equation for simple configuration. • Define and understand the mechanical concept related to discrete and continuous mechanical system. • Describe and understand the motion of the mechanical system using lagrange and Hamiltonian formulation.

**QUANTUM
MECHANICS-I & II**

- Show an understanding of wave mechanics in three dimensions.
- Describe the structure of the hydrogen atom and show an understanding quantization of angular momentum.
- Apply techniques such as Fourier methods and ladder operators for selected problems in quantum numbers.
- Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations.
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- Describe the structure of the hydrogen atom and show an understanding quantization of angular momentum.
- Apply techniques such as Fourier methods and ladder operators for selected problems in quantum numbers.
- Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations.

NUMERICAL METHODS

- Apply numerical analysis which has enormous application in the field of science and some fields of engineering.
- Familiar with finite precision computation.
- Familiar with numerical solutions of nonlinear equations in a single variable.
- Familiar with calculation and interpretation of errors in numerical method.

**ELECTROMAGNETIC
THEORY**

- Understand the basic mathematical concepts related to electromagnetic vector fields.
- Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.

ATOMIC AND MOLECULAR PHYSICS

- Understand the concepts related faraday's law, induced emf and maxwells equations.
- Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation.

NUCLEAR AND PARTICLE PHYSICS

- Explain the rotational, vibrational, electronic and raman spectra Of molecules.
- Describe electron spin and nuclear magnetic resonance spectroscopy and their application.
- Describe the theories explaining the structure atoms and origin of the observed.
- Identify atomic effect such as raman and stark effect.

ADVANCED ELECTRONICS

- Demonstrate a knowledge of fundamental aspects of the structure of the nucleus, radioactive decay, nuclear reactions and the interaction of radiation and matter.
- Discuss nuclear and radiation physics connection with other physics disciplines–solid state, elementary particles physics, radiochemistry, astronomy;
- Discuss nuclear and radiation physics application in medical diagnostics and therapy ,energetic ,geology, archaeology;

MICROPROCESSOR AND MICRO CONTROLLER

- Understand the details of operation of the advanced semiconductor electronic devices.
- Know the parameters of electronic devices that govern their performance and limitations.
- Be familiar with tendency in contemporary microelectronics and principles of the nano-scale electronic devices.

MICROPROCESSOR AND MICRO CONTROLLER

- Recall and apply a basic concept of digital fundamentals to microprocessor based personal computer system.
- Identify a detailed s/w of structure to write the microprocessor.

	<ul style="list-style-type: none"> • The analyzed the properties of microprocessor and micro-controllers. • Train the practical knowledge through laboratory experiment.
MODERN OPTICS AND LASER PHYSICS	<ul style="list-style-type: none"> • Describe molecular energy level including vibrational, rotational levels. • Determine the general formula for laser gain in a generalized four level laser. • Describe the optical principle of thick lenses and optical observations. • Describe the operation of optical devices including polarisers, retraders, modulators and interferometers.
NANO SCIENCE	<ul style="list-style-type: none"> • Apply the students the essential role of nanoscience. • Understand the principle, background and characterization techniques. • Understand the basic electronic nanomaterial properties and improved the application of nanotechnology.
ANALYTICAL INSTRUMENT	<ul style="list-style-type: none"> • Select the required instrument for spectroscopy Analysis. • Understand the different constituent in a process outcome and analysis the performance of various online and off line instrument. • Perform the experimental analysis for different test like humidity, moisture, dissolved oxygen etc., • Principle theory and working of the advanced analytical techniques.
THERMODYNAMICS AND STATISTICAL PHYSICS	<ul style="list-style-type: none"> • Has through knowledge on different classical and quantum mechanical distrubtion functions. • Can explain the procedure for deriving the relation between thermodynamics parameters such as pressure, temperature, entropy and heat capacity from the distribution functions. • Can explain phase transitions and magnetization in magnetic systems.

<p>CRYSTAL GROWTH PROCESSES AND CHARACTERIZATION</p>	<ul style="list-style-type: none"> • With various techniques involved in crystal growth. • To determine various theoretical parameter.
<p>COMMUNICATION ELECTRONICS</p>	<ul style="list-style-type: none"> • Fundamentals of analog and digital integrated circuits • Aim is to identify the functions of different components • Learn about theoretical and represent a digital signal using several modulation methods. • Draw the signal compute spectra of modulated signals and applying communication.
<p>ENERGY AND ENVIRONMENTAL STUDIES</p>	<ul style="list-style-type: none"> • Explain the green house effect using simple energy balance models. • Understand the forcing and feedback and related to global warming. • Understand the interaction between emissions, atmospheric pollution and climate change. • Understand the main feature of the global ocean circulation and oceans rate in mitigating climate change.
<p>MEDICAL PHYSICS</p>	<ul style="list-style-type: none"> • Get basic knowledge to carry out the duties in hospital as medical physicist and to provide opportunities for research connected with physics applied to medicine. • Working as a research assistant, teaching and conducting research, often. • Understand the artificial function of inner parts of the human.

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- Understanding the relationship between electric charge, electric field, electric potential and magnetism.
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- Understand the forcing and feedback and related to global warming.
- Understand the interaction between emissions, atmospheric pollution and climate change.
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parts of the human.