THE STANDARD FIREWORKS RAJARATNAMCOLLEGEFORWOMEN (AUTONOMOUS),

SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC,

College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

DEPARTMENT OF PHYSICS

UG DEGREE PROGRAMME IN PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES	
The Graduates will	
PEO1.	pursue higher studies in related fields including teaching and management and take up careers as educationalist, researcher, technical specialist.
PEO2.	explore physical systems through theoretical models, experiments and communicate findings of the scientific work with moral responsibility, social concern and eco-consciousness.
PEO3.	become self- employed in technical fields and consultancy services.

PROGRAMME SPECIFIC OUTCOMES	
By the Completion of B.Sc Physics programme, the learners will be able to	
PSO1.	elucidate and demonstrate the fundamental principles and concepts of physics which include optics, mechanism, electricity, electromagnetism, thermodynamics, digital electronics, wave mechanics etc.
PSO2.	collect, analyze data critically and interpret the results to achieve valid conclusions.
PSO3.	explore systematically the physical phenomenon by solving problems and performing projects and justify their report scientifically.
PSO4.	communicate physics concepts, processes and results both in verbal and written form effectively using ICT tools.
PSO5.	plan with team members, execute experiments, investigate the experimental results and prepare the documentation for the findings.
PSO6.	project the true results of scientific findings and conscientious attempt to describe the physical phenomena accurately, without bias and any hyperbole.
PSO7.	adapt to changes in technology by means of self-directed and lifelong learning in various fields like biopolymers, thin films, crystal growth, nanotechnology, fuel cell etc.

COURSE OUTCOME

Major Course	
Course Code: BDPH11	**Course Title: MECHANICS AND PROPERTIES OF MATTER**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the concepts of Newton's laws of motion, moment of inertia, oscillations, viscosity, elasticity and bending of beams
CO2[K2]	explain frames of reference, moment of inertia of rigid bodies, types of oscillators, theorems of viscosity, Young's modulus and Poisson ratio
CO3[K3]	apply the laws of mechanics and properties of matter to solve problems
CO4[K4]	analyse the transformation in frames of reference, dynamics of rigid bodies, various parameters of oscillators, fluid mechanics and distinguish moduli of elasticity
CO5[K5]	evaluate the parameters related to mechanics and properties of matter

Major Course	
Course Code: BDPH12	**Course Title: PHYSICS APPLICATIONS IN EVERYDAY LIFE**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the basics of electricity, thermal physics, lasers, geographic information system and solar energy
CO2[K2]	explain the concepts of electricity, thermal physics, geographic information system, laser and solar energy
CO3[K3]	solve problems in the field of electricity, Laser, thermal physics and solar energy
CO4[K4]	classify single-phase supply, three phase supply and types of solar cookers
CO5[K5]	appraise the applications of lasers and solar energy

Major Course	
Course Code: BDPH21	**Course Title: OPTICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basic concepts and principles of optics
CO2[K2]	describe various optical parameters, aberrations, optical phenomena, optical theories and optical devices
CO3[K3]	solve problems in optics by selecting appropriate equations
CO4[K4]	analyse various optical parameters, aberrations, dispersion and diffraction
CO5[K5]	evaluate the conditions and ideas to produce desired images through optical devices

Major Course	
Course Code: BDPH2L	**Course Title: PROPERTIES OF MATTER LAB**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the physical concepts underlying the experiments
CO2[K3]	construct the experimental set up
CO3[K3]	perform experiments applying thermal and optical properties
CO4[K4]	analyze the data mathematically and graphically
CO5[K5]	evaluate the experimental results with laboratory ethics

Major Course	
Course Code: BDPH31	**Course Title: ELECTRICITY**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe electric potential, capacitance, electromotive force, direct & alternating current and principle of operation of fuel cell
CO2[K2]	explain electric potential due to charges & dipole, electrical parameters, DC &AC circuit and types of fuel cell
CO3[K3]	solve problems related to various electrical circuits and fuel cell
CO4[K4]	analyze various electrical parameters, capacitor with dielectrics, AC&DC circuits, working mechanism and characteristics of fuel cell
CO5[K5]	evaluate electrical parameters of various circuits and fuel cell

Major Course	
Course Code: BDPH32	**Course Title: ELECTROMAGNETISM**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the laws and concepts of magnetic fields and properties of magnetic materials
CO2[K2]	explain the phenomena of electromagnetic oscillations and waves
CO3[K3]	apply the magnetic phenomena, magnetic material properties of electromagnetic oscillations and waves to solve problems
CO4[K4]	analyse the magnetic effect in case of current carrying wires, induction applied to EM circuits and waves
CO5[K5]	criticize the basic concepts and laws of electromagnetism

Major Course	
Course Code: BDPH41	**Course Title: BASIC ELECTRONICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe transistor parameters, transistor classifications, various types of transistor biasing, feedback concepts, types of oscillators, multivibrators, diodes and op-amps
CO2[K2]	explain transistor biasing methods, working of single stage, multistage transistor amplifiers, different types of oscillators, multivibrators and op-amps
CO3[K3]	determine transistor parameters, voltage gain, input and output impedence of amplifiers, frequency of oscillators, slew rate and band width using electronic devices
CO4[K4]	analyze different types of transistor biasing, coupling in transistor amplifier, significance of feedback Circuits, oscillators, multivibrators and op-amps
CO5[K5]	evaluate the necessary parameters for the proper functioning of electronic circuits by applying appropriate conditions

Major Course	
Course Code: BDPH4L	**Course Title: ELECTRICITY AND ELECTRONICS LAB**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the principles of the experiment
CO2[K3]	construct the electrical and electronic circuits
CO3[K4]	devise the experiments and record data
CO4[K4]	analyze the data and draw conclusions mathematically and graphically
CO5[K5]	evaluate the results of the experiments in an ethical manner

Part IV - DISCIPLINE SPECIFIC COURSE	
Course Code: BDPH4DSL	**Course Title: LAB - SCIENTIFIC SKILL DEVELOPMENT**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the principles of the experiment
CO2[K3]	construct the electrical and electronic circuits
CO3[K3]	determine the physical parameters
CO4[K4]	analyze the data and draw conclusions mathematically and graphically
CO5[K5]	evaluate the results of the experiments in an ethical manner

Major Course	
Course Code: BDPH51	**Course Title: CLASSICAL MECHANICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basic concepts in Classical Mechanics
CO2[K2]	describe conservation laws, generalised coordinates, Lagrangian, Hamiltonian formulations, motion under central force, rotating frames and relative co-ordinate systems
CO3[K3]	apply various concepts of classical mechanics to solve problems
CO4[K4]	investigate mechanics of particles, Lagrangian & Hamiltonian formulations for different systems, Kepler's problem, two body problem, rotating frames and relative co-ordinatesystems
CO5[K5]	interpret the shape of the orbits or path of a moving particle, effects and applications of Coriolis force

Major Course	
Course Code: BDPH5L	**Course Title: PHYSICS LAB – I**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the principles of the experiments
CO2[K3]	construct electronic and non-electronic circuits
CO3[K3]	determine the physical parameters through various experimental techniques
CO4[K4]	analyze the data and draw conclusions manually and graphically
CO5[K5]	evaluate the experimental results with laboratory ethics

Major Course	
Course Code: BDPH5V	**Course Title: INTERNSHIP/ON-THE-JOB TRAINING**
On successful completion of the course, the learners should be able to	
CO1[K2]	relate the class room theory with work place practice.
CO2[K3]	apply the practices / procedures observed in real time working environment
CO3[K4]	analyze the workflow and communication flow prevailing in the institution/industry
CO4[K5]	assess interests and abilities in their field of study
CO5[K6]	propose strategies, policies and guidelines for enhancing efficiency of / industrial institutional operations

Major Elective course	
Course Code: BDPH5E1	**Course Title: DIGITAL ELECTRONICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic principles of number systems, codes and digital systems
CO2[K2]	describe the working of digital circuits for arithmetic/logical operations, memory, counters and converters
CO3[K3]	apply digital principles to solve problems.
CO4[K4]	analyze various types of gates, flip flops, registers, counters, D/A and A/D converters
CO5[K6]	design digital logic circuits

Major Elective course	
Course Code: BDPH5E2	**Course Title: ATOMIC AND NUCLEAR PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the important phenomena in atomic nucleus
CO2[K2]	comprehend the atomic spectra, coupling of electrons, atomic nucleus, particle detectors and nuclear decay
CO3[K3]	solve the problems in atomic and nuclear physics
CO4[K4]	analyse various atomic and nuclear structures/models/spectra, types of coupling, radioactive decay and devices like detectors and accelerator
CO5[K5]	criticize various nuclear models, periodic table, the nuclear reaction and nuclear forces

Major Elective Course	
Course Code: BDPH5E3	**Course Title: FIBER OPTICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basic concepts and importance of fibre optics
CO2[K2]	explain the requirements of fibre optic techniques
CO3[K3]	classify the fabrication techniques and differentiate the functions of wave guides
CO4[K4]	analyse the required light sources for dispersion in optical fibres
CO5[K5]	interpret the transmission through optical fibres

Major Elective course	
Course Code: BDPH5E4	**Course Title: ENERGY PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basics of energy sources
CO2[K2]	describe the applications of different energy sources
CO3[K4]	compare different forms of energy
CO4[K4]	analyse solar energy, wind energy and geothermal energy
CO5[K5]	appraise the advantages and disadvantages of energy sources

Major Course	
Course Code: BDPH61	**Course Title: FUNDAMENTALS OF SOLID STATE PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain interatomic forces, unit cells, different types of bonding, semiconductors, wave nature of matter and X- ray diffraction
CO2[K2]	describe about the symmetry elements, different structures based on packing factor, semiconductors, wave nature of matter and X- ray diffraction
CO3[K3]	determine the crystal system, structures, properties of semiconductors, wave nature of matter and X- ray diffraction
CO4[K4]	analyze various lattices, structures, X- ray diffraction patterns and electrical parameters of different types of conductors.
CO5[K5]	evaluate the different parameters of solids, crystals, waves and X-rays to solve problems

Major Course	
Course Code: BDPH62	**Course Title: QUANTUM PHYSICS AND RELATIVITY**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basic concepts of quantum physics and relativity
CO2[K2]	describe the origin, general formalism and energy Eigen values of quantum mechanics
CO3[K3]	apply the theories of relativity and quantum Physics to solve simple problems
CO4[K4]	analyse the various laws and hypothesis involved in Special and Theory of Relativity wave mechanics
CO5[K5]	appraise concepts of special theory of relativity and wave mechanics

Major Course	
Course Code: BDPH6L	**Course Title: PHYSICS LAB – II**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the principles of the experiments
CO2[K2]	construct electronic and non-electronic circuits
CO3[K3]	determine the physical parameters through various experimental techniques
CO4[K4]	analyze the data and interpret appropriate conclusions
CO5[K5]	evaluate the experimental results with laboratory ethics

Major course	
Course Code: BDPH6P	**Course Title: PROJECT**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the principles behind the physics related problem
CO2[K3]	implement the basic principles of physics in exploring new avenues
CO3[K3]	solve physics problems using qualitative and quantitative reasoning including sophisticated mathematical techniques
CO4[K4]	organize the results of the study in written form
CO5[K5]	design and conduct scientific studies for specific purposes

Major Elective course		
Course Code: BDPH6E1		**Course Title: THERMODYNAMICS AND STATISTICAL THERMODYNAMICS**
On successful completion of the course, the learners should be able to		
CO1[K2]	explain the properties of thermodynamic systems, the laws governing them and basics of statistical thermodynamics	
CO2[K2]	describe the energy equation, entropy changes, thermodynamic potentials and different types of statistical distribution functions	
CO3[K3]	use the laws of thermodynamics to determine heat flow, change in entropy and thermodynamic probability using MB, BE and FD statistics	
CO4[K4]	analyze the properties of gases, phase transitions in closed and open systems and different kinds of statistical systems	
CO5[K5]	evaluate thermodynamic properties using laws of thermodynamics and statistical thermodynamics	

Major Elective course		
Course Code: BDPH6E2		**Course Title: INSTRUMENTATION TECHNIQUES**
On successful completion of the course, the learners should be able to		
CO1[K2]	explain the separation techniques, principles of spectroscopy, crystallography and biosafety	
CO2[K2]	describe the features of spectroscopy, crystallography, separation techniques and biosafety	
CO3[K3]	apply NMR spectroscopy in chemistry, biochemistry and biophysics	
CO4[K4]	analyze crystal structures, XRD data, NMR data	
CO5[K5]	interpret the types of laboratory safety	

Allied Course-I	
Course Code: BDPH1A	**Course Title: FUNDAMENTAL PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basics of photo electricity, transport properties of gases, laws and parameters involved in electricity, rotational motion and gravitational laws
CO2[K2]	explain photo electric cells, Boy's experiment, laws related to electricity and gravitation
CO3[K3]	solve simple problems related to photo electricity, kinetic theory of gases, rotational motion, electricity and gravitation
CO4[K4]	analyze photo electricity with respect to various parameters, 'g' using compound pendulum and compare the variation of 'g' with respect to latitude, depth and altitude
CO5[K5]	evaluate transport properties of gases, gravitational parameters, electric field for different charge distributions and parameters of rotational motion

Allied Course -II	
Course Code: BDPH2A1	**Course Title: DIGITAL ELECTRONICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic principles in digital systems.
CO2[K2]	describe logic gates, karnaugh map, flip flops, and arithmetic circuits
CO3[K3]	apply digital logic principles to simplify simple circuits, convert number system and codes
CO4[K4]	analyze circuits for various arithmetic and logic operations
CO5[K5]	interpret the functioning of gates, combinational logic circuits, number systems and flip flops

Allied course-II	
Course Code: BDPH2A2	**Course Title: SOLID STATE PHYSICS & DIGITAL ELECTRONICS (FOR CHEMISTRY)**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the concepts of crystal structures, X-ray diffraction, semiconductors and logic gates.
CO2[K2]	describe the different crystal structures, XRD methods, types of semiconductors and logic gates.
CO3[K3]	apply different methods to simplify the equations and construct combinational logic circuits
CO4[K4]	analyze crystal structures, semiconductors and combinational logic circuits
CO5[K5]	evaluate lattice parameters, prove digital logic laws and truth tables of logic gates.

Allied course	
Course Code: BDPH2AL	**Course Title: FUNDAMENTAL PHYSICS LAB (FOR B.Sc MATHEMATICS AND CHEMISTRY)**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the principle of the experiment
CO2[K3]	construct electronic and electrical circuits
CO3[K3]	determine the physical parameters by performing the experiments.
CO4[K4]	analyze the physical parameters both manually and graphically
CO5[K5]	evaluate the obtained results following the laboratory ethics

Non-Major Elective course	
Course Code: BDPH4N	**Course Title: Basics of Solar Energy**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe solar radiation, solar based devices and systems.
CO2[K2]	explain the types of solar energy and solar energy devices
CO3[K3]	apply the principles of solar energy to solve problems.
CO4[K3]	construct solar water heater, solar cooker, solar air heater, solar stills and solar cells.
CO5[K5]	comment on solar energy/solar devices, its applications, merits and demerits

Non-Major Elective course	
Course Code: BDPH5N	**Course Title: PHYSICS FOR THE NEW WORLD**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basics of lasers, ultrasonics, electrical safety
CO2[K2]	describe the applications of lasers, ultrasonics, satellites and global positioning system
CO3[K3]	classify the ordinary light and laser beam, single phase supply and three phase supply, ultrasonic scanning methods and different types of satellites
CO4[K4]	analyze the effects of lightning and electric shock
CO5[K5]	appraise the functions of ultrasonic flaw detector, sonograms, earthing, Satellites and global positioning system

SELF EMPLOYMENT COURSE	
Course Code: BDSE66	**Course Title: DOMESTIC ELECTRICAL APPLIANCES SERVICING**
On successful completion of the course, the learners should be able to	
CO1[K2]	summarize the basic electrical and electronic parameters
CO2[K2]	describe the basic household wiring, types of earthing, electrical devices and appliances
CO3[K3]	determine various electrical parameters
CO4[K4]	analyze the colour coding of resistors and working of domestic electrical appliances
CO5[K5]	interpret the possible defects in household appliances

SELF EMPLOYMENT COURSE	
Course Code: BDSE66L	**Course Title: DOMESTIC ELECTRICAL APPLIANCES SERVICING - LAB**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the working principles of various appliances
CO2[K3]	carry out the basic household wiring and service the household appliances
CO3[K3]	construct different electrical circuits
CO4[K4]	analyze the colour coding and various electrical parameters
CO5[K5]	deduct the defects in the electrical appliances

EXTRA CREDIT COURSE - I	
Course Code: ADPHEC1	**Course Title: NANOTECHNOLOGY**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basics of nanomaterials and characterization techniques
CO2[K2]	describe the synthesis, characterization and applications of carbon nanotubes/ nano materials
CO3[K3]	identify the properties of carbon nanotubes and nanomaterials
CO4[K4]	analyze the significance of various microscopic and diffraction techniques
CO5[K5]	interpret the different synthesis routes of nanomaterials

EXTRA CREDIT COURSE - II	
Course Code: ADPHEC2	**Course Title: PHYSICS FOR COMPETITIVE EXAMINATIONS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic laws of motion, gravitation, thermal, optics and electronics
CO2[K2]	describe the concepts of work, waves, atomic and nuclear physics
CO3[K3]	solve problems in Physics
CO4[K4]	classify the different electronic devices and communication systems
CO5[K5]	appraise the importance of recent trends in Physics

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DEPARTMENT OF PHYSICS

PG DEGREE PROGRAMME IN PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES The Graduates will	
PEO1.	become competent professional in industry,consultancy, education, research and public administration.
PEO2.	excel as Junior Research Fellow, research associates, analyse complex problems and experimental data in physics imbibed by ethical, moral and social values leading to highly cultured and civilized physics.
PEO3.	become tutors, tech or digital entrepreneur and undertake projects.

PROGRAMME SPECIFIC OUTCOMES By the Completion of M.Sc. Physics programme, the learners will be able to	
PSO1.	apply graduate-level acquaintance in solving problems and provingthe theories in various areas of physics like quantum mechanics, solid state physics, molecular spectroscopy, mathematical physics and nanophysics.
PSO2.	possess scientific attitude, experimental skills, analysedataand interpret theresults obtained in physics related problems.
PSO3.	implement the physical concepts in a high quality research or creative capstone project under appropriate disciplinary or multidisciplinary context.
PSO4.	present the recent trends in physics effectively in seminars, conferences using ICT tools.
PSO5.	plan and carry out group discussions, respond to the views of team members and perform complicated projects successfully.
PSO6.	follow scientific ethics in all stages of scientificpractices such as data collection, transcription, validation ofresults through replication and publication.
PSO7.	realize the impact of science on society and engage in lifelong learning and professional development through self study or higher studies in thediversefields like material science,electronics,energydevices, eco-friendlymaterials etc.

COURSE OUTCOME

Core Course	
Course Code: MDPH11	**Course Title: MATHEMATICAL PHYSICS-I**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain about integral transforms, differential equations and special functions
CO2[K3]	solve differential equations, integral transforms and special functions
CO3[K3]	apply the generating function to obtainthe recurrencerelations for special functions
CO4[K4]	analyze the orthogonal property and recurrence relations of special functions
CO5[K5]	evaluate integral transforms, differential equations, beta function, gamma function and special functions

Core Course	
Course Code: MDPH12	**Course Title: CLASSICAL AND STATISTICAL MECHANICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic concepts in classical and statistical mechanics
CO2[K2]	describe Lagrangian equation, Hamiltonian methods, canonical transformations, methods of ensembles and quantumstatistics
CO3[K3]	solve simple problems in classical and statistical mechanics
CO4[K4]	classify different constraints, Lagrangian from Hamiltonian, different ensembles and classical statistics from quantum mechanical statistics
CO5[K5]	appraise Lagrangian and Hamiltonian equations, Canonical transformations, Partition functions, thermodynamic properties of different ensembles and different properties of quantum mechanical statistics

Core Course	
Course Code: MDPH13	**Course Title: LINEAR INTEGRATED CIRCUIS**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the working of op-amp, comparator and 555 timer with necessary diagrams
CO2[K2]	explain the characteristics of op-amp and operation of 555 timer
CO3[K3]	use op-amp for different applications and construct activeand passive components
CO4[K4]	analyze waveform generators, detectors, oscillators, op-amp, filters, multivibrators and fabrication technology of ICs.
CO5[K5]	assess the steps in fabrication of semiconductors, op-amp, comparator and timer

Core Course	
Course Code: MDPH1L	**Course Title: ADVANCED PHYSICSLAB–I**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the principles of the experiments.
CO2[K3]	construct electronic and non-electronic set ups
CO3[K3]	determine the physical parameters by following the laboratory ethics
CO4[K4]	analyse the data both manuallyand graphically
CO5[K5]	interpret the obtained results.

Core Course	
Course Code: MDPH21	**Course Title: MATHEMATICAL PHYSICS-II**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the types of tensor, vectors, matrices, theorems,complex variables, Dirac delta function, reducible and irreducible representations
CO2[K3]	solve problems in vectors, matrices, tensors, Diracdeltafunction, green functions and complexvariables
CO3[K3]	construct the analytic functions using Cauchy-Riemann conditions and the charactertable for point group
CO4[K4]	analyze complex variables, tensors, Dirac delta function, green functions and charactertable for point group
CO5[K5]	evaluate tensors, vectors, matrices, complex variables

Core Course	
Course Code: MDPH22	**Course Title: QUANTUM MECHANICS - I**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the inadequacies of classical concepts, properties of Schrodinger wave function, energy & momentum eigen functions, angular momentum operators and various approximation methods
CO2[K3]	apply Schrodinger wave equation to solve stationarystateproblems and exactly soluble eigen value problems
CO3[K3]	apply various approximation methods to solve stationary state problems
CO4[K4]	analyse the shortcomings of classical concepts, solution of various stationary state & exactly soluble eigen value problems and general formalism of wavemechanics
CO5[K5]	evaluate eigen values, eigen functions and various approximation methods for stationarystateproblems

Core Course	
Course Code: MDPH23	**Course Title: ELECTRO MAGNETIC THEORY**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic concepts and different laws of electrostatic fields, magnetic fields, propagation ofwaves and Maxwell's equations
CO2[K2]	describe static electric and magnetic fields, their behavior in different media, associated laws, boundaryconditionsand electromagneticpotentials
CO3[K3]	apply different techniques of vector calculus to solve problems related to electromagnetic field
CO4[K4]	analyse static electric and magnetic fields, the propagation of electromagnetic waves in different media and their interfaces
CO5[K5]	evaluate electric and magnetic parameters, electromagnetic wave propagation in different transmission lines and media

Core Course	
Course Code: MDPH2L	**Course Title: ADVANCED PHYSICS LAB–II**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the principles of the experiments.
CO2[K3]	construct electronic and non-electronic setups
CO3[K3]	calculate the physical parameters
CO4[K4]	analyse the data and draw conclusions manually and graphically
CO5[K5]	evaluate the experimental results with laboratory ethics

Core Elective Course	
Course Code: MDPH1E1	**Course Title: SOLAR ENERGY AND ITS APPLICATIONS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain basics of solar radiation, collectors, energystorage, solar cells and applications
CO2[K2]	describe the different types of solar energyresources and its applications
CO3[K3]	apply the concepts of solar energy to fabricate solar cells
CO4[K4]	analyse the working principle of instruments used in solar energy
CO5[K5]	appraise the essentials of solar energy

Core Elective Course	
Course Code: MDPH1E2	**Course Title: DIGITAL LOGIC DESIGN**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the theory regarding simplification of boolean functions and the working of digital circuits (combinational and sequential) with circuits diagram
CO2[K3]	apply the simplification and design procedure to solve problems
CO3[K4]	simplify the Boolean functions and analyze digital circuits (combinational and sequential) using gates and flip flops
CO4[K6]	construct circuits (combinational and sequential) for the simplified boolean functions
CO5[K6]	design combinational and sequential circuits using gates and flip flops

Core Course	
Course Code: MDPH31	**Course Title: SOLID STATE PHYSICS- I**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe elastic / thermal properties, parameters of different crystals / materials / waves/lattice
CO2[K2]	derive parameters of inert gas/ionic/semiconductor crystals, elastic waves/ lattice and different models
CO3[K3]	determine parameters of different crystals/elastic waves/lattice, heat capacity, electrical and thermal properties of different materials/models
CO4[K4]	examine elastic waves/lattice, thermal/electrical parameters of different crystals/ models/materials, and carrier concentrations
CO5[K5]	interpret parameters of different types of crystals/elastic waves/waves/lattice and models

Core Course	
Course Code: MDPH32	**Course Title: QUANTUM MECHANICS- II**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain various approximation methods for scattering problems and perturbation theory for time evolution problems
CO2[K2]	describe the correspondence between quantum states & vectors in Hilbert space, transformation and symmetries, properties & matrix representation of angular momentum and relativistic theories
CO3[K3]	apply appropriate approximation methods to various collision and perturbation problems and relativistic theories to obtain plane wave solution of Hydrogen like atom
CO4[K4]	analyze the asymptotic behavior of wave functions in collision problems, geometrical aspect of state vectors & wave functions, transformations and conservation laws
CO5[K5]	assess the properties of angular momentum operators, various pictures of time evolution, Dirac matrices, plane wave solution of relativistic wave equations

Core Course	
Course Code: MDPH33	**Course Title: COMPUTATIONAL PHYSICS AND MICROPROCESSOR**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain C++ with syntax and examples, numerical solution for different types of equations, algorithms/errors, 8085 MPU and I/O devices.
CO2[K2]	outline C++ data types, numerical methods of solving equations, 8085 programming model
CO3[K3]	apply appropriate numerical techniques to solve different types of equations
CO4[K4]	analyze algorithms and programs in C++, numerical methods and 8085 features
CO5[K5]	appraise the features of C++, numerical methods, 8085 MPU architecture, memory and I/O devices

Core Course	
Course Code: MDPH3L	**Course Title: ADVANCED PHYSICSLAB–III**
On successful completion of the course, the learners should be able to	
CO1[K2]	write assembly language programs for microprocessor, C++ programs for solving numerical equations and draw circuits
CO2[K3]	implement the programs and construct the circuits
CO3[K4]	analyze the observed data and report the results
CO4[K5]	interpret the results following laboratory ethics
CO5[K5]	examine the outputs for different inputs

Core Elective Course	
Course Code: MDPH3E1	**Course Title: MATERIALS SCIENCE AND IPR**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the classification, characteristics, applications of materials and concepts of research
CO2[K2]	explain materials characterizations, concepts of fuel cells and research ethics
CO3[K3]	identify the different materials, its characterization and IPR
CO4[K4]	analyze various materials, structures, fuel cells and the types of IPR & plagiarism
CO5[K5]	appraise property rights and nature of materials from different characterization

Core Elective Course	
Course Code: MDPH3E2	**Course Title: RECENT TRENDS IN PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic concepts of simulation and applications of nanotechnology
CO2[K2]	describe various nano lithographic techniques, modeling, smart materials and self healing structures
CO3[K3]	solve problems using simulation
CO4[K4]	analyze the applications of nanotechnology in optics and electronics
CO5[K4]	classify system simulation and discrete system simulation, sensors

Core Course	
Course Code: MDPH41	**Course Title: SOLID STATE PHYSICS- II**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe orbits, energy bands of metals, survey of superconductor, parameters of magnetic materials/different particles/waves
CO2[K2]	explain properties/parameters of metals, magnetic materials, different particles/ waves
CO3[K3]	determine Fermi surfaces and metals, super conductivity and different magnetic materials and different particles/waves
CO4[K4]	analyze parameters of metals, super conductivity, magnetic materials, plasmons, polaritons and polarons/waves
CO5[K5]	interpret different parameters of different materials and different particles/waves

Core Course	
Course Code: MDPH42	**Course Title: NUCLEAR AND PARTICLE PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	outline the basic definitions in nuclear and particle Physics
CO2[K2]	describe the concepts of nuclear forces, nuclear models, nuclear reactions, nuclear decay, elementary particles and Quarks
CO3[K3]	classify the different nuclear forces, reactions, models, decays and elementary particles
CO4[K4]	analyze simple problems in nuclear and particle Physics
CO5[K5]	appraise the different types of scatterings, models, cross- sections, nuclear decay and elementary particles

Core Course	
Course Code: MDPH43	**Course Title: MOLECULAR SPECTROSCOPY**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the basic elements of spectroscopy, nature of interaction of various radiations on different types of molecules and the experimental techniques
CO2[K2]	obtain the energy expressions for interacting molecules using microwave, infrared, Raman, electronic and spin resonance spectroscopic method
CO3[K3]	estimate the factors like interatomic distance, absorption energy etc. from various spectral data
CO4[K4]	analyze the structure and intensity of rotational, vibrational, electronic spectra and spin resonance spectra of molecules
CO5[K5]	deduce the structure of molecules using spectroscopic data

Core Course	
Course Code: MDPH4P	**Course Title: PROJECT AND VIVAVOCE**
On successful completion of the course, the learners should be able to	
CO1[K3]	identify the nature of the problems and collect relevant data
CO2[K3]	utilize the collected data and manipulate them to arrive the solution
CO3[K4]	analyze the data with the literature survey
CO4[K5]	justify the results in the project report in an ethical manner
CO5[K6]	defend their dissertations in viva-voce

Core Elective Course	
Course Code: MDPH4E1	**Course Title: NANO PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the classification/properties/fabrication/characterization/ applications of nanoparticles
CO2[K2]	explain the features, applications and technical studies of individual nanoparticles, nanostructures and nano materials
CO3[K3]	apply the physical and characterization techniques in nanomaterials
CO4[K4]	inspect the studies of Nanoparticles
CO5[K5]	appraise the basics of nano and features of nano technology

Elective Course	
Course Code: MDPH4E2	**Course Title: MEDICALPHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the physiological effects of ultrasound in therapy
CO2[K2]	describe the theory of light in medical applications
CO3[K3]	apply an insight on various aspects of radiology
CO4[K4]	analyze the physical principles of the instruments used in medical diagnosis & therapy
CO5[K5]	interpret the physics behind radiation therapy

Elective Course	
Course Code: MDPH2E1	**Course Title: APPLIED PHYSICS**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the various optical and medical instruments, various types of communication
CO2[K2]	describe the working of optical and medical instruments, fibre optics and various communication systems
CO3[K3]	solve problems related to fibre optics and communication system
CO4[K4]	compare various telescopes, scanning methods, classification of holograms, types of optical fibre and power budget calculation
CO5[K5]	appraise the effect of optical phenomenon and medical instrumentation in their relevant field

Elective Course	
Course Code: MDPH2E2	**Course Title: MICROCONTROLLER**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain the architecture and instruction set of the microcontroller Intel 8051
CO2[K2]	write the assembly language programming for the microcontroller Intel 8051
CO3[K3]	implement the features of 8051
CO4[K4]	analyse interrupts sources and interrupt vector addresses
CO5[K5]	disseminate different programmable devices and methods to interface them

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC,

College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

DEPARTMENT OF PHYSICS

CERTIFICATE PROGRAMME IN DIGITAL PHOTOGRAPHY AND PHOTOSHOP

PROGRAMME EDUCATIONAL OBJECTIVES The Graduates will	
PEO1.	be effective photographer with mastery of the materials including the uses of camera, film, light and digital technique.
PEO2.	be self employed/freelance commercial photographers and photo composer.

PROGRAMME SPECIFIC OUTCOMES By the Completion of Certificate programme, the learners will be able to	
PSO1.	handle software to design digital photos creatively.
PSO2.	develop images by intermingling arts and science in an unique way.
PSO3.	use digital photo technique instead of mechanical tools to have ecofriendly environment.

Certificate course	
Course Code: CCDP11	**Course Title: PHOTOGRAPHY AND PHOTOSHOP TECHNIQUES**
On successful completion of the course, the learners should be able to	
CO1[K2]	describe the parts of camera, digital camera, pixels, storage card, photoshop program window, digital zoom and optical zoom, image edit tools and various file formats.
CO2[K2]	explain types of camera, camera parts, lens types, digital camera, metering, sensors, storage card, photoshop program window, tool box and file format.
CO3[K3]	apply different file formats to create images
CO4[K6]	create images with different tools, use screen modes in photoshop program window
CO5[K6]	develop photos of required size using different tools, file formats, matrix, metering, sensors, pixels, rotating, cropping and editing images.

Certificate course	
Course Code: CCDP1L	**Course Title: PHOTOGRAPHY AND PHOTOSHOP TECHNIQUES-LAB**
On successful completion of the course, the learners should be able to	
CO1[K2]	explain menu and menu options in Photoshop.
CO2[K2]	describe the various image editing tools.
CO3[K3]	apply various effects and adjustment options for an image.
CO4[K4]	organize pleasant and effective images as per requirements.
CO5[K6]	create greeting cards and photos with different effects.