KONGUNADU ARTS AND SCIENCE COLLEGE

(AUTONOMOUS)

COIMBATORE - 641029

DEPARTMENT OF PHYSICS (PG)

Course Outcome

(2024-2025)

Sub. Code: 24PPH101

Programme code : 03		M.Sc. Physics			
Title of the Paper		Core Paper 1 – Classical Mechanics			
Batch 2024-2025	Semester 1	Hours/Week 5	Total Hours 75	Credits 4	Skill Development

Course Objectives

To enable the learners to know about the

1. Mechanics of single and system of particle
2. Generalized coordinates, Lagrangian formulation and mechanics of rigid body motion
3. Hamiltonian formulation of mechanics, Hamilton-Jacobi theory, harmonic oscillator problem, theory and applications of small oscillations.

Course outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Know about Newtonian mechanics
	CO2	Gain knowledge about Lagrangian formulation
	CO3	Acquire knowledge about mechanics of rigid body motion.
	CO4	Know about Hamiltonian formulation
	CO5	Understand Hamilton-Jacobi theory and small oscillations

Sub. Code: 24PPH102

Programme code : 03		M.Sc. Physics			
Title of the Paper		Core Paper 2 - Mathematical Physics			
Batch 2024-2025	Semester 1	Hours/Week 5	Total Hours 75	Credits 4	Skill Development

Course Objectives

To enable the learners to

1. Understand complex variables, group theory & tensors
2. Know about types of differential equations in Physics
3. Study about numerical methods

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understanding of complex analysis including important theorems and determination of residues to evaluate definite integrals
	CO2	Solve partial differential equations and be familiar with special functions such as Bessel, Legendre and Hermite
	CO3	Have knowledge in abstract group theory and tensors
	CO4	Understand partial differential equations in Physics
	CO5	Apply numerical methods to obtain appropriate solutions to mathematical problems

Sub. Code: 24PPH103

Programme code : 03		M.Sc. Physics			
Title of the Paper		Core Paper 3 – Condensed Matter Physics I			
Batch 2024-2025	Semester 1	Hours/Week 5	Total Hours 75	Credits 4	Skill Development

Course Objectives

To enable the learners to

1. Understand the crystal system of materials
2. Know about crystal imperfection and lattice vibrations
3. Study about lattice and electronic specific heat

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand the crystal structure and reciprocal lattice
	CO2	Understand the crystal structure by XRD
	CO3	Gain knowledge about crystal imperfection
	CO4	Acquire knowledge on lattice vibrations and thermal properties
	CO5	Acquire knowledge about lattice and electronic specific heat

Sub. Code: 24PPH204

Programme code : 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper 4 – Quantum Mechanics I**			
Batch **2024-2025**	**Semester** **2**	**Hours/Week** **5**	**Total Hours** **75**	**Credits** **4**	**Skill Development**

Course Objectives

Enable the learners to

1. Gain knowledge on General formalism of quantum mechanics
2. Gain knowledge on energy Eigenvalue problems, angular momentum and approximation methods
3. Understand time dependent, time independent and perturbation theories.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Knowledge on General formalism of quantum mechanics
	CO2	Knowledge on one and three dimensional energy Eigenvalue problems
	CO3	Knowledge on three-dimensional energy Eigenvalue problems and angular momentum concepts
	CO4	Acquire knowledge on time independent quantum approximation Methods
	CO5	Understand time dependent perturbation theory and semi-classical treatment of radiation

Sub. Code: 24PPH205

Programme code : 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper 5 - Thermodynamics and Statistical Mechanics**			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Employability**
2024-2025	**2**	**5**	**75**	**4**	

Course Objectives

To enable the learner to know about

1. Thermodynamics and ensembles
2. Classical distribution law and quantum statistics
3. Application of quantum statistics.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Know about thermodynamics and radiations
	CO2	Acquire knowledge on ensembles
	CO3	Get knowledge about classical distribution law
	CO4	Get knowledge about quantum statistics
	CO5	Understand applications of quantum statistics

Sub.Code: 24PPH206

Programme code : 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper-6 Electronics and Microprocessor**			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Employability**
2024-2025	**2**	**5**	**75**	**4**	

Course Objectives

To enable the learners to

1. Know about power electronics, operational amplifiers and non-linear integrated circuits
2. Understand architecture of microprocessors
3. Know about peripheral devices, interfacing and data acquisition systems.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand power electronics
	CO2	Gain knowledge on operational amplifiers and non-linear integrated circuits
	CO3	Understand architecture of microprocessors
	CO4	Know about peripheral devices and interfacing
	CO5	Know about data acquisition systems

Sub.Code: 24PPH307

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper 7 - Quantum Mechanics II**			
Batch **2024-2025**	**Semester** **3**	**Hours/Week** **5**	**Total Hours** **75**	**Credits** **4**	**Skill Development**

Course Objectives

To enable the learners to

1. Understand the basic approximate methods in molecular quantum mechanics
2. Understand relativistic quantum theory, quantum optics
3. Understand quantization of fields and scattering

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand different approximations and models to describe a many electron system
	CO2	Comparison of MO and VB theories to explain molecular structure of hydrogen molecule and hydrogen ion
	CO3	Understand relativistic quantum mechanics
	CO4	Acquire knowledge on quantum field theory
	CO5	Interpret scattering theory in terms of quantum aspects.

Sub.Code: 24PPH308

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper 8 – Electromagnetic Theory and Electrodynamics**			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**3**	**5**	**75**	**4**	

Course Objectives

To know about

1. Electrostatics and magnetostatics
2. Applications of Maxwell's equations
3. Antenna arrays

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand electrostatics and magnetostatics
	CO2	Acquire knowledge on field equations and conservation laws
	CO3	Understand the propagation of electromagnetic waves in different media on microscopic scale
	CO4	Study the interaction of electromagnetic waves with different media on macroscopic scale
	CO5	Acquire knowledge on relativistic electrodynamics

Sub. Code: 24PPH309

Programme: 03		M.Sc. Physics			
Title of the Paper		Core Paper 9 – Condensed Matter Physics II			
Batch 2024-2025	Semester 3	Hours/Week 4	Total Hours 60	Credits 4	Skill Development

Course Objectives

To gain knowledge about

1. Band theory of solids
2. Semiconductors, dielectrics and ferroelectrics
3. Magnetism and superconductors

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Knowledge on band theory of solids
	CO2	Understand semiconductors
	CO3	Acquire knowledge on superconductors
	CO4	Gain knowledge on dielectrics and ferroelectric materials
	CO5	Acquire knowledge on magnetism

Sub. Code: 24PPH410

Programme: 03		M.Sc. Physics			
Title of the Paper		Core Paper 10 - Problems in Physics II			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**4**	**5**	**75**	**4**	

Course Objectives

To enable the learners to

1. Acquire knowledge and skills to solve problem through the concept behind physics
2. Apply creative thinking techniques towards realistic problem
3. Visualize the basic concepts clearly

Course outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand and solve problems in classical mechanics
	CO2	Understand and solve problems in quantum mechanics
	CO3	Understand and solve problems in electromagnetics
	CO4	Understand and solve problems in electronics
	CO5	Understand and solve problems in thermodynamics and statistical Physics

Sub. Code: 24PPH411

Programme: 03		M.Sc. Physics			
Title of the Paper		Core Paper 11 - Atomic and Molecular Spectroscopy			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**4**	**5**	**75**	**4**	

Course Objectives

To enable the learners to

1. Understand atomic, microwave and IR spectroscopy
2. Know about Raman, NMR and NQR spectroscopy
3. Know about ESR and Mossbauer spectroscopy

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand atomic spectroscopy
	CO2	Gain knowledge on microwave and IR spectroscopy
	CO3	Acquire knowledge on Raman spectroscopy
	CO4	Understand NMR and NQR spectroscopy
	CO5	Acquire knowledge on ESR and Mossbauer spectroscopy

Sub. Code: 24PPH412

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Paper 12 - Nuclear and Particle Physics**			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**4**	**5**	**75**	**4**	

Course Objectives

To enable the learners to

1. Know about radioactivity
2. Gain knowledge on Alpha and Beta particles and Gamma rays
3. Understand nuclear models and particle Physics

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Study the phenomenon of radioactivity
	CO2	Understand Alpha and Beta particles and Gamma rays
	CO3	Gain knowledge on nuclear properties
	CO4	Acquire knowledge on nuclear models
	CO5	Gain knowledge on elementary particles

Sub. Code: 24PPH2CL

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Practical 1 – General Experiments**			
Batch	**Semesters**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**1 & 2**	**5**	**150**	**5**	

Course Objectives

To enable the learners to

1. Perform experiments in the field of general Physics
2. Explain physical phenomena and enable to relate physical laws and their applications
3. Apply standard techniques and analyze the experimental results and output.

Course outcomes (CO)

On successful completion of the course, the students will be able to

K3,K4,K5	**CO1**	Have a foundation in fundamentals and applications of general Physics
	CO2	Able to design, carry out record and analyze experimental data.
	CO3	Provide hands on experiences in conducting laboratory experiments.
	CO4	Understand the relationship between theory and experimental results.
	CO5	Practice record keeping of experimental work and data graphing.

Sub. Code: 24PPH2CM

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Practical 2 – Electronics Experiments**			
Batch	**Semesters**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**1 & 2**	**5**	**150**	**4**	

Course Objectives

To enable the learners to

1. Design and construct electronic circuits
2. Develop experimental skills and understand relation between experimental data and theoretical analysis.
3. Have a foundation in the fundamentals and applications of experimental Physics.

Course outcomes (CO)

On successful completion of the course, the students will be able to

K3,K4,K5	**CO1**	Acquire a basic knowledge in solid state electronics
	CO2	Analyse and design analog electronic circuits using discrete components.
	CO3	Observe the amplitude / frequency response of amplifiers.
	CO4	Take measurements to compare experimental results in the laboratory with the theoretical analysis.
	CO5	Practice record keeping of experimental work and data graphing.

Sub. Code: 24PPH4CN

Programme: 03		M.Sc. Physics			
Title of the Paper		Core Practical 3 – Advanced Experiments			
Batch	**Semesters**	**Hours/Week**	**Total Hours**	**Credits**	**Skill Development**
2024-2025	**3 & 4**	**5**	**150**	**5**	

Course Objectives

To enable the learners to

1. Perform experiments in the field of advanced Physics and interpret the results.
2. Explain physical phenomena and enable to estimate various related parameters and to analyze them.
3. Apply the experimental techniques to research level.

Course outcomes (CO)

On successful completion of the course, the students will be able to

K3,K4,K5	**CO1**	Gain fundamental knowledge on applications of advanced Physics.
	CO2	Understand the relationship between theory and experiments
	CO3	Provide hands on experiences in conducting scientific investigations
	CO4	Provide hands on experiences in conducting laboratory experiments.
	CO5	Recording and analyzing experimental data.

Sub. Code: 24PPH4CO

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Core Practical 4 – Special Electronics Experiments**			
Batch 2024-2025	**Semesters 3 & 4**	**Hours/Week 5**	**Total Hours 150**	**Credits 4**	**Skill Development**

Course Objectives

To enable the learners to

1. Design and construct special electronic circuits
2. Develop experimental skills and understand relation between experimental data and theoretical analysis.
3. Have a foundation in the fundamentals and applications of experimental Physics.

Course outcomes (CO)

On successful completion of the course, the students will be able to

K3,K4,K5	**CO1**	Acquire knowledge in solid state electronics
	CO2	Develop the ability to construct electronic circuits using discrete components.
	CO3	Acquire knowledge to construct Op. amp based circuits
	CO4	Acquire knowledge to construct microprocessor based circuits
	CO5	Understand the relation between theory and experiments

Sub. Code: 24PPH4Z1

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Project and Viva Voce**			
Batch 2024-2025	**Semester 4**	**Hours/Week 1**	**Total Hours 15**	**Credits 4**	**Skill Development**

Course objectives

To enable the learners to

1. Have foundations in the fundamentals of Physics and related area.
2. Acquire skills to develop a working model
3. Visualize the applications of theoretical concepts

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K3 to K5	**CO1**	Construct working models
	CO2	Gain expertise to present the idea systematically through PPT
	CO3	Get familiarized to develop a report on the project work
	CO4	Accomplish the result accumulation and data graphing
	CO5	Gain expertise to apply knowledge on multiciliary field

Programme: 03		M.Sc. Physics		
Title of the Paper		Major Elective Paper - Thin Film Physics, Plasma Physics and Crystal Growth		
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand the preparation and characterization of thin films
2. Understand the fundamentals of plasma Physics
3. Acquire knowledge about crystal growth techniques

Course outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand the principles, advantages and disadvantages of different thin film deposition methods
	CO2	Understand the growth mechanism of thin films
	CO3	Understand the fundamentals of plasma
	CO4	Can distinguish single particle approach and fluid approach
	CO5	Understand different crystal growth techniques

Programme: 03		M.Sc. Physics		
Title of the Paper		Major Elective Paper - Communication Physics		
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand various modulation and detection techniques
2. Acquire knowledge about antennas and wave propagation
3. Understand generation and propagation of microwaves
4. Acquire knowledge on radar and communication electronics

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand the concept of modulation and demodulation
	CO2	Understand the principle of antennas and wave propagation
	CO3	Knowledge on television and radar
	CO4	Acquire knowledge on communication electronics
	CO5	Understand microwave generation

Programme: 03		M.Sc. Physics		
Title of the Paper		Major Elective Paper - Energy Physics		
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

To enable the learners to

1. Know about Solar thermal and photovoltaic energy
2. Understand hydrogen energy, wind energy and ocean thermal energy
3. Understand energy auditing and carbon credits.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand Solar thermal energy
	CO2	Gain knowledge on solar photovoltaic energy
	CO3	Understand wind and ocean thermal energy
	CO4	Know about Hydrogen energy and Fuel cells
	CO5	Understand energy auditing and carbon credits

Programme code : 03		M.Sc. Physics		
Title of the Paper		Major Elective Paper - Industrial Physics		
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand power electronic devices
2. Understand voltage regulators, switching and counting circuits
3. Understand industrial heating system and production of vaccum

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand power electronic devices
	CO2	Understand voltage regulators
	CO3	Gain knowledge on switching and counting circuits
	CO4	Know about industrial heating system
	CO 5	Acquire knowledge on production of vacuum

Programme code : 03	M.Sc. Physics			
Title of the Paper	Major Elective Paper – Problems in Physics I			
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Skill Development

Course Objectives

To enable the learners to

1. Acquire knowledge and skills to solve problem through the concept behind physics
2. Apply creative thinking techniques towards realistic problem
3. Visualize the basic concepts clearly

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand and solve problems in mathematical methods in physics
	CO2	Understand and solve problems in experimental techniques and data analysis
	CO3	Understand and solve problems in atomic and molecular physics
	CO4	Understand and solve problems in condensed matter physics
	CO 5	Understand and solve problems in nuclear and particle physics

Programme code : 03	M.Sc. Physics			
Title of the Paper	Major Elective Paper – Semiconductor Devices			
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

To enable the learners to

1. Impart knowledge on application of semiconducting materials
2. Understand the photolithography and etching processes
3. Impart knowledge on IC manufacturing

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Understand silicon oxidation process
	CO2	Understand photolithography
	CO3	Gain knowledge on different etching processes
	CO4	Know about ion implantation
	CO 5	Acquire knowledge on production of ICs

Title of the Paper	Major Elective Paper – Photovoltaic Science			
Batch 2024-2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand the science behind photovoltaics
2. Understand he classification of solar cells
3. Understand the characterization of silicon and dye sensitized solar cells

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Explain Photovoltaic and solar cell
	CO2	Understand the basics about semiconductors
	CO3	Classification of amorphous silicon solar cell
	CO4	Construction and working of solar cells and Thin film fabrication methods.
	CO 5	Know about preparation and mechanism of dye sensitized solar cell.

Programme code : 03		M.Sc. Physics			
Title of the Paper		Major Elective Paper – Modern Optics			
Batch 2024-2025	Semester 1 / 2	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

To enable the learners to

1. Understanding necessary and sufficient condition for laser
2. Understanding basic principles involved in Non-linear optical effects
3. Understanding different types of optical fibers and its applications

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand polarization and optics of solids
	CO2	Understand laser action
	CO3	Gain knowledge about non-linear optics and its applications
	CO4	Know about construction of optical fibers
	CO 5	Acquire knowledge on applications of optical fibers

Programme: 03	M.Sc. Physics			
Title of the Paper	Non Major Elective Paper – Nanotechnology : Principles and Applications			
Batch 2024-2025	Hours/Week 4	Total Hours 60	Credits 4	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand the concepts in nanomaterials
2. know about different synthesis processes of nanomaterials
3. know about characterization techniques and applications of nanomaterials

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Understand the concepts in nanomaterials
	CO2	Know the synthesis methods of 0-D, 1-D, 2-D and 3-D nanomaterials
	CO3	Know the various characterization methods
	CO4	Gain knowledge on properties of nanomaterials
	CO5	Understand the applications of nanomaterials

Programme code : 03	M.Sc. Physics			
Title of the Paper	Non Major Elective Paper - Intellectual Property Rights			
Batch 2024-2025	Hours/Week 4	Total Hours 60	Credits 4	Entrepreneurship

Course Objectives

To enable the learners to

1. Understand the aspects of Intellectual Property Rights
2. Know about Patents, Copyrights, Trademarks and Registration aspects
3. Know about Design and Geographical Indication of IPR

Course outcomes (CO)

On successful completion of the course, the students will be able to

K1 to K5	CO1	Acquire knowledge about Intellectual Property Rights
	CO2	Understand about patents and patent registration
	CO3	Acquire knowledge on copyrights and registration
	CO4	Gain knowledge on trademarks and registration
	CO5	Understand the design and geographical indication of IPR

Programme Code : 03	M.Sc. Physics			
Title of the Paper	Non Major Elective Paper - Research Ethics			
Batch 2024-2025	Hours/Week 4	Total Hours 60	Credits 4	Skill Development

Course Objectives

To enable the learners

1. To understand the philosophy of science and ethics,
2. To know about research integrity and publication ethics.
3. To understand indexing, citation databases and the usage of plagiarism tools.
4. At the end of the course the student will have awareness about the publication ethics and publication misconducts

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 - K5	CO1	understand the philosophy of science and ethics, research integrity and publicationethics
	CO2	identify research misconduct and predatory publications
	CO3	Know about indexing and citation databases, open access publications, research metrics(citations, h-index, impact Factor, etc.)
	CO4	Understand the usage of plagiarism tools
	CO5	Gain knowledge on the publication ethics and publication misconducts

Subject Code: 24PGI4N2

Programme Code: 03		M.Sc Physics			
Title of the Paper		Non-Major Elective Paper: Information Security			
Batch 2024-2025	Semester 4	Hours/Week 4	Total Hours 60	Credits 4	Skill Development

Course Objectives

1. Students will identify the core concepts of Information security.
2. To examine the concepts of Information Security.
3. To design and implement the security features for IT and Industrial sectors.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K1 – K5	CO1	To Learn the principles and fundamentals of information security.
	CO2	To Demonstrate the knowledge of Information security concepts
	CO3	To Understand about Information Security Architecture.
	CO4	To Analyze the various streams of security in IT and Industrial sector.
	CO5	To know about Cyber Laws and Regulations.

Subject Code: 24PPH3X1

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**EDC - Biomedical Instrumentation**			
Batch 2024-2025	**Semester 3**	**Hours/Week 2**	**Total Hours 30**	**Credits 2**	**Employability**

Course Objective

To enable the learners to

1. Gain knowledge on bioelectric signals and transducers
2. Understand blood gas analyzers, pulmonary function analyzers and Oximeters
3. Understand the modern imaging systems and electrical safety

Course outcome (CO)

On successful completion of the course, the students will be able to

K1 to K5	**CO1**	Gain knowledge on bioelectric signals and transducers
	CO2	Understand Blood gas analyzers, pulmonary function analyzers and Oximeters
	CO3	Acquire knowledge on blood cell counters and audiometer
	CO4	Acquire knowledge on bio-medical recorders
	CO5	Gain knowledge on modern imaging systems and electrical safety

Programme: 03	M.Sc. Physics
Title of the Paper	ALC - Advanced Experimental Techniques
Batch	2024-2025
Extra Credits	2

Course Objective

To enable the learners to

1. Understand different types of structural and surface morphological andspectrosco
2. Gain knowledge about magnetic techniques
3. Understand thermal analytical techniques

Course outcome (CO)

K1 to K5	CO1	Gain knowledge on structural characterization
	CO2	Acquire knowledge on spectroscopic analysis
	CO3	Gain knowledge on morphological techniques
	CO4	Acquire knowledge on magnetic properties of materials
	CO5	Gain knowledge on thermal analytical techniques

Sub. Code: 24PDP101

Programme code : 03		**PG Diploma in Particle Accelerator**			
Title of the Paper		**Core Paper 1 – Nuclear Physics**			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Employability**
2024-2025	**1**	**2**	**30**	**2**	

Course Objectives

To enable the learners to know about the

4. Basic properties of nucleus.
5. Various nuclear forces, nuclear models and nuclear reaction.
6. Different types of nuclear detectors.

Course outcomes (CO)

K1 to K5	**CO1**	Know about basic properties of nucleus.
	CO2	Gain knowledge about nuclear forces.
	CO3	Acquire knowledge about nuclear models.
	CO4	Know about nuclear reactions.
	CO5	Understand the working of various nuclear detectors.

Sub. Code: 24PDP102

Programme code : 03		PG Diploma in Particle Accelerator			
Title of the Paper		Core Paper 2 – Radioactivity			
Batch 2024-2025	Semester 1	Hours/Week 2	Total Hours 30	Credits 2	Employability

Course Objectives

To enable the learners to know about the

1. Basics of radioactivity and its types.
2. Characteristics of alpha (α), beta (β) and gamma (γ) rays.
3. Fundamental laws of radioactivity.

Course outcomes (CO)

K1 to K5	**CO1**	Know about basics of radioactivity and its types.
	CO2	Gain knowledge about alpha rays.
	CO3	Acquire knowledge about beta rays.
	CO4	Know about gamma rays.
	CO5	Understand the fundamentals laws of radioactivity.

Sub. Code: 24PDP103

Programme code : 03		PG Diploma in Particle Accelerator			
Title of the Paper		Core Paper 3 – Charged Particle Interaction			
Batch 2024-2025	Semester 1	Hours/Week 2	Total Hours 30	Credits 2	Employability

To enable the learners to know about the

1. Basics of particle interaction.
2. Interaction of electromagnetic waves with matter.
3. Pair production.

Course outcomes (CO)

K1 to K5	**CO1**	Know about basics of particle interaction.
	CO2	Gain knowledge about interaction of electromagnetic waves with matter.
	CO3	Acquire knowledge about photoelectric effect.
	CO4	Know about Compton effect.
	CO5	Understand pair production.

Sub. Code: 24PDP204

Programme code : 03		PG Diploma in Particle Accelerator			
Title of the Paper		Core Paper 4 – Physics of Basic Particle Accelerators			
Batch 2024-2025	Semester 2	Hours/Week 2	Total Hours 30	Credits 2	Employability

To enable the learners to know about the

1. Importance of particle accelerators.
2. Various types of accelerators and their applications.
3. Working principles, limitations and applications of Cyclotron, Betatron, Synchrotron and Microtron.

Course outcomes (CO)

K1 to K5	**CO1**	Know about particle accelerators and its types.
	CO2	Gain knowledge about RF linear accelerator.
	CO3	Acquire knowledge about linear accelerator designs and set up.
	CO4	Know about Cyclotron and Betatron.
	CO5	Understand Synchrotron and Microtron.

Sub. Code: 24PDP205

Programme code : 03		PG Diploma in Particle Accelerator			
Title of the Paper		Core Paper 5 – Physics of Advanced Particle Accelerators			
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**	**Employability**
2024-2025	**2**	**2**	**30**	**2**	

To enable the learners to know about the

1. Charged particle dynamics.
2. Importance of advanced particle accelerators.
3. Various types of advanced accelerators and their applications.

Course outcomes (CO)

K1 to K5	**CO1**	Know about charged particle dynamics.
	CO2	Gain knowledge about RIB accelerator science.
	CO3	Acquire knowledge about ion source for particle accelerators.
	CO4	Know about synchrotron radiation.
	CO5	Understand advance accelerators.

Sub. Code: 24PDP206

Programme code : 03		PG Diploma in Particle Accelerator			
Title of the Paper		Core Paper 6 – Elementary Particles			
Batch 2024-2025	Semester 2	Hours/Week 2	Total Hours 30	Credits 2	Employability

To enable the learners to know about the

1. Fundamental interaction of elementary particles.
2. Various conservation laws of elementary particles.
3. Production and properties of various elementary particles.

Course outcomes (CO)

K1 to K5	**CO1**	Know about fundamental interaction of elementary particles.
	CO2	Gain knowledge about various conservation laws.
	CO3	Acquire knowledge about production and properties of various elementary particles.
	CO4	Know about mesons and its properties.
	CO5	Understand quarks and its properties.

Sub. Code: 24PDP2Z2

Programme: 03		**M.Sc. Physics**			
Title of the Paper		**Project and Viva Voce**			
Batch 2024-2025	**Semester 2**	**Hours/Week 2**	**Total Hours 30**	**Credits 2**	**Skill Development**

Course objectives

To enable the learners to

1. Have foundations in the fundamentals of Particle accelerators.
2. Acquire knowledge on elementary particles
3. Understand the applications of radioactive materials

Course Outcomes (CO)

On successful completion of the course, the students will be able to

K3 to K5	**CO1**	Construct working models
	CO2	Gain expertise to present the idea systematically through PPT
	CO3	Get familiarized to develop a report on the project work
	CO4	Accomplish the result accumulation and data graphing
	CO5	Gain expertise to apply knowledge on multiciliary field