DEPARTMENT OF PHYSICS

The Physics Department of the college was established in 1998. The department started M.Sc. Physics from the session 2016. The department provides a very vibrant and dynamic academic ambience with effective tutorial work, discussions and seminars. The department facilitates opportunities for higher studies and placements**.**

VISION

- Provide the highest quality education to students, nurture their talent, promote intellectual growth and shape their personal development
- Remain dedicated and steadfast in the pursuit of truth
- To build a foundation for excellence and encourage the development of the institution as a premier institution by igniting enthusiasm, interest and passion

MISSION

- To create transformative educational experience for students
- Focus on deep disciplinary knowledge, problem solving, leadership, communication and interpersonal skills
- To promote exchange of innovative ideas across the disciplines through effective use of teaching learning methods, tools and techniques
- Our mission is to towards enhancing the employability of students of the college through continuous personality programs, workshops etc.
- To organize and sustain efficient operating systems in the Department for realization of our objectives as Institution of eminence and International standards

OBJECTIVES

- To make students confident and versatile problem solver who use physical intuition together with analytical and quantitative skills
- To develop a solid grasp of over concepts and application of core subjects
- To teach students how physics and other disciplines have impacted and continue to impact each other and society

- To engage students vigorously in further studies and variety of other lifelong learning opportunities

Programme run by department:

1. M.Sc. (PHYSICS) (Programme code: MSCPHY)

M.Sc. (PHYSICS)

Program Outcomes

On successful completion of M.Sc. (PHYSICS) programme, the students will be able to develop following attributes, qualities and skills:

PO 1	**Disciplinary knowledge**	Capable of demonstrating good knowledge and understanding of major concepts, theoretical principles experimental findings in Physics and its different subfields.
PO 2	**Communication skills**	Ability to transmit complex technical information relating all areas in Physics in a clear and concise manner and technical concepts in a simple language for better understanding.
PO 3	**Critical thinking**	Critical thinker and problem solver: Ability to employ critical thinking and efficient problem solving skills in all the basic areas of Physics
PO 4	**Problem solving**	Capability for asking appropriate questions relating to the issues and problems in the field of Physics, and planning, executing and reporting the results of a theoretical or experimental investigation.
PO 5	**Analytical Reasoning**	Demonstrate the ability to evaluate the reliability and relevance of evidence, identify logical flaws and holes in the arguments of others, analyse and synthesise data from a variety of sources, draw valid conclusions.
PO 6	**Research-related Skills**	Demonstrate a sense of inquiry and capability for asking relevant questions, problematizing, synthesising and articulating, demonstrate the ability to recognise cause-and-effect relationships, define problems, formulate and test hypotheses, analyse, interpret and draw conclusions from data.
PO 7	**Collaboration/Cooperation/Team work**	Demonstrate ability to work effectively and respectfully with diverse teams, facilitate coordinated effort on the part of a group, and act together as a group in the interests of a common cause and work efficiently as a member of a team.

PO 8	**Scientific Reasoning using Quantitative/Qualitative Data**	Demonstrate the ability to understand cause-and-effect relationships, define problems, apply scientific principles, analyse, interpret and draw conclusions from quantitative/qualitative data.
PO 9	**Reflective Thinking**	Demonstrate critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.
PO 10	**Information/Digital Literacy**	Capable of using computers for simulation studies in Physics and computation and appropriate software for numerical and statistical analysis of data.
PO 11	**Self-Directed Learning**	Demonstrate ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
PO 12	**Multicultural Competence**	Demonstrate knowledge of the values and beliefs of multiple cultures and a global perspective, effectively engage in a multicultural society.
PO 13	**Moral and Ethical Awareness/Reasoning**	The graduate should be capable of demonstrating ability to think and analyse rationally with modern and scientific outlook and identify ethical issues related to one's work.
PO 14	**Leadership Readiness/Qualities**	Demonstrate capability for mapping out where one needs to go to "win" as a team or an organization, and set direction, formulate an inspiring vision.
PO 15	**Lifelong Learning**	Demonstrate the ability to acquire knowledge and skills, including 'learning how to learn' that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development.

Program Specific Outcomes (PSOs)

PSO1	Students are expected to acquire core knowledge in physics, including the major premises of classical mechanics, quantum mechanics, electromagnetic theory, electronics, nuclear and particle physics, special theory of relativity and modern physics.
PSO2	Students are also expected to develop a written and oral communication skill in communicating physics-related topics.
PSO3	Students should learn how to design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes. Not only that they are expected to have understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.
PSO4	Students will develop the proficiency in the acquisition of data using a variety of laboratory

	instruments and in in the analysis and interpretation of such data.
PSO5	Develop the following experiment tools: Numerically model simple physical systems for which analytical methods are inappropriate or of limited utility.

Course Outcomes (COs) of M.Sc. Physics

Semester	Course Title	College Code	COURSE OUTCOMES On completion of course student will be able to:	
Semester 1st	**Mathematical Physics I**	**MSPHY 101**	**CO1**	Learn the way to solve differential equations like Legendre, Bessel and Hermite that are common in physical sciences.
			CO2	Gain the complete knowledge about different partial differential equations encountered in physical problems and draw inferences from solutions.
			CO3	Fully understand transfer functions in instrumentation using Laplace transforms.
			CO4	Learn the method to apply Fourier transforms in Holography.
			CO5	Understand the way to use complex numbers and variables.
			CO6	Apply the knowledge of Tensors to understand phenomenon like stress and strain.
	Classical Mechanics	**MSPHY 102**	**CO1**	Understand the concept of Lagrangian and Hamiltonian approaches in classical mechanics.
			CO2	Solve the classical background of Quantum mechanics and get familiarized with Poisson brackets and Hamilton -Jacobi equation
			CO3	To know how to impose constrains on a system in order to simplify the method to be used in solving physics problems,
			CO4	To establish the Kepler's law are just consequences of Newton's law of gravitation and that of motion.
			CO5	To find the linear approximation to dynamical system near equilibrium and also know how to derive and solve the wave equation for small oscillations.
			CO6	To distinguish between 'inertial frame of reference' and 'non-inertial frame of reference.
	Quantum Mechanics-I	**MSPHY 103**	**CO1**	Develop knowledge and understanding the concept that quantum states live in vector space.
			CO2	Elate this abstract formulation to wave and matrix mechanics.
			CO3	Familiarize with the concept of Linear vector space, Hilbert space, concepts of basis, operators and bra ket notation.
			CO4	Analyze angular momentum, spin matrices and Clebsh-

				Gorden coefficient.
			CO5	Develop knowledge and understanding of perturbation theory, level splitting.
			CO6	Learn about various approximation methods utilized in Quantum Mechanics.
	Electronics I	**MSPHY 104**	**CO1**	Learn the way to use OP Amps as summation, subtractor, sine wave generator , square wave generator and triangular wave generator .
			CO2	Have deep theoretical knowledge of wave guides, transmission lines, microwave components, microwave tubes and devices.
			CO3	Fully understand the working of transistor at high frequency, working of transistorized and IC based multivibrator circuits .
			CO4	Understand the construction, operation and characteristics of JFET and MOSFET , which can be used in design of amplifiers .
			CO5	Understand the concept of feedback and design feedback amplifier.
			CO6	Analyze the concepts of SCR and observe its characteristics.
	Physics Practical I	**MSPHY 105**	**CO1**	Learn various experimental techniques and various apparatus.
			CO2	Co-relate the theoretical concepts with experimental one and develop confidence to handle sophisticated equipment wherever necessary.
			CO3	Adopt the skills related to research, education, and industry-academia.
	Computationa l Physics I	**MSPHY 106**	**CO1**	Learn about various numerical methods and their interpretation.
			CO2	Learn C++, Programming Language Algorithm, Structure programming.
			CO3	Analyze numerical problems.
	Mathematical Physics II	**MSPHY 201**	**CO1**	To know the method of contour integration to evaluate definite integrals of varying complexity.
			CO2	Have gained ability to apply group theory to physics problems, which is pre-requisite for deeper understanding of crystallography, particle physics quantum mechanics and energy bands in solids.
			CO3	Be able to apply calculus of variations to diverse problems in physics including isoperimetric problems. Another interesting aspect is the use of Lagrange multipliers in solving physics problems.
			CO4	To become familiar with the method of Green's function to solve linear differential equations with inhomogeneous term.
			CO5	To find solutions to integral equations using different

Semester 2nd				methods.
			CO6	Apply the knowledge of tensors to understand phenomenon like stress and strain.
	Statistical Mechanics	**MSPHY 202**	**CO1**	Explain statistical physics and thermodynamics as logical consequences of postulates of statistical mechanics.
			CO2	Apply the principles of statistical mechanics to selected problems.
			CO3	Grasp the basis of ensemble approach in statistical mechanics to range of situations.
			CO4	Analyze important examples of ideal Bose systems and Fermi systems.
			CO5	Discuss various phenomena in solids using statistical mechanics.
			CO6	Develop and apply Ising model and mean field theory for first and second order phase transitions.
	Classical Electrodynamics- I	**MSPHY 203**	**CO1**	Understand the concept of Coulomb's law, Gauss law, Laplace and Poisson's equation in the electrostatic field.
			CO2	Be able to understand the concept of multipole expansion of the scaler potential and energy of a charge distribution.
			CO3	Knowledge on the electrostatics of dielectrics.
			CO4	To explain and solve the Maxwell's equation and Boundary value problems.
			CO5	Students will be able to grasped the idea of electromagnetic wave propagation through wave guides and transmission line.
			CO6	Gain of Knowledge to analyse the radiation systems in which the electric dipole, magnetic dipole or electric quadrupole dominate.
	Electronics – II	**MSPHY 204**	**CO1**	Understand different type of codes and number systems used in digital communication and computer systems.
			CO2	Describe and explain the operation of fundamental digital gates.
			CO3	Design combinational and sequential circuits.
			CO4	Analyze the operation of a flip - flop and examine relevant timing diagrams.
			CO5	Analyze the operation of counters and shift registers.
			CO6	Understand the architecture and use of microprocessors and microcontrollers for the basic operations.
	Physics Practical- II	**MSPHY 205**	**CO1**	Learn various experimental techniques and various apparatus.
			CO2	Co-relate the theoretical concepts with experimental one and develop confidence to handle sophisticated equipment wherever necessary.
			CO3	Adopt the skills related to research, education, and industry-

				academia.
	Computational Physics- II	**MSPHY 206**	**CO1**	To describe and use software tools in the programming process.
			CO2	Acquire skills in C++ programming language.
			CO3	Analyze Physics problems using numerical methods and programing.
Semester 3rd	**Nuclear Physics I**	**MSPHY 301**	**CO1**	Demonstrate knowledge of fundamental aspects of the structure of nucleus, nuclear forces, radioactivity and nuclear reactions.
			CO2	Familiarize with wave mechanical properties of nuclei, electric and magnetic moments.
			CO3	Acquire knowledge about nuclear decay processes and their outcomes.
			CO4	Understanding the theory behind nuclear experimental technologies.
			CO5	Grasp knowledge about Nuclear reactions, Fission and Fusion and their characteristics.
			CO6	Understanding the applications of nuclear techniques in various field.
	Particle Physics – I	**MSPHY 302**	**CO1**	Understand the basic forces in nature and classification of particles and study in detail conservation laws and quark models in detail.
			CO2	Fully understand the C, P, T invariance and relativistic kinematics.
			CO3	Familiar with the spin parity concept.
			CO4	Learn about interaction among elementary particles and understand their behaviour.
			CO5	Learn about the decay phenomenon and the process how they will occur.
			CO6	Understand the experimental techniques related to high energy physics.
	Condensed Matter Physics –I	**MSPHY 303**	**CO1**	Knowledge on Elementary Crystallography, basis, crystal class and Ewald construction.
			CO2	The subject treats functional materials from an experimental viewpoint, solid state theory and properties.
			CO3	Knowledge on lattice vibrations and thermal properties and quantization of lattice vibration, phonon momentum.
			CO4	Dielectric properties of insulators and Ferro electricity.
			CO5	Magnetic properties of solids, Diamagnetism, paramagnetic susceptibility and ferromagnetism is discussed and a quantum picture of Heisenberg exchange energy is covered.
			CO6	Semiconductors and their properties include motion of hole – electron pair-carrier transport equation.

	Classical Electrodynamics-II	**MSPHY 304**	**CO1**	Master the technique of deriving and evaluating formulae for the electromagnetic fields from general charge and current distribution.
			CO2	Fully understand the electro dynamic problems in relativistically covariant form in 4 dimensional space-time.
			CO3	Be familiar with elementary phenomenon and concepts in quantum electrodynamics.
			CO4	Interpret the deeper meaning of field equations and account for the frames of referenc .
			CO5	Learn the way to solve transformations in the form of Lorentz along with length contraction and time dilation.
			CO6	Understand the method to illustrate scatterings in the order of Reyleigh and Thomson to understand the concept of bound or free electron.
	Quantum Mechanics-II	**MSPHY 305**	**CO1**	Understand the concept of scattering theory and validity of Born approximation and partial wave analysis.
			CO2	Have deep knowledge about relativistic Quantum mechanics using Dirac equation and K.G equations.
			CO3	Have basic knowledge about advanced technique like approximation method for time independent problem like the WKB approximation.
			CO4	Understand the exposure of quantum field theory and universal interactions.
			CO5	Know about Various tools to understand field quantization and related concepts.
	Physics Practical III	**MSPHY 306**	**CO1**	Understand experimental techniques in various fields of physics such as nuclear physics, Practical physics, Electronics.
			CO2	Adopt the skills related to research, education, and industry-academia.
			CO3	Co-relate the theoretical concepts with experimental one and develop confidence to handle sophisticated equipment wherever necessary.
Semester 4th	**Experimental Techniques in physics**	**MSPHY 401**	**CO1**	Have gained a clear understanding of different vacuum pumps and the production and maintenance of vacuum systems and its uses and needs in Physics.
			CO2	Understands in depth about thin film preparation and production controlling techniques and the applications of thin films in the field of Science and technology.
			CO3	Extend their understanding of various particle accelerators and its industrial uses.
			CO4	Understand about different material analysis techniques and applications.

			CO5	Understand about electronics and experimental methods.
			CO6	Basic knowledge about interaction of gamma rays, electrons, heavy charge particles, neutrons, neutrinos and other particles with matter.
	Atomic and Molecular Physics	**MSPHY 402**	**CO1**	Acquire basic knowledge about fine structure of atom, spin orbit interaction, LS and JJ coupling.
			CO2	Learn about Zeeman effect, Paschen-Back effect, Stark effect, Lande's factor.
			CO3	Understand the concept of spontaneous and stimulated emission and study various types of lasers like He-Ne laser, Ruby laser, CO_2 laser.
			CO4	Knowledge about Molecular spectra like rotational and vibrational and their interaction.
			CO5	Familiarize with Frank-Condon principle, Born-Oppenheimer approximation.
			CO6	Knowledge about various spectrometers, instrumentation, ESR and NMR.
	Physics Practical IV	**MSPHY 403**	**CO1**	Understand experimental techniques in various fields of physics such as nuclear physics, Practical physics, Electronics.
			CO2	Adopt the skills related to research, education, and industry-academia.
			CO3	Co-relate the theoretical concepts with experimental one and develop confidence to handle sophisticated equipment wherever necessary.
	(Special Subjects) Nuclear Physics	**MSPHY 404**	**CO1**	Grasp knowledge about various nuclear models and potential associated.
			CO2	Familiarize with C.G. coefficient, Racah Coefficients, L-S and jj coupling.
			CO3	Deep knowledge about collective model of nucleus, rotational spectra for even-even and odd A nuclei, electric and quardrupole moments.
			CO4	Learn about nuclear reactions and their properties, Breit-Wigner Dispersion Formula, Compound nucleus and its cross section.
			CO5	Understand about kinematics of stripping and pickup reactions.
			CO6	Knowledge about harmonic anisotropic oscillator, Backbending phenomenon, nuclear halos, proton rich nuclei and production of super-heavy nuclei.
	Condensed Matter Physics–II	**MSPHY 406**	**CO1**	Knowledge of the concept of optical properties.
			CO2	Magnetic properties of solids, Diamagnetism, paramagnetic susceptibility and ferromagnetism, anti-ferromagnetism,

				ferrimagnetism and ferrites are discussed.
			CO3	Knowledge on superconductivity and their effects.
			CO4	To study the BCS theory and Josephson effect.
			CO5	Detail study in Defects and their types in the solids.
			CO6	Learn about Liquid crystals and their types.

Mapping of Course Outcomes (COs) with Programme Outcomes(POs)

Programme Outcome																
College code	**Course Out-comes**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PO 13**	**PO 14**	**PO 15**
Semester I																
MSPHY101	**CO1**	2	1	X	X	X	X	1	2	1	X	X	X	1	X	1
	CO2	1	X	1	X	1	X	X	X	1	2	1	3	2	1	X
	CO3	2	3	1	2	2	1	1	2	1	2	1	1	2	X	X
	CO4	1	2	X	X	X	X	1	2	3	1	2	1	1	X	X
	CO5	1	1	X	1	2	X	X	1	1	X	1	2	X	X	1
	CO6	2	2	1	2	1	X	2	2	2	1	2	1	2	X	1
MSPHY102	**CO1**	3	2	X	1	2	1	X	3	X	1	X	1	X	X	X
	CO2	1	1	2	1	X	X	X	2	1	X	X	X	X	X	X
	CO3	X	1	2	3	2	3	1	3	X	X	X	X	X	X	X
	CO4	X	2	1	1	2	1	X	1	X	X	X	X	X	X	1
	CO5	X	2	1	1	X	2	1	X	1	X	X	X	X	X	1
	CO6	2	2	1	X	2	1	1	X	X	X	X	X	X	X	1
MSPHY103	**CO1**	3	2	2	1	X	1	X	1	X	X	X	X	X	X	X
	CO2	1	X	2	2	X	1	X	1	X	X	X	X	X	1	X
	CO3	2	3	3	2	X	X	X	1	X	X	X	X	1	X	X
	CO4	2	1	2	3	X	1	X	2	X	X	X	X	1	X	X
	CO5	3	X	1	2	X	X	X	1	X	X	X	X	X	X	X

	CO6	2	1	2	2	X	1	X	2	X	X	X	X	1	X	X
MSPHY104	**CO1**	2	1	1	1	X	2	1	2	2	2	X	X	1	3	2
	CO2	1	X	1	1	1	2	X	2	2	2	1	1	2	3	2
	CO3	2	3	1	2	2	3	1	2	2	2	1	1	2	2	2
	CO4	1	2	2	1	X	2	1	2	2	1	1	1	1	2	3
	CO5	1	1	2	1	2	2	X	2	2	2	1	2	X	2	3
	CO6	2	2	1	2	1	2	1	3	2	2	1	1	2	3	3
MSPHY105	**CO1**	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO2	3	1	1	X	1	X	X	1	X	1	X	X	X	X	X
	CO3	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
MSPHY106	**CO1**	3	X	1	2	X	X	X	X	X	2	1	X	X	X	2
	CO2	2	1	2	2	1	X	X	2	X	2	1	X	X	X	2
	CO3	3	X	1	3	X	X	X	X	X	2	1	X	X	X	2
Semester-II																
MSPHY201	**CO1**	2	1	X	X	X	X	1	2	1	X	X	X	1	X	1
	CO2	1	X	1	X	1	X	X	X	1	2	1	3	2	1	X
	CO3	2	3	1	2	2	1	1	2	1	2	1	1	2	X	X
	CO4	1	2	X	X	X	X	1	2	3	1	2	1	1	X	X
	CO5	1	1	X	1	2	X	X	1	1	X	1	2	X	X	1
	CO6	2	2	1	2	1	X	2	2	2	1	2	1	2	X	1
MSPHY202	**CO1**	2	1	1	1	X	2	1	2	2	2	X	X	1	3	1
	CO2	1	X	1	1	1	2	X	2	2	2	1	1	2	3	2
	CO3	1	X	1	2	2	3	1	2	2	X	1	X	2	1	2
	CO4	1	2	X	1	X	2	1	2	2	1	X	1	1	2	2
	CO5	1	1	2	1	2	2	X	2	2	2	1	2	X	2	1
	CO6	2	2	1	2	1	2	1	3	1	2	1	1	2	3	1
MSPH	**CO1**	3	2	2	2	1	2	X	1	X	X	X	X	X	X	X

Y203	**CO2**	3	1	2	2	X	1	X	1	X	X	X	X	X	X	X
	CO3	3	2	2	2	2	1	1	1	1	X	1	X	X	X	1
	CO4	3	2	2	2	X	X	1	2	X	X	X	X	X	X	X
	CO5	2	1	1	1	X	X	X	2	X	X	X	X	X	X	X
	CO6	2	2	2	2	X	X	1	2	X	X	X	X	X	X	X
MSPHY204	**CO1**	1	1	2	1	X	2	1	2	1	1	X	X	1	3	2
	CO2	1	X	1	1	1	2	X	2	2	2	1	1	2	3	2
	CO3	2	3	1	2	2	3	1	2	2	2	1	1	2	2	2
	CO4	1	2	2	1	X	2	1	2	2	2	3	1	1	3	3
	CO5	X	1	2	1	2	2	X	2	2	2	1	2	X	2	1
	CO6	2	X	1	2	3	X	1	3	X	2	1	3	2	1	3
MSPHY205	**CO1**	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO2	3	1	1	X	1	X	X	1	X	1	X	X	X	X	X
	CO3	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
MSPHY206	**CO1**	1	1	1	X	2	X	X	X	X	1	1	X	X	X	2
	CO2	2	2	1	2	2	1	X	X	X	2	1	X	X	X	2
	CO3	3	2	X	1	3	X	X	X	X	2	1	X	X	X	2
Semester-III																
MSPHY301	**CO1**	3	1	2	X	X	2	X	1	X	X	X	X	1	X	X
	CO2	1	1	2	2	X	1	X	1	X	X	X	X	1	X	X
	CO3	2	1	1	2	1	2	X	1	X	X	X	X	2	X	X
	CO4	2	3	2	1	1	3	1	2	X	2	X	X	2	1	X
	CO5	1	2	2	2	X	3	1	2	X	X	X	X	2	X	1
	Practical	3	1	2	3	2	3	1	2	X	1	2	1	3	1	1
MSPHY302	**CO1**	2	1	1	1	X	2	1	2	1	X	X	2	1	X	1
	CO2	1	X	1	1	1	2	1	1	2	1	X	3	X	1	X

	CO3	2	2	1	2	2	2	2	2	1	1	X	2	2	X	1
	CO4	1	2	X	X	X	2	1	2	2	1	X	2	1	X	X
	CO5	1	1	1	1	2	2	X	1	1	X	X	2	X	1	1
	CO6	2	2	1	X	1	2	1	2	2	X	X	1	2	X	1
MSPHY303	**CO1**	3	2	2	X	1	2	X	1	X	X	X	X	1	X	X
	CO2	3	1	2	2	X	1	X	1	X	X	X	X	1	1	X
	CO3	3	2	1	2	1	1	X	1	X	X	X	X	2	X	X
	CO4	3	2	2	1	1	2	1	2	X	X	X	X	2	1	X
	CO5	2	2	2	2	1	3	1	2	X	X	X	1	2	X	1
	CO6	2	2	2	3	1	2	1	2	X	X	2	1	2	1	X
MSPHY304	**CO1**	2	1	X	X	X	X	1	2	1	X	X	X	1	X	1
	CO2	1	X	1	X	1	X	X	X	1	2	1	3	2	1	X
	CO3	2	3	1	2	2	1	1	2	1	2	1	1	2	X	X
	CO4	1	2	X	X	X	X	1	2	3	1	2	1	1	X	X
	CO5	1	1	X	1	2	X	X	1	1	X	1	2	X	3	1
	CO6	2	2	1	2	1	X	2	2	2	1	2	1	2	X	1
MSPHY305	**CO1**	3	2	X	1	2	1	X	3	X	1	X	1	X	X	X
	CO2	1	1	2	1	X	X	X	2	1	X	X	X	X	X	X
	CO3	X	1	2	3	2	3	1	3	X	X	X	X	X	X	X
	CO4	X	2	1	1	2	1	X	1	X	X	X	X	X	X	1
	CO5	X	2	1	1	X	2	1	X	1	X	X	X	X	X	1
MSPHY306	**CO1**	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO2	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO3	3	2	X	1	X	X	X	1	X	1	X	X	X	X	X
Semester-IV																
MSPHY401	**CO1**	2	1	X	X	X	X	1	2	1	X	X	X	1	X	1
	CO2	1	X	1	X	1	X	X	X	1	2	1	3	2	1	X

	CO3	2	3	1	2	2	1	1	2	1	2	1	1	2	X	X
	CO4	1	2	X	X	X	X	1	2	3	1	2	1	1	X	X
	CO5	1	1	X	1	2	X	X	1	1	X	1	2	X	3	1
	CO6	2	2	1	2	1	X	2	2	2	1	2	1	2	X	1
MSPHY402	**CO1**	3	2	3	2	1	1	1	2	X	X	1	X	X	X	X
	CO2	3	2	2	2	1	2	X	2	X	X	X	X	X	X	X
	CO3	3	2	2	1	1	2	X	1	X	1	1	X	X	X	1
	CO4	3	2	2	1	1	2	1	2	X	X	X	X	X	X	X
	CO5	3	2	2	2	1	1	1	2	X	X	1	X	X	X	X
	CO6	2	2	2	1	1	3	1	2	X	1	2	X	X	1	1
MSPHY403	**CO1**	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO2	3	2	X	1	X	X	X	1	X	2	X	X	X	X	X
	CO3	3	2	X	1	X	X	X	1	X	1	X	X	X	X	X
MSPHY404	**CO1**	3	2	2	1	X	1	X	2	X	X	X	X	1	X	X
	CO2	3	2	3	3	X	1	X	1	1	X	X	X	1	X	X
	CO3	3	2	2	1	X	2	X	2	X	1	X	X	1	X	X
	CO4	3	2	2	2	1	2	1	2	X	1	X	X	2	X	1
	CO5	3	2	2	2	X	2	1	2	X	1	X	X	2	X	1
	CO6	3	2	1	1	X	1	X	1	X	X	X	X	X	X	X
MSPHY406	**CO1**	3	2	2	1	1	2	1	2	X	X	1	X	X	1	1
	CO2	3	2	2	2	2	1	X	1	X	X	X	X	X	X	X
	CO3	3	2	2	2	1	1	X	1	X	X	1	X	X	X	X
	CO4	3	2	2	1	1	2	1	2	X	X	X	X	X	X	1
	CO5	3	2	2	2	1	3	1	2	X	X	1	X	X	X	X
	CO6	2	2	2	1	1	1	1	1	X	X	2	X	X	X	X

Mapping of Course Outcomes (COs) with Programme Specific Outcomes(PSOs)

College code	Course Outcomes	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
MSPHY101	**CO1**	3	1	1	X	X
	CO2	3	2	1	X	X
	CO3	3	1	X	1	X
	CO4	3	1	1	X	X
	CO5	3	2	X	X	X
	CO6	3	1	X	1	X
MSPHY102	**CO1**	1	2	3	X	X
	CO2	1	2	1	X	X
	CO3	2	1	X	1	X
	CO4	X	2	X	X	1
	CO5	1	X	1	1	X
	CO6	1	1	X	X	1
MSPHY103	**CO1**	3	2	X	X	X
	CO2	3	3	1	1	1
	CO3	3	3	1	X	1
	CO4	3	2	2	1	1
	CO5	3	2	1	X	X
	CO6	3	2	X	2	1
MSPHY104	**CO1**	2	3	1	2	3
	CO2	2	2	2	1	3
	CO3	2	2	2	1	2
	CO4	1	1	3	3	1
	CO5	X	2	2	2	1
	CO6	1	X	2	2	2

MSPHY105	**CO1**	2	2	2	1	1
	CO2	2	1	1	1	2
	CO3	2	2	1	1	1
MSPHY106	**CO1**	2	X	X	2	1
	CO2	2	1	1	2	1
	CO3	2	1	1	2	1
MSPHY201	**CO1**	3	1	1	X	X
	CO2	3	2	1	X	X
	CO3	3	1	X	1	X
	CO4	3	1	1	X	X
	CO5	3	2	X	X	X
	CO6	3	1	X	1	X
MSPHY202	**CO1**	2	1	1	3	1
	CO2	2	2	2	1	2
	CO3	2	2	1	1	2
	CO4	1	1	3	3	1
	CO5	X	2	2	1	1
	CO6	1	X	2	2	X
MSPHY203	**CO1**	3	3	X	X	X
	CO2	2	2	X	X	X
	CO3	3	3	1	X	X
	CO4	3	2	X	X	X
	CO5	3	3	X	X	X
	CO6	2	2	X	X	X
MSPHY204	**CO1**	2	1	2	2	X
	CO2	2	2	2	1	3
	CO3	1	2	1	1	2

	CO4	2	1	3	X	X
	CO5	1	2	2	2	1
	CO6	2	X	1	3	2
MSPHY205	**CO1**	2	2	2	1	1
	CO2	2	1	1	1	2
	CO3	2	2	1	1	1
MSPHY206	**CO1**	1	X	1	1	1
	CO2	2	1	1	1	2
	CO3	2	2	1	1	1
MSPHY301	**CO1**	3	3	3	2	2
	CO2	3	3	1	X	1
	CO3	3	2	2	1	X
	CO4	3	2	3	2	X
	CO5	3	3	2	2	2
	CO6	3	2	3	2	X
MSPHY302	**CO1**	2	2	2	2	1
	CO2	1	1	2	1	X
	CO3	1	1	X	1	X
	CO4	X	2	1	1	X
	CO5	X	1	2	1	X
	CO6	1	1	1	1	X
MSPHY303	**CO1**	2	2	2	2	X
	CO2	2	2	2	2	X
	CO3	2	2	X	1	X
	CO4	3	2	2	2	X
	CO5	3	3	2	3	X
	CO6	2	2	2	X	X

MSPHY304	**CO1**	3	1	1	X	X
	CO2	3	2	1	X	X
	CO3	3	1	X	1	X
	CO4	3	1	1	X	X
	CO5	3	2	X	X	X
	CO6	3	1	X	1	X
MSPHY305	**CO1**	2	3	1	1	X
	CO2	1	1	2	X	1
	CO3	2	1	X	1	1
	CO4	2	2	1	X	X
	CO5	2	2	X	X	1
MSPHY306	**CO1**	2	2	2	1	1
	CO2	2	2	1	1	1
	CO3	2	1	1	1	2
MSPHY401	**CO1**	3	1	1	X	X
	CO2	3	2	1	X	X
	CO3	3	1	X	1	X
	CO4	3	1	1	X	X
	CO5	3	2	X	X	X
	CO6	3	1	X	1	X
MSPHY402	**CO1**	3	3	X	1	1
	CO2	2	2	2	2	1
	CO3	3	3	2	2	1
	CO4	3	2	X	1	1
	CO5	3	3	1	1	1
	CO6	2	2	3	3	1
MSPHY403	**CO1**	2	2	2	1	1

	CO2	2	2	1	1	1
	CO3	2	1	1	1	2
MSPHY404	**CO1**	3	2	1	1	3
	CO2	3	2	1	X	2
	CO3	3	2	1	1	3
	CO4	3	2	2	2	1
	CO5	3	2	2	2	1
	CO6	3	2	X	X	X
MSPHY406	**CO1**	3	3	1	1	1
	CO2	2	2	2	X	X
	CO3	3	3	1	1	X
	CO4	3	2	X	X	X
	CO5	3	3	X	X	X
	CO6	2	2	X	X	X