PRIST
DEEMED TO BE
UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

School of Arts and Science

Department of Physics

B. Sc., and M. Sc., Physics syllabi

Regulation 2019

CO-PO mapping of curriculum

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Program Outcomes and Course outcomes
Department of Physics

Regulation-2019

COs-POs - Mapping of curriculum

Programme offered:

S.No	Programme Name	PO and CO
1.	B.Sc Physics	Yes
2.	M.Sc Physics	Yes

B.Sc Physics

PROGRAMME OUTCOMES	
PO1	To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
PO2	Develop interpersonal and communication skills including communicating in small groups, writing, working effectively with peers
PO3	Express their knowledge and ideas through oral and written language.
PO4	To define the basic laws involved in Physics
PO5	To understand the concepts and significance of the various physical phenomena.
PO6	To carry out experiments to understand the laws and concepts of Physics.
PO7	To apply the theories learnt and the skills acquired to solve real time problems.
PO8	To acquire a wide range of problem solving skills, both analytical andcomputational and to apply them.
PROGRAM SPECIFIC OUTCOME	
PSO1	Students are expected to acquire a core knowledge in physics, including the major premises of classical mechanics, quantum mechanics, electromagnetic theory, electronics, optics, special theory of relativity and modern physics.

PSO2	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 an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.

PSO3	Students will learn the applications of numerical techniques for modeling physic systems for which analytical methods are inappropriate or of limited utility.
PSO4	Apply conceptual understanding of the physics to general real-world situations.
PSO5	Learn to minimize contributing variables and recognize the limitations of equipment.
PSO6	Develop the following experimental tools: Numerically model simple physicalsystems using Euler's method, curve fitting, and error analysis.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	Read, understand and interpret physical information – verbal, mathematical and graphical.
PEO2	Equip students in methodology related to Physics.
PEO3	Impart skills required to gather information from resources and use them.
PEO4	To give need based education in physics of the highest quality at the undergraduate level.
PEO5	Offer courses to the choice of the students with interdisciplinary approach.
PEO6	Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.
PEO7	Provide an intellectually stimulating environment to develop skills and Enthusiasms of students to the best of their potential.
PEO8	Use Information Communication Technology to gather knowledge at will.

B. Sc., CURRICULUM MAPPING

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives – PEO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
PEO1	*	*	*	*		*	*	
PEO2	*		*		*	*		*
PEO3		*		*			*	
PEO4	*	*	*		*	*		*
PEO5	*		*	*		*	*	
PEO6		*		*			*	
PEO7	*	*	*		*	*		*
PEO8	*		*	*		*	*	

COs-POs - Mapping of curriculum

B.Sc., Physics – Regulation 2019

Semester	Course Code	Course Name	COs	POs							
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	19110AEC11	**Tamil I**	Learn the changes occurred in literature since classical period.	*	*	*		*			*
			Make use of vocabulary systematically.	*	*	*		*			*
			Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*		*	*		*	*	
	19111AEC11	Advanced English-I	Develop vocabulary	*	*		*	*		*	*
			Read and comprehend literature	*		*	*	*	*	*	*
			Learn to edit and do proof reading		*	*	*		*	*	*
	19111AEC12	English-I	Read and comprehend literature	*	*	*		*	*		*
			Appreciate poetry and prose	*		*	*	*		*	*
			Familiarize students with fiction.	*	*		*	*	*	*	
	19113AEC13	Properties of Matter	This course would empower the student to acquire engineering skills and practical knowledge, which help the students in their everyday life.	*		*	*		*	*	*
			The properties of solids especially knowledge of elasticity helps the students to identify the materials suitable for the construction of buildings, houses etc.	*	*	*		*	*		*
			Properties of fluids especially knowledge of viscosity and surface tension help the students in their daily life and agriculture.	*		*	*	*		*	*
			This syllabus will cater the basic requirements for their higher studies. This course will provide a theoretical basis for	*	*	*		*	*		*
			doing experiments in related areas.	*		*	*	*		*	*

	19113AEC14L	Properties of Matter Lab	Study the elastic behaviour and working of torsional pendulum	*	*		*	*		*	*
			Study of bending behaviour beams and analyse the expression for young's modulus	*		*	*	*	*		*
			Understand the surface tension and viscosity of fluid	*	*	*	*	*	*	*	*
			Analyse waves and oscillations	*	*	*		*	*		*
	19112AEC15A	**Calculus and Fourier series**	Define a vector differentiation	*		*	*	*		*	*
			Evaluate Gauss divergence theorem, Stoke's theorem and Green's theorem	*	*		*	*	*	*	
			Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.	*		*	*		*		*
			Discuss the Application of Laplace transforms with Solution of ODE's.	*	*		*	*		*	*
			Define Fourier series and Finding Fourier expansion of a periodic function with period 2π	*	*	*		*	*		*
	19112AEC16A	**Algebra and Trigonometry**	Expansion of sin nq, cosnq, tan nq and powers of sines and cosines in terms of functions of multiples of q.	*		*	*	*		*	*
			Define and illustrate the concept of hyperbolic functions and logarithms of complex numbers.	*	*		*	*	*		*
			Understanding the concept of Inequalities.		*	*	*		*	*	
			Find relation between the roots and coefficients of equations and Symmetric function of the roots.	*	*		*	*	*		*
	19120SEC01AL	**Package Lab-I**	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	*		*	*	*	*		*
			Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.	*	*	*		*	*		*

			Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.	*		*		*	*	*	

	19160SEC01B	**Soft Skill -I**	Develop leadership skills and body language	*		*	*	*		*	*
	19111SEC01L	**Communicative English Lab-I**	Make effective communication	*	*		*	*	*	*	
	191INDCONS	**Indian Constitution**	Democratic values and citizenship Training are gained.		*	*		*	*		*
			Awareness on Fundamental Rights are established.	*		*	*		*	*	*
			Learn the functions of union and State Governments	*	*		*	*		*	*
			Learn the power and functions of the Judiciary	*		*	*	*		*	*
			Appreciate of Democratic Parliamentary Rule	*	*		*	*	*		*
II	19110AEC21	**Tamil II**	Know what devotion really is.	*		*	*		*	*	*
			Know the fruitfulness obtained through devotion.	*	*	*		*	*		*
			Perceive the progress achieved in the society through devotion.	*		*	*	*		*	*
	19111AEC21	**Advanced English-II**	Develop technological skill.	*	*		*	*	*		*
			Able to write in a variety of formats	*	*	*	*	*	*	*	*
			Read biographies and develop personality	*	*		*	*	*		*
	19111AEC22	**English-II**	Appreciate different forms of literature	*		*	*	*		*	*
			Acquire language skills through literature	*	*		*	*	*		*
			Broadens the horizon of knowledge	*	*		*	*	*	*	

	19113AEC23	**Mechanics and Relativity**	Understand the definition for centre of gravity in hemisphere, hollow hemisphere etc.,		*	*	*		*		*
			Understand the dynamics and gravitation	*	*		*	*		*	*
			Study the behaviour of rigid body dynamics	*	*	*		*	*		*
			Analyse the performance of hydrostatic and hydrodynamics	*		*	*	*	*		*
			Understand the negative result of Michelson-Morley experiment, Galilean and Lorentz transformation	*	*	*	*	*		*	*
	19113AEC24L	**Mechanics Lab**	Understand the dynamics and gravitation	*	*		*	*	*	*	*
			Understand the negative result of Michelson-Morley experiment	*	*		*	*		*	*
			Study the behaviour of rigid body dynamics	*		*	*	*	*	*	
			Analyse the performance of hydrostatic and hydrodynamics	*	*		*	*		*	
	19112AEC25A	**ODE, PDE and Laplace Transforms**	Discuss and demonstrate the linear equations with constant coefficients	*	*		*	*	*		*
			Complementary function and particular integrals.	*	*	*	*	*	*	*	*
			Discuss and demonstrate the Linear equations with variable coefficients and Variation of parameters.	*	*		*	*	*		*
			Define and illustrate Partial Differential Equations of the first order and Classification of integrals	*		*	*	*		*	*
			Define Linear equation and Bernoulli's equation	*	*		*	*	*		*
			Define Laplace transforms and discuss the Properties of Laplace transforms	*		*	*	*		*	*
			Define Fourier series and Finding Fourier expansion of a periodic function with period 2π.	*	*	*	*		*	*	

	19112AEC26A	**3D Vector Calculus**	Define a vector differentiation	*	*		*	*	*		*
			Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.	*		*	*	*	*		*

	19111RLC27	**Research Led seminar**	Know the emerging areas in research	*		*	*	*	*		*
			Exposure to various research domains	*	*	*	*	*		*	*
			Acquaintance with languages of research	*		*	*	*	*	*	
			Development of research aptitude	*		*	*	*		*	*
	19120SEC02AL	**Packages Lab-II**	Identify the names and functions of the PowerPoint interface.		*	*	*	*	*		*
			Create, edit, save, and print presentations.	*	*		*	*		*	*
			Format presentations.	*	*	*		*	*	*	*
			Add a graphic to a presentation.	*		*	*	*	*		*
			Create and manipulate simple slide shows with outlines and notes.	*	*		*	*	*		*
			Create slide presentations that include text, graphics, animation, and transitions.		*	*	*	*		*	*
	19160SEC02B	**Soft Skill -II**	Build self-development	*	*		*	*		*	*
	19111SEC02L	**Communicative English Lab-II**	Learn grammar.	*		*	*		*	*	
			Use a variety of reading strategies	*		*	*		*	*	*
			Enhance the skill of making grammatically correct sentences.	*	*		*	*		*	*
III	19110AEC31	**Tamil III**	Achieve one's goal by following the ancestral path	*		*	*	*		*	*
			Learn to lead life of perfection by realizing the uncertainty in the life		*	*		*	*	*	*
			Attain happiness through honesty	*	*		*	*		*	*
	19111AEC31	**Advanced English-III**	Understand Phonetics.	*	*	*		*	*		*
			Develop writing skill	*	*		*	*		*	*
			Able to develop creative writing systems.	*		*	*	*	*	*	
			Correct methodology when developing mathematical models.	*	*		*	*	*		*
			Skill in applications	*		*	*	*		*	*

			Designing and developing the solutions	*		*	*		*		*
	19111AEC32	**English-III**	Enable to appreciate different types of prose	*	*	*		*		*	*

	19113AEC33	**Heat and Thermodynamics**	Understand how statistics of the microscopic world can be used to explain the thermal features of the macroscopic world.	*		*	*		*	*	*
			Be able to use thermal and statistical principles in a wide range of applications.	*	*		*	*		*	*
			Learn a variety of mathematical and computer techniques.	*		*	*	*	*		*
	19113AEC34L	**Heat and Thermodynamics lab**	Understand the nature of calorimetry by specific heat of solids and law of thermodynamics and entropy	*	*		*	*	*		*
			Analyses thermal conductivity and black body radiation		*	*	*	*		*	*
			Analyses of zeroth law of thermodynamics and entropy	*	*		*	*		*	*
			Understanding the low temperature physics	*		*	*	*	*		*
	19114AEC35	**Inorganic, organic and Physical chemistry – I**	Apply the fundamental principles of measurement, matter, atomic theory	*	*	*		*	*	*	
			Chemical periodicity, chemical bonding	*		*	*	*		*	*
			General chemical reactivity and solution chemistry to subsequent courses in science.		*	*	*		*	*	*
	19114AEC36L	**Volumetric analysis Lab – I**	Facilitate the learner to make solutions of various molar concentrations.	*	*		*	*	*		*
			Defining concentration; Dilution of Solutions;	*		*	*	*	*	*	*
			Making different molar concentrations.	*	*	*	*	*	*		*
			Describe bonding models that can be applied to a consideration of the properties of transition metal compounds.	*	*		*	*	*		*
	19113RMC37	**Research methodology**	Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.	*		*	*		*	*	*
			Understanding research questions and tools		*	*	*		*	*	
			Experience in scientific writings Practice in various aspects of scientific publications	*	*		*	*		*	*

	19120SEC03AL	**Packages Lab-III**	□ Indicate the names and functions of the Excel interface components.	*	*	*		*	*		*
			□ Enter and edit data.	*		*	*	*		*	*
			□ Format data and cells.	*	*	*		*	*	*	
			□ Construct formulas, including the use of built-in functions, and relative and absolute references.	*	*		*	*	*		*
			□ Create and modify charts.		*	*	*	*	*		*
			□ Preview and print worksheets.	*	*	*		*	*	*	
	191__SEC03_ _____	**Soft Skill-III**	□ Learn interpersonal relations and social responsibilities.	*		*	*	*		*	*
	19111SEC03L	**Communicative English Lab-III**	□ Learn grammar.	*	*	*		*	*		*
			□ Develop speaking and writing skills	*	*		*	*		*	*
			□ Enhance their fluency in English	*	*	*	*	*	*	*	*
			□ Develop individual perspectives that demonstrate critical thinking skills	*		*	*	*		*	*
IV	19110AEC41	**Tamil IV**	□ Realize how the ancient people changed their life style according to the ages	*	*		*		*	*	*
			□ Learn how to change one's lifestyle according to the needs of the future	*		*	*	*	*		*
			□ Accept the modern trend and its uses	*		*		*	*	*	*
	19111AEC41	**Advanced English-IV**	□ Develop writing skill.	*		*	*	*	*		*
			□ Comprehend and describe poems	*	*	*	*	*		*	*
			□ Learn interviewing skills	*		*	*		*	*	*
	19111AEC42	**English IV**	□ Improve their ability to read and understand them		*	*	*	*	*	*	*
			□ Know the genius of Shakespeare	*	*		*		*		*
			□ Express in writing their views.	*		*	*	*	*	*	*
	19113AEC43	**Optics**	□ Understand the basic concepts of wave optics and an ability to compute basic quantities in optics.	*	*		*	*	*		*
			□ Learn to use methods for solving differential equations.	*		*	*	*		*	*
			□ Experience the diverse applications of the wave equation.	*	*		*	*	*	*	
	19113AEC44L	**Optics Lab**	□ Study the elastic behaviour of materials	*		*		*		*	*
			□ Analyse the relationship between various types of experiments	*	*		*		*	*	*
			□ Perform the procedure as per standard values	*		*	*	*		*	*
			□ Understand the applications of optical devices	*	*		*	*	*		*

	19114AEC45	**Inorganic, organic and Physical chemistry – II**	The fundamentals of the chemistry of the main group elements, and important real-world applications of many of these species		*	*	*		*		*
			The bonding models, structures, reactivity's, and applications of Hydrogen peroxide, ozone and hydrides.	*	*		*	*	*	*	
			Predicting geometries of simple molecules	*		*	*	*	*		*
			Skills in handling and measurement of radioactive material.	*	*		*	*		*	*
	19114AEC46L	**Volumetric analysis Lab – II**	Facilitate the learner to make solutions of various molar concentrations.		*	*	*		*	*	
			The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration	*		*		*	*		*
			Dilution of Solutions; Making different molar concentrations.	*	*		*	*		*	*
	19120SEC04AL	**Packages Lab-IV**	Examine database concepts and explore the Microsoft Office Access environment.	*		*	*		*	*	*
			Design a simple database.		*	*		*	*	*	
			Build a new database with related tables.	*			*	*			*
			Manage the data in a table.	*	*		*		*		*
			Query a database using different methods.	*		*		*	*		*
			Design a form.		*	*		*		*	*
			Generate a report.	*	*		*	*	*	*	
			Import and export data.	*		*	*		*		*
	191__SEC04_ _____	**Soft Skill-IV**	Develop etiquette and interviewing skills.	*	*		*	*		*	*
	19111SEC04L	**Communicative English Lab-IV**	Learn grammar.	*		*		*	*	*	*
			Enable to express their views in conversation	*	*		*	*		*	*
			Develop soft skills	*		*	*		*	*	*
			Enhance presentation skills	*	*		*	*		*	*
	191ENVTSTU	**Environmental Studies**	Learn about environmental pollution.	*		*		*	*	*	
			Familiarize with the social issues and the environment	*	*		*	*		*	

			Learn about environmental pollution.	*		*	*	*	*	*	*
			Familiarize with the social issues and the environment	*	*		*	*		*	*
V	19113AEC51	**Electricity and Magnetism**	Know the vocabulary and concepts of physics as it applies to: Principles of Electric Fields, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Current and Resistance, Direct Current Circuits, Magnetic Fields, Sources of Magnetic Fields, Faraday's Law, Inductance, Alternating Current Circuits, and Electromagnetic Waves.		*	*		*	*		*
			Understand the relationship between electrical charge, electrical field, electrical potential, and magnetism.	*		*		*	*	*	
			Be able to use electromagnetic theory and principles in a wide range of applications.	*	*		*		*	*	*
			Learn a variety of advanced mathematical methods and computer techniques.	*		*	*	*		*	
			Develop skill to solve numerical problems on it.	*	*		*	*		*	*
			Solve mathematical problems involving electric and magnetic forces, fields, and various electro-magnetic devices and electric circuits.		*	*		*	*		*

	19113AEC52	**Atomic Physics**	Apply the mathematical tools developed to various quantum mechanics problems.	*	*		*	*		*	
			Develop problem solving methods that will include mathematical as well as numerical computations and solutions.		*	*	*		*		*
			Build connections between mathematical development and conceptual understanding	*	*		*		*		*
	19113AEC53	**Basic Electronics**	to impart knowledge of Basic Electronics in a broader context to the BSc students.	*		*	*	*	*	*	
			to clarify the concepts of Semiconductors, p- n junctions, Fermi Level.		*	*		*	*		*
			to develop the understanding of rectifiers, Transistors and FET.	*		*	*	*		*	
			learn the basics of the transistor action along with their application as an amplifier.		*	*		*	*		*
			gain basic knowledge of electronics.	*	*		*	*		*	*
			learn the logic of flip flops, counters, registers etc.,		*	*	*		*	*	
	19113AEC54L	**Digital Electronics Lab**	Understand the fundamentals of codes and number system	*		*	*		*	*	
			Understand the binary arithmetic, logics and Boolean functions	*	*		*	*		*	
			Understand the functions and working of flip-flop circuits registers and counters	*	*		*	*		*	*

	19113DSC55_	**Energy Physics**	Understand the basic significance of various energy resources	*		*	*		*	*	
			Understand about solar energy related applications	*	*		*	*		*	*
	19113DSC55_	**Laser Physics**	Understand the basic principle of laser and characteristics	*		*	*		*	*	
			Understand the theory of types of lasers	*	*		*		*	*	*
			Perform the procedures into applications oriented one		*	*		*		*	*
	19113DSC55_	Digital Photography	Can understand the principles of photography and image formation and the science and arts behind it.	*	*		*	*		*	*
			Able to understand the essential components of conventional and digital cameras and also the different image processing techniques	*		*	*		*	*	
	19113BRC56	**Participation in Bounded Research**	Do the allotted work in research		*	*		*	*		*
			Learn to do review of literature	*	*		*	*	*	*	
			Hands on exposure to problem solving tools in contemporary research		*	*		*	*		*
			Evolution of research intuitiveness and orientation Familiarity with cutting edge research trends	*		*	*	*		*	*
	19120SEC05AL	**Packages Lab-V**	work with the Photoshop workspace	*	*		*		*	*	
			navigate images		*	*		*	*		*
			resize and crop images	*	*		*	*		*	*
			make and work with selections	*		*	*		*	*	*
			create new layers and perform other basic layer functions transform images.	*	*	*		*	*		*
	19113SEC05_	**Soft Skill-V**	Develop leadership skills and body language	*		*	*		*	*	
	19111SEC05L	**Communicative English Lab-V**	Develop corporate skills. Handle their day to day affairs well with their knowledge of language skills.		*	*		*	*		*
	19113AEC56L	**Electricity and Magnetism Lab**	Analyze the chemical and heating effect of current	*	*		*	*		*	
			Analyze the value of Maxwell equation-	*		*	*		*	*	*

			boundary conditions								
			Understand the Faraday's laws of electromagnetic induction	*	*		*		*	*	*

VI	19113AEC61	**Digital Electronics & Microprocessor**	Students will familiarize with logic circuits and their applications which enables them to design logic circuits of their own.	*	*		*	*		*	*
	19113AEC62	**Wave Mechanics**	Learn the mathematical tools needed to solve quantum mechanics problems. This will include complex functions and Hilbert spaces, and the theory of operator algebra. Solutions of ordinary and partial differential equations that arise in quantum mechanics will also be studied.	*		*	*		*		*
	19113AEC63L	**Digital Electronics Lab**	Understand the fundamentals of codes and number system	*	*	*		*		*	*
			Understand the binary arithmetic, logics and Boolean functions	*		*	*		*	*	
			Understand the functions and working of flip flop circuits registers and counters	*	*	*		*	*		*
	19113DSC64_	**Elements and Theoretical Physics**	They have understood the difference between covariance and invariance of various quantities and applied it.	*	*		*	*	*	*	
			One of the major advantages of this course is that it is very much related to the real life where the ionosphere is playing very important part.	*		*	*		*	*	
			They have understood the difference between covariance and invariance of various quantities and applied it.	*	*		*	*		*	*
			One of the major advantages of this course is that it is very much related to the real life where the ionosphere is playing very important part.	*		*	*		*	*	
			Students now know the basics of scattering and absorption and relate them to real life phenomena.		*	*		*	*		*
	19113DSC64_	**Material Physics**	To develop an understanding of the unique properties and characteristics of polymer based materials.	*	*		*	*		*	*

	19113DSC64_	Numerical Methods and C Programming	understand the methods in numerical differentiation and integration and to develop the problem solving skills of the student.	*	*	*	*		*	*	
			explain the basic structure, rules of compiling and execution of C programming.	*	*	*		*	*		*
	19113DSC64_	**Communication physics**	Explain the concept of amplitude and frequency modulation		*	*		*	*		*
			Distinguish Digital modulation (pulse code and Pulse amplitude modulation) types	*		*	*		*	*	
			Know fundamental of AM radio receiver and super heterodyne receiver.	*	*	*		*		*	*
			Compare working principle of single mode and multimode optical fibers.		*		*		*		*
	19113PRW66	**Project Work**	Enables the students to research on particular topic of their choice that has a relationship with the field of study.	*		*		*	*		*
	19120SEC06AL	**Packages Lab-VI**	Learn to create animated graphics and sound and interactivity.	*	*	*		*	*	*	
			Can develop Website	*		*	*		*		*
			CD based presentations	*	*		*	*	*	*	
			Develop life skills and other skills	*	*	*	*	*	*	*	*
	191__SEC06_	**Soft Skill –VI**	Develop leadership skills and body language		*		*		*		*
	19111SEC06L	**Communicative English Lab-VI**	Apply study skills	*		*	*	*		*	*
			Widen creative thinking		*	*		*	*		*
			Be a good team worker	*	*		*	*		*	*
			Make them proficient in English	*		*	*	*	*		*

M.Sc., Physics

PROGRAMME OUTCOMES	
PO1	➢ Explain the behavior of physical systems under various environmental and physical conditions
PO2	➢ Interpret Laws of Physics and develop mathematical models of systems to predict behavior and estimate performance
PO3	➢ Use modern tools and techniques for the solution of mathematical models and prediction of behavior of physical systems
PO4	➢ Instrument and perform physical experiments for testing and evaluation of systems
PO5	➢ Operate and monitor performance of machines and systems
PO6	➢ Conduct research under supervision
PO7	➢ Choose appropriate online programmes for further learning, participate in seminars and conferences
PO8	➢ Lead a team to successfully complete a project and communicateacross teams
PROGRAM SPECIFIC OUTCOME	
PSO1	➢ Students are also expected to develop a written and oral communicationskills in communicating physics-related topics.
PSO2	➢ Students will develop the proficiency in the acquisition of data using a variety oflaboratory instruments and in the analysis and interpretation of such data.
PSO3	➢ Students will realize and develop an understanding of the impact of physicsand science on society.

PSO4	➢ Describe the methodology of science and the relationship betweenobservation and theory.
PSO5	➢ Discover of physics concepts in other disciplines such as mathematics, computer science, engineering, and chemistry.
PSO6	➢ Analyze physical problems and develop correct solutions using naturallaws.
PROGRAM EDUCATIONAL OBJECTIVES	
PEO1	➢ Work alongside of engineers, healthy professionals, scientists and

	Other professionals to help solve scientific problems.
PEO2	➢ Work as techno manager, administrator, or an entrepreneur with further training and education.
PEO3	➢ Pursue doctoral research degrees to work in colleges, universities asprofessors or as scientists in research establishments.
PEO4	➢ To understand the underlying physics in respective specializations, and, beable to teach and guide successfully.
PEO5	➢ To introduce advanced ideas and techniques that are applicable inrespective fields.
PEO6	➢ To develop human resource with a solid foundation in theoretical and experimental aspects of respective specializations as a preparation forcareer in academia and industry.

M. Sc., CURRICULUM MAPPING

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO **Programme Educational Objectives – PEO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
PEO1	*	*	*	*		*	*	
PEO2	*		*		*	*		*
PEO3		*		*			*	
PEO4	*	*	*		*	*		*
PEO5	*		*	*		*	*	
PEO6		*		*			*	

COs-POs - Mapping of curriculum

M.Sc., Physics – Regulation 2019

Semester	Course Code	Course Name	Course Outcome	POs							
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	19213SEC11	**Advanced Mathematical Physics**	know the method of contour integration to evaluate definite integrals of varying complexity.	*		*			*	*	*
			ability to apply group theory to physics problems, which is a pre-requisite for deeper understanding of crystallography, particle physics, quantum mechanics and energy bands in solids.	*	*		*	*		*	*
			able to apply calculus of variations to diverse problems in physics including isoperimetric problems.		*	*		*	*		*
	19213SEC12	**Classical and Statistical Mechanics**	Understand the terminology used in Classical Mechanics.	*		*	*		*	*	
			Employ conceptual understanding to make predictions, and then approach the problem mathematically.	*	*	*		*	*		*
			Understand the important connections between theory and experiment.	*	*		*	*		*	
			Connect concepts and mathematical rigor in order to enhance understanding		*	*	*		*	*	*

	19213SEC13	**Electronics and Communication**	basic knowledge of semiconductor diode, rectifier and filter circuits.	*		*	*		*		*
			Understand transistor biasing and working principle of Amplifiers.		*	*		*	*		*
			Explain feedback and oscillatory circuits.	*		*	*		*	*	
			idea about Multivibrators and operational amplifiers.		*	*		*	*		*
	19213SEC14L	General Electronics Lab	Analysis of Resistive Circuits and Solution of resistive circuits with independent sources	*		*	*		*	*	
			Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits	*	*		*	*		*	*
			Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits	*		*		*	*		*
	19213DSC15_	Instrumentation	Demonstrate basic knowledge about various instruments.		*	*		*	*		*
			Get exposure about the real-time applications	*	*		*	*	*		*
	19213DSC15_	**Digital Communication**	To understand the use of Fourier, transform in analyzing the signals	*		*	*		*	*	
			To learn about the quanta of transmission of information	*	*		*		*		*
			To make students familiar with different types of pulse modulation	*		*	*	*		*	*
			To have an in depth knowledge about the various methods of error controlling codes	*	*		*		*	*	*
			To acquire knowledge about spread spectrum techniques in getting secured communication	*	*		*	*		*	*
	19213DSC15_	**Crystal Growth Processes**	Introduction to crystal system and Symmetry	*		*		*	*	*	*
			Description on crystal nucleation and growth		*	*	*		*	*	

			Discussion on various crystal growing techniques	*		*		*	*		*
			Thin film by spray pyrolysis method		*		*		*	*	*
II	19213SEC21	**Microprocessor and Microcontroller**	Study the Organization and internal architecture of the Intel 8085	*		*	*	*		*	*
			learn assembly language programming and arithmetic operation		*	*		*	*	*	
			Aware of memory interfacing, and different Data transfer schemes, Learn interfacing with peripheral I/O devices	*		*	*		*		*

	19213SEC22	**Quantum Mechanics**	Students will learn the role of uncertainty in quantum physics and use the commutation relations of operators.	*	*		*	*		*	*
			Students will learn the method of separation variables to solve problems in 3D and spherical polar coordinates and will the occurrence of degeneracy in atomic structure.	*		*	*		*	*	
			Students will learn some matrix technique to solve physical problems.		*	*		*	*		*
	19213SEC23	**Condensed Matter Physics**	Explain the significance and value of condensed matter physics, both scientifically and in the wider community.	*		*	*		*	*	
			The subject treats functional materials from an experimental viewpoint, solid state theory and properties.	*		*		*		*	*
			Critically analyse and evaluate experimental strategies, and decide which is most appropriate for answering specific questions.		*	*	*		*	*	
			Apply key analysis techniques to typical problems encountered in the field.	*	*		*	*		*	*
			Gain and apply discipline-specific knowledge, including self-directed research into the scientific literature.	*		*	*		*	*	
			The subject will be useful to gain an understanding of the interplay between classical - and quantum mechanical phenomena, and how microscopic/atomic processes acting between many atoms/molecules produces the typical properties of different solid state matter.		*	*		*	*		*

	19213SEC24L	**Microprocessor Lab**	To become familiar with the architecture and Instruction set of Intel 8085 microprocessor.	*	*		*	*		*	*
			To improve programming logic and concepts of 8085 microprocessor.		*	*		*	*		*
			To provide practical hands on experience with Assembly Language Programming.	*	*		*	*		*	*
			To familiarize the students with interfacing of various peripheral devices with 8085 microprocessor.	*		*	*		*		*
	19213DSC25_	**Atomic and Nuclear Physics**	Understand the properties of positive rays, experimental proof by Frank and Hertz method	*	*		*	*		*	*
			Analyse the relationship between various types of couplings		*	*	*		*	*	*
			Understand the properties of x-ray s verification	*	*		*	*		*	*
			Analyse the ideas of basics of nucleus and their energy		*	*		*	*		*
			Perform the procedures for nuclear fission and fusion	*		*	*		*	*	
	19213DSC25_	**Materials Science**	gain knowledge on optoelectronic materials	*	*		*		*		*
			learn about ceramic processing and advanced ceramics	*	*		*	*		*	*
			understand the processing and applications of polymeric materials	*		*	*		*	*	*

			To gain knowledge on the fabrication of composite materials	*		*		*	*		*
			To learn about shape memory alloys, metallic glasses and nanomaterials	*	*	*		*		*	*
	19213DSC25_	**Radiation Physics**	Explain the principles of radiation dosimetry;		*	*	*		*	*	*
			Explain the principles of therapeutic radiation physics including X-rays, electron beam physics, radioactive sources, use of unsealed sources and Brachytherapy;	*		*		*	*		*
			Describe how to use radiotherapy equipment both for tumor localisation, planning and treatment; Define quality assurance and quality control, in the context of radiotherapy and the legal requirements	*	*		*	*		*	*
	19213RMC26	**Research Methodology**	Assess critically the following methods: literature study, case study, structured surveys, interviews, focus groups, participatory approaches, narrative analysis, cost- Critically assess research methods pertinent to technology innovation research.		*	*		*	*		*
			Understanding research questions and tools	*	*		*		*	*	
			Experience in scientific writings		*	*		*	*		*
			Practice in various aspects of scientific publications Inculcation of research ethics	*	*		*	*	*		*

	19213BRC27	**Participation in bounded research**	Hands on exposure to problem solving tools in contemporary research		*	*		*	*		*
			Evolution of research intuitiveness and orientation	*		*	*	*		*	
			Do the allotted work in research Learn to do review of literature		*	*		*	*		*
III	19213SEC31	**Electro Magnetic Theory**	Explains the fundamentals of electrostatics	*		*	*		*	*	
			Illustrates the application of electrostatics in macroscopic media	*	*	*		*	*		*
			Briefs out the various concepts of magnetostatics	*		*	*		*	*	
			Describes the elementary ideas of electromagntic theory		*	*		*	*		*
			Elaborates the utilization of electromagntic theory in optics	*	*		*	*		*	*
	19213SEC32	**Nuclear and Particle Physics**	Acquire knowledge in the content areas of nuclear and particle physics, focusing on concepts that are commonly used in this area.	*		*	*		*	*	*
			Develop and communicate analytical skills in subatomic physics.		*		*	*		*	*
			Develop familiarity with the vast areas of nuclear and particle physics as well as develop an interest in these subjects.	*		*		*	*		*
	19213SEC33L	**Advanced Electronics Lab**	Understand the current voltage characteristics of semiconductor devices		*		*	*		*	
			Evaluate frequency response to understand behavior of Electronics circuits	*		*	*		*		*
			Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation, Design and analyze of electronic circuits	*	*		*	*		*	*
	19213DSC34_ _	**Non-Conventional Energy Physics**	Describe the environmental aspects of non-conventional energy resources		*	*		*	*		*
			In Comparison with various conventional energy system, their prospects and limitations	*		*	*			*	

			Know the need of renewable energy resources, historical and latest developments	*		*	*		*		*

	19213DSC34__	Photonics devices and application	Learn Fundamentals of computerized modeling of diverse optical and photonics systems.	*		*	*		*	*	
			Gain working experience with standard computational tools used in industry.		*		*	*		*	*
			Acquire essential laboratory skills in designing experiments. Assembling standard optical tools for optical experimentation.	*	*		*	*	*		*
	19213DSC34_	**Analysis of Crystal Structures**	the concept of crystal structures and symmetry, and diffraction theory		*	*	*		*	*	
	_		students with a background to X-ray generation, scattering theory and experimental diffraction from single crystals	*	*		*	*		*	*
			provide instruction on the methods and basis for determining low-molecular weight crystal structures using X-ray Crystallography	*		*	*		*	*	
			give the students a background to the instrumentation used for powder diffraction and structure refinement using Rietveld method	*	*		*	*		*	
			different levels of structure exhibited by proteins and nucleic acids and methods used in protein crystallography.		*	*		*	*		*
	19213SRC36	**Societal research**	Sensitization of social needs for innovation	*	*		*	*		*	
			Team work towards interdisciplinary synchronous research strategy		*	*		*	*		*
			Development of critical thinking and synergistic research approach.	*		*	*		*	*	

IV	19213AEC41	**Laser Physics and Non Linear Optics**	Apply the concepts and theories of a range of advanced topics in physics;	*		*	*		*	*	
			Demonstrate specialized analytical skills and techniques necessary to carry out advanced calculations in a range of advanced topics in physics; Approach and solve new problems in a range of advanced topics in physics		*	*		*	*		*
	19213AEC42	**Numerical Methods and Computational Physics**	Describe and apply the Newton's forward, backward and divided difference formulas, Lagrange's polynomial and cubic spline to obtain the polynomial interpolation.	*		*	*		*	*	
			Develop algorithmic solutions to simple computational problems and write simple Python programs.	*	*		*	*		*	*
			Explain the methods to solve algebraic and transcendental equations; solve the linear system of equations by direct or iterative methods and find the dominant Eigen value of a matrix.		*	*		*	*		*
	19213SEC43 L	**Numerical methods lab with C++**	Be aware of the use of numerical methods in modern scientific computing.	*		*	*		*	*	
			Be familiar with finite precision Computing.	*	*		*	*		*	*
			Be familiar with calculation and interpretation of errors in numerical methods.	*		*		*	*		*
			Be familiar with numerical solutions of nonlinear equations in a single variable		*		*	*		*	*
			Be familiar with numerical interpolation and approximation of functions	*		*	*		*	*	

			Be familiar with numerical integration and differentiation	*		*	*		*	*	
			Be familiar with numerical solution of ordinary differential equations	*	*		*	*		*	*

	19213DSC44_	**Nano Science and Technology**	Elucidate emerging needs in nanotechnology environment, health; and safety, and incorporate them into basic education that can be immediately employed in industry.	*		*	*		*	*	
			Promote interdisciplinary interactions among engineering, engineering technology, science, and industrial management/ technology majors;		*		*	*		*	*
	19213DSC44_	Non-linear Dynamics	The aim of the course is to present introduction to nonlinear dynamics of continuous and discrete models.	*		*	*		*	*	
			Students should be able to illustrate mentioned nonlinear phenomena in models from various science fields.		*	*		*	*		*
			Students will be able to analyze models in using appropriate software.	*	*		*	*		*	
			Students will be able to explain one and multiparametric bifurcations and chaotic dynamics.	*		*	*		*	*	*
	19213DSC44_	**Advanced Spectroscopy**	Helps students understand and appreciate spectroscopy as a sufficiently broad field in which many sub disciplines exist.		*	*		*	*		*
			Make them appreciate each of these specific techniques with numerous implementations.	*		*	*		*	*	
			To realize the progress in this field that is rapid, resulting in improved instrument capabilities and an ever-widening range of applications.	*	*		*	*			*
			To apply group theory in spectroscopy to shed light on molecular symmetry and	*		*	*			*	*

			determine important physical parameters.								
	19213PRW45	**Project**	Understand the basic ideas about the project		*		*	*		*	*
			Understand the working procedure of the project	*	*	*		*	*		*
			Perform the procedure as the laboratory standards Understand the values obtained and its applications	*		*	*	*	*		*