



**PRIST**  
DEEMED TO BE  
**UNIVERSITY**  
NAAC ACCREDITED  
THANJAVUR – 613 403 - TAMILNADU

**School of Arts and Science**

**Department of Physics**

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

**Regulation 2017**

**CO-PO mapping of curriculum**



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**Program Outcomes and Course outcomes  
 Department of Physics**

**Regulation-2017**

**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**

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

<b>PSO2</b>	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.
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<b>PSO3</b>	Students will learn the applications of numerical techniques for modeling physics systems for which analytical methods are inappropriate or of limited utility.
<b>PSO4</b>	Apply conceptual understanding of the physics to general real-world situations.
<b>PSO5</b>	Learn to minimize contributing variables and recognize the limitations of equipment.
<b>PSO6</b>	Develop the following experimental tools: Numerically model simple physical systems using Euler's method, curve fitting, and error analysis.
<b>PROGRAM EDUCATIONAL OBJECTIVES</b>	
<b>PEO1</b>	Read, understand and interpret physical information – verbal, mathematical and graphical.
<b>PEO2</b>	Equip students in methodology related to Physics.
<b>PEO3</b>	Impart skills required to gather information from resources and use them.
<b>PEO4</b>	To give need based education in physics of the highest quality at the undergraduate level.
<b>PEO5</b>	Offer courses to the choice of the students with interdisciplinary approach.
<b>PEO6</b>	Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.
<b>PEO7</b>	Provide an intellectually stimulating environment to develop skills and Enthusiasms of students to the best of their potential.
<b>PEO8</b>	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
<b>PEO1</b>	*	*	*	*		*	*	
<b>PEO2</b>	*		*		*	*		*
<b>PEO3</b>		*		*			*	
<b>PEO4</b>	*	*	*		*	*		*
<b>PEO5</b>	*		*	*		*	*	
<b>PEO6</b>		*		*			*	
<b>PEO7</b>	*	*	*		*	*		*
<b>PEO8</b>	*		*	*		*	*	

## COs-POs - Mapping of curriculum

### B.Sc., Physics – Regulation 2017

Semester	Course Code	Course Name	COs	POs							
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	17110AEC11	Tamil I	<input type="checkbox"/> Learn the changes occurred in literature since classical period.	*	*	*		*			*
			<input type="checkbox"/> Make use of vocabulary systematically.	*	*	*		*			*
			<input type="checkbox"/> Understand how to lead one's life realizing the modernity and its environment/atmosphere.	*		*	*		*	*	
	17111AEC11	Advanced English-I	<input type="checkbox"/> Develop vocabulary	*	*		*	*		*	*
			<input type="checkbox"/> Read and comprehend literature	*		*	*	*	*	*	*
			<input type="checkbox"/> Learn to edit and do proof reading		*	*	*		*	*	*
	17111AEC12	English-I	<input type="checkbox"/> Read and comprehend literature	*	*	*		*	*		*
			<input type="checkbox"/> Appreciate poetry and prose	*		*	*	*		*	*
			<input type="checkbox"/> Familiarize students with fiction.	*	*		*	*	*	*	
	17113AEC13	Properties of Matter	<input type="checkbox"/> This course would empower the student to acquire engineering skills and practical knowledge, which help the students in their everyday life.	*		*	*		*	*	*
			<input type="checkbox"/> The properties of solids especially knowledge of elasticity helps the students to identify the materials suitable for the construction of buildings, houses etc.	*	*	*		*	*		*
			<input type="checkbox"/> Properties of fluids especially knowledge of viscosity and surface tension help the students in their daily life and agriculture.	*		*	*	*		*	*
			<input type="checkbox"/> This syllabus will cater the basic requirements for their higher studies. This course will provide a theoretical basis for	*	*	*		*	*		*
			<input type="checkbox"/> doing experiments in related areas.	*		*	*	*		*	*

17113AEC14L	Properties of Matter Lab	<input type="checkbox"/> Study the elastic behaviour and working of torsional pendulum	*	*		*	*		*	*
		<input type="checkbox"/> Study of bending behaviour beams and analyse the expression for young's modulus	*		*	*	*	*		*
		<input type="checkbox"/> Understand the surface tension and viscosity of fluid	*	*	*	*	*	*	*	*
		<input type="checkbox"/> Analyse waves and oscillations	*	*	*		*	*		*
17112AEC15A	<b>Calculus and Fourier series</b>	<input type="checkbox"/> Define a vector differentiation	*		*	*	*		*	*
		<input type="checkbox"/> Evaluate Gauss divergence theorem, Stoke's theorem and Green's theorem	*	*		*	*	*	*	
		<input type="checkbox"/> Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.	*		*	*		*		*
		<input type="checkbox"/> Discuss the Application of Laplace transforms with Solution of ODE's.	*	*		*	*		*	*
		<input type="checkbox"/> Define Fourier series and Finding Fourier expansion of a periodic function with period $2\pi$	*	*	*		*	*		*
17112AEC16A	<b>Algebra and Trigonometry</b>	<input type="checkbox"/> Expansion of $\sin nq$ , $\cos nq$ , $\tan nq$ and powers of sines and cosines in terms of functions of multiples of $q$ .	*		*	*	*		*	*
		<input type="checkbox"/> Define and illustrate the concept of hyperbolic functions and logarithms of complex numbers.	*	*		*	*	*		*
		<input type="checkbox"/> Understanding the concept of Inequalities.		*	*	*		*	*	
		<input type="checkbox"/> Find relation between the roots and coefficients of equations and Symmetric function of the roots.	*	*		*	*	*		*
17120SEC01AL	<b>Package Lab-I</b>	<input type="checkbox"/> Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	*		*	*	*	*		*
		<input type="checkbox"/> Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.	*	*	*		*	*		*

			<input type="checkbox"/> 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.	*		*		*	*	*	
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	17160SEC01 B	<b>Soft Skill -I</b>	<input type="checkbox"/> Develop leadership skills and body language	*		*	*	*		*	*
	17111SEC01 L	<b>Communicative English Lab-I</b>	<input type="checkbox"/> Make effective communication	*	*		*	*	*	*	
	171INDCON S	<b>Indian Constitution</b>	<input type="checkbox"/> Democratic values and citizenship Training are gained.		*	*		*	*		*
			<input type="checkbox"/> Awareness on Fundamental Rights are established.	*		*	*		*	*	*
			<input type="checkbox"/> Learn the functions of union and State Governments	*	*		*	*		*	*
			<input type="checkbox"/> Learn the power and functions of the Judiciary	*		*	*	*		*	*
			<input type="checkbox"/> Appreciate of Democratic Parliamentary Rule	*	*		*	*	*	*	*
<b>II</b>	17110AEC21	<b>Tamil II</b>	<input type="checkbox"/> Know what devotion really is.	*		*	*		*	*	*
			<input type="checkbox"/> Know the fruitfulness obtained through devotion.	*	*	*		*	*		*
			<input type="checkbox"/> Perceive the progress achieved in the society through devotion.	*		*	*	*		*	*
	17111AEC21	<b>Advanced English-II</b>	<input type="checkbox"/> Develop technological skill.	*	*		*	*	*		*
			<input type="checkbox"/> Able to write in a variety of formats	*	*	*	*	*	*	*	*
			<input type="checkbox"/> Read biographies and develop personality	*	*		*	*	*		*
	17111AEC22	<b>English-II</b>	<input type="checkbox"/> Appreciate different forms of literature	*		*	*	*		*	*
			<input type="checkbox"/> Acquire language skills through literature	*	*		*	*	*		*
			<input type="checkbox"/> Broadens the horizon of knowledge	*	*		*	*	*	*	



17113AEC23	<b>Mechanics and Relativity</b>	<input type="checkbox"/> Understand the definition for centre of gravity in hemisphere, hollow hemisphere etc.,		*	*	*		*		*
		<input type="checkbox"/> Understand the dynamics and gravitation	*	*		*	*		*	*
		<input type="checkbox"/> Study the behaviour of rigid body dynamics	*	*	*		*	*		*
		<input type="checkbox"/> Analyse the performance of hydrostatic and hydrodynamics	*		*	*	*	*		*
		<input type="checkbox"/> Understand the negative result of Michelson-Morley experiment, Galilean and Lorentz transformation	*	*	*	*	*		*	*
17113AEC24 L	<b>Mechanics Lab</b>	<input type="checkbox"/> Understand the dynamics and gravitation	*	*		*	*	*	*	*
		<input type="checkbox"/> Understand the negative result of Michelson-Morley experiment	*	*		*	*		*	*
		<input type="checkbox"/> Study the behaviour of rigid body dynamics	*		*	*	*	*	*	
		<input type="checkbox"/> Analyse the performance of hydrostatic and hydrodynamics	*	*		*	*		*	
17112AEC25 A	<b>ODE, PDE and Laplace Transforms</b>	<input type="checkbox"/> Discuss and demonstrate the linear equations with constant coefficients	*	*		*	*	*		*
		<input type="checkbox"/> Complementary function and particular integrals.	*	*	*	*	*	*	*	*
		<input type="checkbox"/> Discuss and demonstrate the Linear equations with variable coefficients and Variation of parameters.	*	*		*	*	*		*
		<input type="checkbox"/> Define and illustrate Partial Differential Equations of the first order and Classification of integrals	*		*	*	*		*	*
		<input type="checkbox"/> Define Linear equation and Bernoulli's equation	*	*		*	*	*		*
		<input type="checkbox"/> Define Laplace transforms and discuss the Properties of Laplace transforms	*		*	*	*		*	*
		<input type="checkbox"/> Define Fourier series and Finding Fourier expansion of a periodic function with period $2\pi$ .	*	*	*	*		*	*	

	17112AEC26 A	<b>3D Vector Calculus</b>	<input type="checkbox"/> Define a vector differentiation	*	*		*	*	*		*
			<input type="checkbox"/> Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.	*		*	*	*	*		*

	17111RLC27	<b>Research Led seminar</b>	<input type="checkbox"/> Know the emerging areas in research	*		*	*	*	*		*
			<input type="checkbox"/> Exposure to various research domains	*	*	*	*	*		*	*
			<input type="checkbox"/> Acquaintance with languages of research	*		*	*	*	*	*	
			<input type="checkbox"/> Development of research aptitude	*		*	*	*		*	*
	17120SEC02 AL	<b>Packages Lab-II</b>	<input type="checkbox"/> Identify the names and functions of the PowerPoint interface.		*	*	*	*	*		*
			<input type="checkbox"/> Create, edit, save, and print presentations.	*	*		*	*		*	*
			<input type="checkbox"/> Format presentations.	*	*	*		*	*	*	*
			<input type="checkbox"/> Add a graphic to a presentation.	*		*	*	*	*		*
			<input type="checkbox"/> Create and manipulate simple slide shows with outlines and notes.	*	*		*	*	*		*
			<input type="checkbox"/> Create slide presentations that include text, graphics, animation, and transitions.		*	*	*	*		*	*
	17160SEC02 B	<b>Soft Skill -II</b>	<input type="checkbox"/> Build self-development	*	*		*	*		*	*
	17111SEC02 L	<b>Communicative English Lab-II</b>	<input type="checkbox"/> Learn grammar.	*		*	*		*	*	
			<input type="checkbox"/> Use a variety of reading strategies	*		*	*		*	*	*
			<input type="checkbox"/> Enhance the skill of making grammatically correct sentences.	*	*		*	*		*	*
<b>III</b>	17110AEC31	<b>Tamil III</b>	<input type="checkbox"/> Achieve one's goal by following the ancestral path	*		*	*	*		*	*
			<input type="checkbox"/> Learn to lead life of perfection by realizing the uncertainty in the life		*	*		*	*	*	*
			<input type="checkbox"/> Attain happiness through honesty	*	*		*	*		*	*
	17111AEC31	<b>Advanced English-III</b>	<input type="checkbox"/> Understand Phonetics.	*	*	*		*	*		*
			<input type="checkbox"/> Develop writing skill	*	*		*	*		*	*
			<input type="checkbox"/> Able to develop creative writing systems.	*		*	*	*	*	*	
			<input type="checkbox"/> Correct methodology when developing mathematical models.	*	*		*	*	*		*
			<input type="checkbox"/> Skill in applications	*		*	*	*		*	*

			<input type="checkbox"/> Designing and developing the solutions	*		*	*		*		*
	17111AEC32	<b>English-III</b>	<input type="checkbox"/> Enable to appreciate different types of prose	*	*	*		*		*	*

	17113AEC33	<b>Heat and Thermodynamics</b>	<input type="checkbox"/> Understand how statistics of the microscopic world can be used to explain the thermal features of the macroscopic world.	*		*	*		*	*	*
			<input type="checkbox"/> Be able to use thermal and statistical principles in a wide range of applications.	*	*		*	*		*	*
			<input type="checkbox"/> Learn a variety of mathematical and computer techniques.	*		*	*	*	*		*
	17113AEC34 L	<b>Heat and Thermodynamics lab</b>	<input type="checkbox"/> Understand the nature of calorimetry by specific heat of solids and law of thermodynamics and entropy	*	*		*	*	*		*
			<input type="checkbox"/> Analyses thermal conductivity and black body radiation		*	*	*	*		*	*
			<input type="checkbox"/> Analyses of zeroth law of thermodynamics and entropy	*	*		*	*		*	*
			<input type="checkbox"/> Understanding the low temperature physics	*		*	*	*	*		*
	17114AEC35	<b>Inorganic, organic and Physical chemistry – I</b>	<input type="checkbox"/> Apply the fundamental principles of measurement, matter, atomic theory	*	*	*		*	*	*	
			<input type="checkbox"/> Chemical periodicity, chemical bonding	*		*	*	*		*	*
			<input type="checkbox"/> General chemical reactivity and solution chemistry to subsequent courses in science.		*	*	*		*	*	*
	17114AEC36 L	<b>Volumetric analysis Lab – I</b>	<input type="checkbox"/> Facilitate the learner to make solutions of various molar concentrations.	*	*		*	*	*		*
			<input type="checkbox"/> Defining concentration; Dilution of Solutions;	*		*	*	*	*	*	*
			<input type="checkbox"/> Making different molar concentrations.	*	*	*	*	*	*		*
			<input type="checkbox"/> Describe bonding models that can be applied to a consideration of the properties of transition metal compounds.	*	*		*	*	*		*
	17113RMC37	<b>Research methodology</b>	<input type="checkbox"/> Able to carry out independent literature survey corresponding to the specific publication type and assess basic literary research tools.	*		*	*		*	*	*
			<input type="checkbox"/> Understanding research questions and tools		*	*	*		*	*	
			<input type="checkbox"/> Experience in scientific writings Practice in various aspects of scientific publications	*	*		*	*		*	*



	17120SEC03 AL	<b>Packages Lab-III</b>	<input type="checkbox"/> Indicate the names and functions of the Excel interface components.	*	*	*		*	*		*
			<input type="checkbox"/> Enter and edit data.	*		*	*	*		*	*
			<input type="checkbox"/> Format data and cells.	*	*	*		*	*	*	
			<input type="checkbox"/> Construct formulas, including the use of built-in functions, and relative and absolute references.	*	*		*	*	*		*
			<input type="checkbox"/> Create and modify charts.		*	*	*	*	*		*
			<input type="checkbox"/> Preview and print worksheets.	*	*	*		*	*	*	
	171__SEC03_	<b>Soft Skill-III</b>	<input type="checkbox"/> Learn interpersonal relations and social responsibilities.	*		*	*	*		*	*
	17111SEC03 L	<b>Communicative English Lab-III</b>	<input type="checkbox"/> Learn grammar.	*	*	*		*	*		*
			<input type="checkbox"/> Develop speaking and writing skills	*	*		*	*		*	*
			<input type="checkbox"/> Enhance their fluency in English	*	*	*	*	*	*	*	*
			<input type="checkbox"/> Develop individual perspectives that demonstrate critical thinking skills	*		*	*	*		*	*
<b>IV</b>	17110AEC41	<b>Tamil IV</b>	<input type="checkbox"/> Realize how the ancient people changed their life style according to the ages	*	*		*		*	*	*
			<input type="checkbox"/> Learn how to change one's lifestyle according to the needs of the future	*		*	*	*	*		*
			<input type="checkbox"/> Accept the modern trend and its uses	*		*		*	*	*	*
	17111AEC41	<b>Advanced English-IV</b>	<input type="checkbox"/> Develop writing skill.	*		*	*	*	*		*
			<input type="checkbox"/> Comprehend and describe poems	*	*	*	*	*		*	*
			<input type="checkbox"/> Learn interviewing skills	*		*	*		*	*	*
	17111AEC42	<b>English IV</b>	<input type="checkbox"/> Improve their ability to read and understand them		*	*	*	*	*	*	*
			<input type="checkbox"/> Know the genius of Shakespeare	*	*		*		*		*
			<input type="checkbox"/> Express in writing their views.	*		*	*	*	*	*	*
	17113AEC43	<b>Optics</b>	<input type="checkbox"/> Understand the basic concepts of wave optics and an ability to compute basic quantities in optics.	*	*		*	*	*		*
			<input type="checkbox"/> Learn to use methods for solving differential equations.	*		*	*	*		*	*
			<input type="checkbox"/> Experience the diverse applications of the wave equation.	*	*		*	*	*	*	
	17113AEC44 L	<b>Optics Lab</b>	<input type="checkbox"/> Study the elastic behaviour of materials	*		*		*		*	*
			<input type="checkbox"/> Analyse the relationship between various types of experiments	*	*		*		*	*	*
			<input type="checkbox"/> Perform the procedure as per standard values	*		*	*	*		*	*
			<input type="checkbox"/> Understand the applications of optical devices	*	*		*	*	*		*

17114AEC45	<b>Inorganic, organic and Physical chemistry – II</b>	<input type="checkbox"/> The fundamentals of the chemistry of the main group elements, and important real-world applications of many of these species	*	*	*	*	*	*	*
		<input type="checkbox"/> The bonding models, structures, reactivity's, and applications of Hydrogen peroxide, ozone and hydrides.	*	*	*	*	*	*	*
		<input type="checkbox"/> Predicting geometries of simple molecules	*	*	*	*	*	*	*
		<input type="checkbox"/> Skills in handling and measurement of radioactive material.	*	*	*	*	*	*	*
17114AEC46 L	<b>Volumetric analysis Lab – II</b>	<input type="checkbox"/> Facilitate the learner to make solutions of various molar concentrations.	*	*	*	*	*	*	*
		<input type="checkbox"/> The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration	*	*	*	*	*	*	*
		<input type="checkbox"/> Dilution of Solutions; Making different molar concentrations.	*	*	*	*	*	*	*
17120SEC04 AL	<b>Packages Lab-IV</b>	<input type="checkbox"/> Examine database concepts and explore the Microsoft Office Access environment.	*	*	*	*	*	*	*
		<input type="checkbox"/> Design a simple database.	*	*	*	*	*	*	*
		<input type="checkbox"/> Build a new database with related tables.	*	*	*	*	*	*	*
		<input type="checkbox"/> Manage the data in a table.	*	*	*	*	*	*	*
		<input type="checkbox"/> Query a database using different methods.	*	*	*	*	*	*	*
		<input type="checkbox"/> Design a form.	*	*	*	*	*	*	*
		<input type="checkbox"/> Generate a report.	*	*	*	*	*	*	*
		<input type="checkbox"/> Import and export data.	*	*	*	*	*	*	*
171__SEC04_	<b>Soft Skill-IV</b>	<input type="checkbox"/> Develop etiquette and interviewing skills.	*	*	*	*	*	*	
17111SEC04 L	<b>Communicative English Lab-IV</b>	<input type="checkbox"/> Learn grammar.	*	*	*	*	*	*	
		<input type="checkbox"/> Enable to express their views in conversation	*	*	*	*	*	*	
		<input type="checkbox"/> Develop soft skills	*	*	*	*	*	*	
		<input type="checkbox"/> Enhance presentation skills	*	*	*	*	*	*	
171ENVTST U	<b>Environmental Studies</b>	<input type="checkbox"/> Learn about environmental pollution.	*	*	*	*	*	*	
		<input type="checkbox"/> Familiarize with the social issues and the environment	*	*	*	*	*	*	



			<input type="checkbox"/> Learn about environmental pollution.	*		*	*	*	*	*	*
			<input type="checkbox"/> Familiarize with the social issues and the environment	*	*		*	*		*	*
<b>V</b>	17113AEC51	<b>Electricity and Magnetism</b>	<input type="checkbox"/> 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.		*	*		*	*		*
			<input type="checkbox"/> Understand the relationship between electrical charge, electrical field, electrical potential, and magnetism.	*		*		*	*	*	
			<input type="checkbox"/> Be able to use electromagnetic theory and principles in a wide range of applications.	*	*		*		*	*	*
			<input type="checkbox"/> Learn a variety of advanced mathematical methods and computer techniques.	*		*	*	*		*	
			<input type="checkbox"/> Develop skill to solve numerical problems on it.	*	*		*	*		*	*
			<input type="checkbox"/> Solve mathematical problems involving electric and magnetic forces, fields, and various electromagnetic devices and electric circuits.		*	*		*	*		*

	17113AEC52	<b>Atomic Physics</b>	<input type="checkbox"/> Apply the mathematical tools developed to various quantum mechanics problems.	*	*		*	*		*	
			<input type="checkbox"/> Develop problem solving methods that will include mathematical as well as numerical computations and solutions.		*	*	*		*		*
			<input type="checkbox"/> Build connections between mathematical development and conceptual understanding	*	*		*		*		*
	17113AEC53	<b>Basic Electronics</b>	<input type="checkbox"/> to impart knowledge of Basic Electronics in a broader context to the BSc students.	*		*	*	*	*	*	
			<input type="checkbox"/> to clarify the concepts of Semiconductors, p- n junctions, Fermi Level.		*	*		*	*		*
			<input type="checkbox"/> to develop the understanding of rectifiers, Transistors and FET.	*		*	*	*		*	
			<input type="checkbox"/> learn the basics of the transistor action along with their application as an amplifier.		*	*		*	*		*
			<input type="checkbox"/> gain basic knowledge of electronics.	*	*		*	*		*	*
			<input type="checkbox"/> learn the logic of flip flops, counters, registers etc.,		*	*	*		*	*	
	17113AEC54 L	<b>Digital Electronics Lab</b>	<input type="checkbox"/> Understand the fundamentals of codes and number system	*		*	*		*	*	
			<input type="checkbox"/> Understand the binary arithmetic, logics and Boolean functions	*	*		*	*		*	
			<input type="checkbox"/> Understand the functions and working of flip-flop circuits registers and counters	*	*		*	*		*	*

	17113DSC55	<b>Energy Physics</b>	<input type="checkbox"/> Understand the basic significance of various energy resources	*		*	*		*	*	
			<input type="checkbox"/> Understand about solar energy related applications	*	*		*	*		*	*
	17113DSC55	<b>Laser Physics</b>	<input type="checkbox"/> Understand the basic principle of laser and characteristics	*		*	*		*	*	
			<input type="checkbox"/> Understand the theory of types of lasers	*	*		*		*	*	*
			<input type="checkbox"/> Perform the procedures into applications oriented one		*	*		*		*	*
	17113DSC55	Digital Photography	<input type="checkbox"/> Can understand the principles of photography and image formation and the science and arts behind it.	*	*		*	*		*	*
			<input type="checkbox"/> Able to understand the essential components of conventional and digital cameras and also the different image processing techniques	*		*	*		*	*	
	17113BRC56	<b>Participation in Bounded Research</b>	<input type="checkbox"/> Do the allotted work in research		*	*		*	*		*
			<input type="checkbox"/> Learn to do review of literature	*	*		*	*	*	*	
			<input type="checkbox"/> Hands on exposure to problem solving tools in contemporary research		*	*		*	*		*
			<input type="checkbox"/> Evolution of research intuitiveness and orientation Familiarity with cutting edge research trends	*		*	*	*		*	*
	17120SEC05 AL	<b>Packages Lab-V</b>	<input type="checkbox"/> work with the Photoshop workspace	*	*		*		*	*	
			<input type="checkbox"/> navigate images		*	*		*	*		*
			<input type="checkbox"/> resize and crop images	*	*		*	*		*	*
			<input type="checkbox"/> make and work with selections	*		*	*		*	*	*
			<input type="checkbox"/> create new layers and perform other basic layer functions transform images.	*	*	*		*	*		*
	17113SEC05_	<b>Soft Skill-V</b>	<input type="checkbox"/> Develop leadership skills and body language	*		*	*		*	*	
	17111SEC05 L	<b>Communicative English Lab-V</b>	<input type="checkbox"/> Develop corporate skills. Handle their day to day affairs well with their knowledge of language skills.		*	*		*	*		*
	17113AEC56 L	<b>Electricity and Magnetism Lab</b>	<input type="checkbox"/> Analyze the chemical and heating effect of current	*	*		*	*		*	
			<input type="checkbox"/> Analyze the value of Maxwell equation-	*		*	*		*	*	*

			boundary conditions								
			<input type="checkbox"/> Understand the Faraday's laws of electromagnetic induction	*	*		*		*	*	*

VI	17113AEC61	<b>Digital Electronics &amp; Microprocessor</b>	<input type="checkbox"/> Students will familiarize with logic circuits and their applications which enables them to design logic circuits of their own.	*	*		*	*		*	*
	17113AEC62	<b>Wave Mechanics</b>	<input type="checkbox"/> 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.	*		*	*		*		*
	17113AEC63 L	<b>Digital Electronics Lab</b>	<input type="checkbox"/> Understand the fundamentals of codes and number system	*	*	*		*		*	*
			<input type="checkbox"/> Understand the binary arithmetic, logics and Boolean functions	*		*	*		*	*	
			<input type="checkbox"/> Understand the functions and working of flip flop circuits registers and counters	*	*	*		*	*		*
	17113DSC64 —	<b>Elements and Theoretical Physics</b>	<input type="checkbox"/> They have understood the difference between covariance and invariance of various quantities and applied it.	*	*		*	*	*	*	*
			<input type="checkbox"/> 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.	*		*	*		*	*	
			<input type="checkbox"/> They have understood the difference between covariance and invariance of various quantities and applied it.	*	*		*	*		*	*
			<input type="checkbox"/> 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.	*		*	*		*	*	
			<input type="checkbox"/> Students now know the basics of scattering and absorption and relate them to real life phenomena.		*	*		*	*		*
	17113DSC64 —	<b>Material Physics</b>	<input type="checkbox"/> To develop an understanding of the unique properties and characteristics of polymer based materials.	*	*		*	*		*	*

17113DSC64	<b>Communication physics</b>	<input type="checkbox"/> Explain the concept of amplitude and frequency modulation	*	*	*	*	*	*	*
		<input type="checkbox"/> Distinguish Digital modulation (pulse code and Pulse amplitude modulation) types	*	*	*	*	*	*	*
		<input type="checkbox"/> Know fundamental of AM radio receiver and super heterodyne receiver.	*	*	*	*	*	*	*
		<input type="checkbox"/> Compare working principle of single mode and multimode optical fibers.	*	*	*	*	*	*	*
17113PRW66	<b>Project Work</b>	<input type="checkbox"/> Enables the students to research on particular topic of their choice that has a relationship with the field of study.	*	*	*	*	*	*	
17120SEC06 AL	<b>Packages Lab-VI</b>	<input type="checkbox"/> Learn to create animated graphics and sound and interactivity.	*	*	*	*	*	*	*
		<input type="checkbox"/> Can develop Website	*	*	*	*	*	*	*
		<input type="checkbox"/> CD based presentations	*	*	*	*	*	*	*
		<input type="checkbox"/> Develop life skills and other skills	*	*	*	*	*	*	*
171__SEC06_	<b>Soft Skill –VI</b>	<input type="checkbox"/> Develop leadership skills and body language	*	*	*	*	*	*	
17111SEC06 L	<b>Communicative English Lab-VI</b>	<input type="checkbox"/> Apply study skills	*	*	*	*	*	*	*
		<input type="checkbox"/> Widen creative thinking	*	*	*	*	*	*	*
		<input type="checkbox"/> Be a good team worker	*	*	*	*	*	*	*
		<input type="checkbox"/> 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 communicate across teams
PROGRAM SPECIFIC OUTCOME	
PSO1	➤ Students are also expected to develop a written and oral communications skills in communicating physics-related topics.
PSO2	➤ Students will develop the proficiency in the acquisition of data using a variety of laboratory instruments and in the analysis and interpretation of such data.
PSO3	➤ Students will realize and develop an understanding of the impact of physics and science on society.

<b>PSO4</b>	➤ Describe the methodology of science and the relationship between observation and theory.
<b>PSO5</b>	➤ Discover of physics concepts in other disciplines such as mathematics, computer science, engineering, and chemistry.
<b>PSO6</b>	➤ Analyze physical problems and develop correct solutions using natural laws.
<b>PROGRAM EDUCATIONAL OBJECTIVES</b>	
<b>PEO1</b>	➤ Work alongside of engineers, health professionals, scientists and



	Other professionals to help solve scientific problems.
<b>PEO2</b>	➤ Work as techno manager, administrator, or an entrepreneur with further training and education.
<b>PEO3</b>	➤ Pursue doctoral research degrees to work in colleges, universities as professors or as scientists in research establishments.
<b>PEO4</b>	➤ To understand the underlying physics in respective specializations, and, be able to teach and guide successfully.
<b>PEO5</b>	➤ To introduce advanced ideas and techniques that are applicable in respective fields.
<b>PEO6</b>	➤ To develop human resource with a solid foundation in theoretical and experimental aspects of respective specializations as a preparation for career 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
<b>PEO1</b>	*	*	*	*		*	*	
<b>PEO2</b>	*		*		*	*		*
<b>PEO3</b>		*		*			*	
<b>PEO4</b>	*	*	*		*	*		*
<b>PEO5</b>	*		*	*		*	*	
<b>PEO6</b>		*		*			*	

**COs-POs - Mapping of curriculum**

**M.Sc., Physics – Regulation 2017**

Semester	Course Code	Course Name	Course Outcome	POs							
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	17213SEC11	<b>Advanced Mathematical Physics</b>	<input type="checkbox"/> know the method of contour integration to evaluate definite integrals of varying complexity.	*		*			*	*	*
			<input type="checkbox"/> 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.	*	*		*	*		*	*
			<input type="checkbox"/> able to apply calculus of variations to diverse problems in physics including isoperimetric problems.		*	*		*	*		*
	17213SEC12	<b>Classical and Statistical Mechanics</b>	<input type="checkbox"/> Understand the terminology used in Classical Mechanics.	*		*	*		*	*	
			<input type="checkbox"/> Employ conceptual understanding to make predictions, and then approach the problem mathematically.	*	*	*		*	*		*
			<input type="checkbox"/> Understand the important connections between theory and experiment.	*	*		*	*		*	
			<input type="checkbox"/> Connect concepts and mathematical rigor in order to enhance understanding		*	*	*		*	*	*

17213SEC13	<b>Electronics and Communication</b>	<input type="checkbox"/> basic knowledge of semiconductor diode, rectifier and filter circuits.	*		*	*		*		*
		<input type="checkbox"/> Understand transistor biasing and working principle of Amplifiers.		*	*		*	*		*
		<input type="checkbox"/> Explain feedback and oscillatory circuits.	*		*	*		*	*	
		<input type="checkbox"/> idea about Multivibrators and operational amplifiers.		*	*		*	*		*
17213SEC14L	General Electronics Lab	<input type="checkbox"/> Analysis of Resistive Circuits and Solution of resistive circuits with independent sources	*		*	*		*	*	
		<input type="checkbox"/> Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits	*	*		*	*		*	*
		<input type="checkbox"/> Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits	*		*		*	*		*
17213DSC15_	Instrumentation	<input type="checkbox"/> Demonstrate basic knowledge about various instruments.		*	*		*	*		*
		<input type="checkbox"/> Get exposure about the real-time applications	*	*		*	*	*		*
17213DSC15_	<b>Digital Communication</b>	<input type="checkbox"/> To understand the use of Fourier, transform in analyzing the signals	*		*	*		*	*	
		<input type="checkbox"/> To learn about the quanta of transmission of information	*	*		*		*		*
		<input type="checkbox"/> To make students familiar with different types of pulse modulation	*		*	*	*		*	*
		<input type="checkbox"/> To have an in depth knowledge about the various methods of error controlling codes	*	*		*		*	*	*
		<input type="checkbox"/> To acquire knowledge about spread spectrum techniques in getting secured communication	*	*		*	*		*	*
17213DSC15_	<b>Crystal Growth Processes</b>	<input type="checkbox"/> Introduction to crystal system and Symmetry	*		*		*	*	*	*
		<input type="checkbox"/> Description on crystal nucleation and growth		*	*	*		*	*	

			<input type="checkbox"/> Discussion on various crystal growing techniques	*		*		*	*		*
			<input type="checkbox"/> Thin film by spray pyrolysis method		*		*		*	*	*
<b>II</b>	17213SEC21	<b>Microprocessor and Microcontroller</b>	<input type="checkbox"/> Study the Organization and internal architecture of the Intel 8085	*		*	*	*		*	*
			<input type="checkbox"/> learn assembly language programming and arithmetic operation		*	*		*	*	*	
			<input type="checkbox"/> Aware of memory interfacing, and different Data transfer schemes, Learn interfacing with peripheral I/O devices	*		*	*		*		*

17213SEC22	<b>Quantum Mechanics</b>	<input type="checkbox"/> Students will learn the role of uncertainty in quantum physics and use the commutation relations of operators.	*	*		*	*		*	*
		<input type="checkbox"/> 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.	*		*	*		*	*	
		<input type="checkbox"/> Students will learn some matrix technique to solve physical problems.		*	*		*	*		*
17213SEC23	<b>Condensed Matter Physics</b>	<input type="checkbox"/> Explain the significance and value of condensed matter physics, both scientifically and in the wider community.	*		*	*		*	*	
		<input type="checkbox"/> The subject treats functional materials from an experimental viewpoint, solid state theory and properties.	*		*		*		*	*
		<input type="checkbox"/> Critically analyse and evaluate experimental strategies, and decide which is most appropriate for answering specific questions.		*	*	*		*	*	
		<input type="checkbox"/> Apply key analysis techniques to typical problems encountered in the field.	*	*		*	*		*	*
		<input type="checkbox"/> Gain and apply discipline-specific knowledge, including self-directed research into the scientific literature.	*		*	*		*	*	
		<input type="checkbox"/> 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.		*	*		*	*		*

	17213SEC24L	<b>Microprocessor Lab</b>	<input type="checkbox"/> To become familiar with the architecture and Instruction set of Intel 8085 microprocessor.	*	*		*	*		*	*		
			<input type="checkbox"/> To improve programming logic and concepts of 8085 microprocessor.		*	*		*	*		*	*	
			<input type="checkbox"/> To provide practical hands on experience with Assembly Language Programming.	*	*		*	*		*	*		*
			<input type="checkbox"/> To familiarize the students with interfacing of various peripheral devices with 8085 microprocessor.	*		*	*		*		*		*
	17213DSC25_	<b>Atomic and Nuclear Physics</b>	<input type="checkbox"/> Understand the properties of positive rays, experimental proof by Frank and Hertz method	*	*		*	*		*	*		
			<input type="checkbox"/> Analyse the relationship between various types of couplings		*	*	*		*	*	*	*	
			<input type="checkbox"/> Understand the properties of x-rays verification	*	*		*	*		*	*	*	*
			<input type="checkbox"/> Analyse the ideas of basics of nucleus and their energy		*	*		*	*		*	*	*
			<input type="checkbox"/> Perform the procedures for nuclear fission and fusion	*		*	*		*	*		*	*
	17213DSC25_	<b>Radiation Physics</b>	<input type="checkbox"/> Explain the principles of radiation dosimetry;		*	*	*		*	*	*		

			<input type="checkbox"/> Explain the principles of therapeutic radiation physics including X-rays, electron beam physics, radioactive sources, use of unsealed sources and Brachytherapy;	*		*		*	*		*
			<input type="checkbox"/> 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	*	*		*	*		*	*
	17213RMC26	<b>Research Methodology</b>	<input type="checkbox"/> 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.		*	*		*	*		*
			<input type="checkbox"/> Understanding research questions and tools	*	*		*		*	*	
			<input type="checkbox"/> Experience in scientific writings		*	*		*	*		*
			<input type="checkbox"/> Practice in various aspects of scientific publications Inculcation of research ethics	*	*		*	*	*		*

	17213BRC27	<b>Participation in bounded research</b>	<input type="checkbox"/> Hands on exposure to problem solving tools in contemporary research		*	*		*	*		*
			<input type="checkbox"/> Evolution of research intuitiveness and orientation	*		*	*	*		*	
			<input type="checkbox"/> Do the allotted work in research Learn to do review of literature		*	*		*	*		*
<b>III</b>	17213SEC31	<b>Electro Magnetic Theory</b>	<input type="checkbox"/> Explains the fundamentals of electrostatics	*		*	*		*	*	
			<input type="checkbox"/> Illustrates the application of electrostatics in macroscopic media	*	*	*		*	*		*
			<input type="checkbox"/> Briefs out the various concepts of magnetostatics	*		*	*		*	*	
			<input type="checkbox"/> Describes the elementary ideas of electromagnetic theory		*	*		*	*		*
			<input type="checkbox"/> Elaborates the utilization of electromagnetic theory in optics	*	*		*	*		*	*
	17213SEC32	<b>Nuclear and Particle Physics</b>	<input type="checkbox"/> Acquire knowledge in the content areas of nuclear and particle physics, focusing on concepts that are commonly used in this area.	*		*	*		*	*	*
			<input type="checkbox"/> Develop and communicate analytical skills in subatomic physics.		*		*	*		*	*
			<input type="checkbox"/> Develop familiarity with the vast areas of nuclear and particle physics as well as develop an interest in these subjects.	*		*		*	*		*
	17213SEC33L	<b>Advanced Electronics Lab</b>	<input type="checkbox"/> Understand the current voltage characteristics of semiconductor devices		*		*	*		*	
			<input type="checkbox"/> Evaluate frequency response to understand behavior of Electronics circuits	*		*	*		*		*
			<input type="checkbox"/> Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation, Design and analyze of electronic circuits	*	*		*	*		*	*
	17213DSC34_	<b>Non-Conventional Energy Physics</b>	<input type="checkbox"/> Describe the environmental aspects of non-conventional energy resources		*	*		*	*		*
			<input type="checkbox"/> In Comparison with various conventional energy system, their prospects and limitations	*		*	*			*	



			<input type="checkbox"/> Know the need of renewable energy resources, historical and latest developments	*		*	*		*		*

17213DSC34_	Photonics devices and application	<input type="checkbox"/> Learn Fundamentals of computerized modeling of diverse optical and photonics systems.	*		*	*		*	*	
		<input type="checkbox"/> Gain working experience with standard computational tools used in industry.		*		*	*		*	*
		<input type="checkbox"/> Acquire essential laboratory skills in designing experiments. Assembling standard optical tools for optical experimentation.	*	*		*	*	*		*
17213DSC34_	<b>Analysis of Crystal Structures</b>	<input type="checkbox"/> the concept of crystal structures and symmetry, and diffraction theory		*	*	*		*	*	
		<input type="checkbox"/> students with a background to X-ray generation, scattering theory and experimental diffraction from single crystals	*	*		*	*		*	*
		<input type="checkbox"/> provide instruction on the methods and basis for determining low-molecular weight crystal structures using X-ray Crystallography	*		*	*		*	*	
		<input type="checkbox"/> give the students a background to the instrumentation used for powder diffraction and structure refinement using Rietveld method	*	*		*	*		*	
		<input type="checkbox"/> different levels of structure exhibited by proteins and nucleic acids and methods used in protein crystallography.		*	*		*	*		*
17213SRC36	<b>Societal research</b>	<input type="checkbox"/> Sensitization of social needs for innovation	*	*		*	*		*	
		<input type="checkbox"/> Team work towards interdisciplinary synchronous research strategy		*	*		*	*		*
		<input type="checkbox"/> Development of critical thinking and synergistic research approach.	*		*	*		*	*	

IV	17213AEC41	<b>Laser Physics and Non Linear Optics</b>	<input type="checkbox"/> Apply the concepts and theories of a range of advanced topics in physics;	*		*	*		*	*	
			<input type="checkbox"/> 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		*	*		*	*		*
	17213AEC42	<b>Numerical Methods and Computational Physics</b>	<input type="checkbox"/> Describe and apply the Newton's forward, backward and divided difference formulas, Lagrange's polynomial and cubic spline to obtain the polynomial interpolation.	*		*	*		*	*	
			<input type="checkbox"/> Develop algorithmic solutions to simple computational problems and write simple Python programs.	*	*		*	*		*	*
			<input type="checkbox"/> 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.		*	*		*	*		*
	17213SEC43 L	<b>Numerical methods lab with C++</b>	<input type="checkbox"/> Be aware of the use of numerical methods in modern scientific computing.	*		*	*		*	*	
			<input type="checkbox"/> Be familiar with finite precision Computing.	*	*		*	*		*	*
			<input type="checkbox"/> Be familiar with calculation and interpretation of errors in numerical methods.	*		*		*	*		*
			<input type="checkbox"/> Be familiar with numerical solutions of nonlinear equations in a single variable		*		*	*		*	*
			<input type="checkbox"/> Be familiar with numerical interpolation and approximation of functions	*		*	*		*	*	

			<input type="checkbox"/> Be familiar with numerical integration and differentiation	*		*	*		*	*	
			Be familiar with numerical solution of ordinary differential equations	*	*		*	*		*	*

17213DSC44	<b>Nano Science and Technology</b>	<input type="checkbox"/> Elucidate emerging needs in nanotechnology environment, health; and safety, and incorporate them into basic education that can be immediately employed in industry.	*		*	*		*	*	
		<input type="checkbox"/> Promote interdisciplinary interactions among engineering, engineering technology, science, and industrial management/ technology majors;		*		*	*		*	*
17213DSC44	Non-linear Dynamics	<input type="checkbox"/> The aim of the course is to present introduction to nonlinear dynamics of continuous and discrete models.	*		*	*		*	*	
		<input type="checkbox"/> Students should be able to illustrate mentioned nonlinear phenomena in models from various science fields.		*	*		*	*		*
		<input type="checkbox"/> Students will be able to analyze models in using appropriate software.	*	*		*	*		*	
		<input type="checkbox"/> Students will be able to explain one and multiparametric bifurcations and chaotic dynamics.	*		*	*		*	*	*
17213DSC44	<b>Advanced Spectroscopy</b>	<input type="checkbox"/> Helps students understand and appreciate spectroscopy as a sufficiently broad field in which many sub disciplines exist.		*	*		*	*		*
		<input type="checkbox"/> Make them appreciate each of these specific techniques with numerous implementations.	*		*	*		*	*	
		<input type="checkbox"/> To realize the progress in this field that is rapid, resulting in improved instrument capabilities and an ever-widening range of applications.	*	*		*	*			*
		<input type="checkbox"/> To apply group theory in spectroscopy to shed light on molecular symmetry and	*		*	*			*	*

			determine important physical parameters.									
	17213PRW45	<b>Project</b>	<input type="checkbox"/> Understand the basic ideas about the project		*		*	*		*	*	
			<input type="checkbox"/> Understand the working procedure of the project	*	*	*		*	*			*
			<input type="checkbox"/> Perform the procedure as the laboratory standards Understand the values obtained and its applications	*		*	*	*	*			*