

B.Sc., Physics

Outcome Based Education Curriculum, Scheme & Syllabus

Batch: 2022-2025



Department of Physics



NGM College, Pollachi

Department of Physics

B.Sc. Programme

Vision

The ultimate goal of the Department of Physics is to bring Eminence and Excellence in Teaching and Learning processes, and to fetch ours as one of the Benchmark Departments with potential for academic excellence.

Mission

To execute the teaching profession to bring the students as an asset for a productive and fascinating career, successful in their life, and to realize the learning with real-world experience.

Program Educational Objectives:

PEO1	Ability to successfully pursue forefront research in their field of interest and engage themselves in lifelong learning process
PEO2	Demonstrate the ability to use skills in Physics and its related areas of technology for formulating and tackling Physics-related problems
PEO3	Acquire jobs in varies service domains like Government, teaching, information, banking and industry
PEO4	Uphold professional ethics, exhibit critical thinking and demonstrate innovative ideas to function as a leader in diverse fields
PEO5	Enhance the Analytical, technical, computational and experimental skills to solve physics related problems individually and collectively
PEO6	Empower the students to establish new identity by articulating their knowledge and understanding of modern digital tools to locate, present and retrieve information

Program Outcomes:

PO1	Acquire fundamental/systematic or coherent understanding of the academic field of Physics and procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics. (K1/K2)
PO2	Demonstrate the ability to use skills in Physics and its related areas of technology. (K3)
PO3	Recognize the importance of mathematical modeling, simulation and computing, and the role of approximation and mathematical approaches to describe the physical world. (K4)
PO4	Plan and execute Physics-related experiments or investigations, analyze and interpret data/information collected using appropriate methods. (K5)
PO5	Demonstrate relevant generic skills and global competencies to tackle open-ended problems that belong to the disciplinary - area Boundaries to work individually and collectively. (K3)
PO6	Demonstrate professional behavior to promote safe learning and working environment. (K6)

Program Specific Outcomes:

PSO - 01	Acquire knowledge and understanding of the core concept of Physics and their applications.
PSO - 02	Inculcate relevant skills to succeed in higher education or fetch jobs in Government/Public sectors.

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS101			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	6	Tutorial Hrs./Sem.	-	Core I: Gravitation, Properties of Matter and Sound	Semester:	I
					Credits:	3

Course Objective

To recognize the basic concepts of gravitation and to get exposure to the properties of liquids and solids

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Gain knowledge and understanding of dynamics and gravitation	K1/K2
CO2	Apply fundamental concepts on the applications of the elastic properties of solids	K3
CO3	Analyze the molecular theory of surface tension, viscosity and diffusion	K4
CO4	Evaluate the general terms in acoustics like intensity, loudness, reverberation etc, and study in detail about production, detection, properties and uses of ultrasonic waves	K5
CO5	Explore the impact of matter properties and gravitation on actual concerns.	K5

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	L	-	M	-	H	-
CO2	M	H	M	L	H	L	M	-
CO3	L	M	H	M	L	M	-	L
CO4	-	L	M	H	M	L	-	M
CO5	-	M	H	H	M	M	-	H

H – High; M – Medium; L – Low

Programme Code:	BSc	Programme Title:	Bachelor of Science	
Course Code:	22UPS202	Title	Batch:	2022-2025
		Core II: Thermal Physics	Semester:	II
Hrs/Week:	5		Credits:	5

Course Objective

- To understand of the fundamental laws and principles of thermodynamics and heat transfer

CO Number	CO Statement	Knowledge Level
CO1	Acquire the knowledge about the fundamental laws of thermodynamics and procure basic knowledge about real gas, specific heat and entropy	K1/K2
CO2	Apply the basic principles of heat transfer and theory of gases for various applications	K3
CO3	Categorize the various thermodynamic cycles used for energy productions	K4
CO4	Enumerate the theory behind low temperature physics and compare the working principles of various liquefaction process	K5
CO5	Design instruments to achieve low temperature environment for domestic applications and inculcate professional ethics to succeed even in diversified sectors	K6

Mapping

CO \ PO / PSO	PO / PSO							
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	-	L	-	-	H	H
CO2	H	H	-	M	L	-	H	H
CO3	H	H	-	H	L	-	H	H
CO4	H	M	-	H	L	-	H	H
CO5	H	H	-	H	H	H	H	H

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS203			Title	Batch:	2020-2023
				Core III: Physics Lab I	Semester:	I & II
Practical Hrs./Week	3	Tutorial Hrs./Sem.	-		Credits:	3

Course Objective

To develop the skill to gain knowledge in Physics Lab

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles in executing the simple experiments	K2
CO2	Apply the knowledge of theory to experiments	K3
CO3	Analyze the experiment results with theory	K4
CO4	Evaluate different physical parameters with maximum accuracy	K5
CO5	Create various experimental techniques to find the Young's Modulus	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	M	L	H	L	H	M
CO2	M	H	M	L	H	M	M	M
CO3	L	M	H	H	M	M	L	H
CO4	-	L	M	H	M	M	L	H
CO5	-	-	M	M	M	H	-	H

H-High; M-Medium; L-Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS304			Title	Batch:	2022 – 2025
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	-	Core IV: Mathematical Physics	Semester:	III
					Credits:	5

Course Objective

To apply the concepts of Mathematics in Physics and to acquire the basic knowledge about mathematical methods

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Gain knowledge on the mathematical concepts of Physics	K1
CO2	Relate mathematics and physics to understand nature	K2
CO3	Apply skills of mathematical modeling in applied fields	K3
CO4	Implement numerical methods in research fields	K4
CO5	Interpret mathematics to many problem in physics particularly in research Area.	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H
CO2	M	H	H	H	M	M	H	H
CO3	H	M	M	H	M	M	H	H
CO4	M	M	M	M	H	H	H	H
CO5	M	H	H	H	M	M	H	H

H – High; M – Medium; L – Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	22UPS3N1	Title	Batch:	2022-2025
		Non-Major Elective I: Principles of Physics – I	Semester:	III
Hrs/Week:	1		Credits:	2

Course Objective

- To create awareness and to develop basic skills about environment, energy resources and its application

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Remember basic knowledge on renewable energy sources	K1/K2
CO2	Apply the concepts of Physics to construct devices	K3
CO3	Analyze the environmental impacts using the core concepts of Physics	K4
CO4	Create energy devices based on the required applications	K5
CO5	Design, construct, evaluate and troubleshoot the appliances using the acquired knowledge	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	-	H	M	H	M	H
CO2	M	-	M	M	H	H	-	M
CO3	H	H	H	L	-	L	H	-
CO4	M	L	H	M	M	M	H	M
CO5	H	L	M	M	H	-	H	L

H – High; M – Medium; L – Low

Programme Code:	BSc	Programme Title:	Bachelor of Science	
Course Code:	22UPS3N2	Title	Batch:	2022-2025
		Non-Major Elective I: Renewable Energy Sources-I	Semester:	III
Hrs/Week:	1		Credits:	2

Course Objective

- To develop the basic skills about various energy resources and its applications

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the fundamental concept of various energy resources	K1/ K2
CO2	Apply the physical principles of conventional and non-conventional sources to study the device and make measurements.	K3
CO3	Analyze the harvested energy from various available sources and utilize it based on the requirements	K4
CO4	Create solar related devices and make measurements	K5
CO5	Design and construct energy related devices and apply based on the available needs	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	H	H	M	H	M	H
CO2	M	-	M	M	H	H	-	M
CO3	H	H	M	L	-	L	H	-
CO4	M	L	H	H	M	H	H	M
CO5	H	M	M	M	H	-	H	L

H- High; M- Medium; L- Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS405			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-	Core V: Electricity & Magnetism	Semester:	IV
					Credits:	5

Course Objective

To familiarize the students with the fundamental concepts and laws in electricity & magnetism and establish a foundation in electromagnetism

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire the knowledge on fundamental concepts of electric and magnetic fields, potentials and electromagnetic induction	K1 / K2
CO2	Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances	K3
CO3	Analyze the problems in electromagnetism that establishes the conceptual understanding	K4
CO4	Evaluate the basic and advanced problems in the field of static and dynamic fields	K5
CO5	Design experiments and acquire data in order to explore physical principles, effectively communicate results, and critically evaluate related scientific studies	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	-	M	-	H	-
CO2	M	H	-	-	H	-	M	-
CO3	-	M	H	M	M	-	M	M
CO4	-	-	M	H	-	L	-	H
CO5	-	-	-	M	-	M	-	H

H – High; M – Medium; L – Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	22UPS4N3	Title	Batch:	2022 - 2025
		Non-Major Elective II: Principles of Physics –II	Semester:	IV
Hrs/Week:	1		Credits:	2

Course Objective

To develop the scientific interests on the portable electronic devices for day to life

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic knowledge about portable devices	K1/K2
CO2	Apply the central concepts of electric and optical devices	K3
CO3	Analyze the basic physical phenomena on the operating features of scientific devices	K4
CO4	Evaluate the applications of the physical quantities	K5
CO5	Create equipment for measuring	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	H	M	M	H	H	H
CO2	M	H	M	M	M	H	-	M
CO3	H	H	-	H	L	L	H	-
CO4	H	L	H	H	M	H	M	M
CO5	H	M	-	M	H	M	H	M

H – High; M – Medium; L – Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	22UPS4N4	Title	Batch:	2022 - 2025
		Non-Major Elective II : Renewable Energy Sources - II	Semester:	IV
Hrs/Week:	1		Credits:	2

Course Objective

To enrich the fundamental scientific skills in inexhaustible sources of energies

Course outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Remember and understand various energy sources like wind energy, bio mass energy and hydrogen energy	K1/ K2
CO2	Apply the basic physical concepts to develop devices based on the conversion technologies	K3
CO3	Analyze the different forms of energy utilizing the basic concepts for various applications	K4
CO4	Design and develop the various energy related devices	K5
CO5	Evaluate and make measurements of the constructed devices	K6

Mapping

CO \ PO/PSO	PO						PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	M	M	H	L	H	L	H	M
CO2	M	M	H	M	H	M	L	H
CO3	H	H	L	H	H	H	H	L
CO4	M	H	H	M	M	M	M	H
CO5	H	M	H	M	L	H	L	M

H- High; M- Medium; L- Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	22UPS406	Title	Batch:	2022-2025
		Core VI: Physics Lab II	Semester:	III & IV
Hrs/Week:	3		Credits:	3

Course objective

- To understand the theory with hands-on experience.

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles of optics and electromagnetic field	K1/K2
CO2	Apply the knowledge of fundamentals of physics to execute experiments and to get appropriate results	K3
CO3	Analyse the theory of optics and electromagnetic field by verifying with obtained data	K4
CO4	Calibrate the devices using error correction methods	K5
CO5	Design instruments by using the principles behind every experiment and develop skills to work collectively	K6

PO / PSO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO								
CO1	H	H	-	M	-	-	H	H
CO2	H	H	-	H	-	-	H	H
CO3	H	H	M	H	-	-	H	H
CO4	H	M	H	H	-	-	H	H
CO5	H	H	-	H	H	H	H	H

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS507			Title	Batch:	2022 – 2025
				Core VII: Mechanics	Semester:	V
Lecture Hrs./Week	5	Tutorial Hrs./Sem.		Credits:	5	

Course Objective

To acquire a complete knowledge about mechanics and classical dynamics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the laws involved in Rigid body dynamics and classical mechanics	K1
CO2	Gain a deeper insight into the physical concepts and its application to various physical systems	K2
CO3	Apply these formalisms to obtain equations of motion for simple systems	K3
CO4	Analyze the problem and frame equations of motion	K4
CO5	Ability to Use the necessary skills and tools to write equations for real time problems	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	H	M	L	H	H
CO2	H	M	H	H	M	H	H	H
CO3	H	M	H	H	H	H	M	M
CO4	H	M	M	H	H	H	M	M
CO5	H	M	M	H	H	H	M	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS508			Title	Batch:	2022 – 2025
				Core VIII: Optics & Spectroscopy	Semester:	V
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To understand the mechanism of energy transfer and to impart knowledge in electromagnetic spectrum

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the characteristics of light and interaction of electromagnetic radiations with matter	K1
CO2	Apply the principle of molecular spectroscopy in identification of properties of materials and applications	K2
CO3	Categorize the spectra from vibrational and rotational motion of atoms or molecules	K3
CO4	Explain the theoretical models of spectroscopy that are suitable for each phenomena related to radiations	K4
CO5	Plan and design the instruments based on electromagnetic radiations by using the tools and methodologies of optics and spectroscopy	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	L	M	M	L	H	H
CO2	H	H	L	H	M	M	H	H
CO3	H	M	M	M	L	L	M	M
CO4	H	M	H	L	M	H	H	M
CO5	H	M	L	H	H	H	H	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS509			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-	Core IX: Relativity & Quantum Mechanics	Semester:	V
					Credits:	5

Course Objective

To develop the skill to gain knowledge in Relativity & Quantum Mechanics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the limitations of classical mechanics and acquire the knowledge of Wave nature of matter	K1/K2
CO2	Illustrate Heisenberg uncertainty principle and obtain the wave equation for time dependent and time independent systems	K3
CO3	Analyze the wave equation and use it to solve physical problems	K4
CO4	Establish Schrodinger equation for hydrogen atom and outline the significance of Quantum numbers	K5
CO5	Understand the concepts and consequences of special theory of relativity	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	M	H	H	H	H	H	H	H
CO2	H	H	H	H	H	M	H	H
CO3	M	H	H	H	M	M	H	H
CO4	H	M	H	H	H	H	H	H
CO5	H	H	H	H	M	H	H	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS5E10			Title	Batch:	2022 – 2025
				Core Elective - I : Basic Electronics & Circuit System	Semester:	V
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To provide fundamental skill to analyze electronic circuit systems and introduce basic semiconductor devices, their characteristics, operations and applications

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts of electronic circuits with semiconductor devices	K1 / K2
CO2	Apply the knowledge of circuits to investigate PN junctions in semiconductor devices under various conditions	K3
CO3	Demonstrate familiarity with basic electronic components and use them to design simple electronic circuits	K4
CO4	Recognize a variety of exciting high-tech products and systems enabled by electronics	K5
CO5	Design, develop and simulate the new electronic circuits for applications in various fields	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	-	M	-	H	-
CO2	M	H	-	-	H	-	M	M
CO3	L	M	H	M	M	L	M	H
CO4	-	L	M	H	L	M	-	H
CO5	-	-	-	M	-	M	-	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS5E11			Title	Batch:	2022 – 2025
				Core Elective I: Communication Electronics	Semester:	V
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To provide fundamental knowledge of digital modulation techniques with the concepts of communication system and their applications

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental theories of electronic systems involved in communication	K1 / K2
CO2	Apply the knowledge of mathematical methods to resolve the components of digital communication system	K3
CO3	Analyze basic wireless transmission circuits using electronic devices and instruments	K4
CO4	Explain clearly the importance of transformation equations to convert signals from one domain to another in the field of digital communication	K5
CO5	Design and analyze the electronic circuit systems that are responsible for digital transmission using various simulation techniques	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	-	M	-	H	-
CO2	M	H	L	M	H	-	M	M
CO3	M	M	H	H	M	L	M	M
CO4	-	-	M	L	-	M	-	H
CO5	-	-	-	-	-	M	-	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS5E12			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.		Materials Science	Semester:	V
					Credits:	5

Course Objective

- To acquire basic knowledge of atomic structure and binding conditions of atom in the materials.
- To acquire enveloping knowledge of physics, chemistry, metallurgy and mathematics to know wider field of materials science
- To provoke the students to pursue research in the field of materials science.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the physics behind the material formation and different properties of the solids.	K1, K2
CO2	Tailor the properties of solids materials with the adequate knowledge.	K3
CO3	Develop a new materials based on the fundamental understanding of the properties	K3
CO4	Evaluate the materials properties for the cutting-edge applications	K4
CO5	Design and analysis the experimental/materials strategies	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	M	H	L	H	M
CO2	H	H	H	L	M	L	H	M
CO3	H	M	M	M	M	L	M	M
CO4	M	H	M	H	M	L	L	M
CO5	H	M	H	M	M	M	M	H

H-High; M-Medium; L-Low;

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS5AL1			Title	Batch:	2022 – 2025
Lecture Hrs./Week		Tutorial Hrs./Sem.		Advanced Learner Course - I - Problem Solving Skills in Physics I	Semester:	V
					Credits:	5

Course Objective

Student will be introduced to solve problems in core physics. Every unit must contain minimum 20 problems based on various principles of Physics.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Get motivated to acquire problem solving skills in Physics	K1/K2
CO2	Apply the skills to solve in Mechanics, Thermal Physics and Electricity	K3
CO3	Select and use appropriate concepts and methods to solve problems effectively and creatively	K4
CO4	Identify, evaluate and synthesize information and engage the imagination to explore new possibilities	K5
CO5	Crack problems confidently in competitive examinations like JEST, JAM& TIFR	K6

Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	M	M	L	H	H
CO2	H	H	M	M	M	L	H	H
CO3	H	H	M	M	M	L	H	H
CO4	H	M	M	M	H	L	H	H
CO5	H	M	M	L	H	L	H	H

H – High; M – Medium; L – Low 20

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS5S1			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	1	Tutorial Hrs./Sem.	-	Skill based Elective I: Mechanical Measurements	Semester:	V
					Credits:	3

Course Objective

To enrich the basic foundation and inspire interest for the knowledge in Mechanical measurements

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the operational features, limitations and difficulties inherent in the instruments	K2
CO2	Classify and select proper measuring instrument for pressure and flow measurement	K3
CO3	Implement the operation and construction to infer the instrument characteristics	K4
CO4	Evaluate the accuracy, error and calibration of an instrument	K5
CO5	Design and use simple instrumentation for a measurement of mechanical properties.	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	M	-	-	H	-
CO2	H	M	-	H	-	H	H	M
CO3	M	M	L	H	L	-	M	-
CO4	-	H	-	-	M	-	-	M
CO5	-	M	M	H	L	M	-	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS5S2			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	1	Tutorial Hrs./Sem.	-	Skill based Elective I: Fundamentals of Biophysics	Semester:	V
					Credits:	3

Course Objective

To develop the basic knowledge about Biophysics and its Applications

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire the knowledge on the key principles of physics toward evaluating and analyzing the biological phenomenon.	K2
CO2	Apply the separation and physico-chemical techniques to study biological Structure	K3
CO3	Implement the characteristics of a biological system using the concept of physics and chemistry	K4
CO4	Explain the techniques and underlying concept of physics of Bio mechanics and Neuro- Biophysics	K4
CO5	Evaluate the physical and chemical properties of biological applications	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	L	-	-	M	-
CO2	H	M	L	M	-	M	M	-
CO3	-	-	-	-	M	-	-	L
CO4	H	H	L	M	-	-	M	M
CO5	-	-	-	-	M	L	-	-

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY		Programme Title:	Bachelor of Physics	
Course Code:	22UPS614		Title	Batch:	2022 - 2025
			Core X: Atomic & Nuclear Physics	Semester:	VI
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:

Course Objective

To comprehend the structure and properties of electron and the nucleus

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire fundamental knowledge about the electronic and nuclear structure of atoms	K1
CO2	Understand the influence of X-rays, atomic and nuclear physics on modern scientific developments	K2
CO3	Apply the key strategies to investigate the atomic and nuclear physics that affects our everyday living	K3
CO4	Analyze techniques to examine and understand the processes within material industry and medical applications of nuclear phenomena	K4
CO5	Evaluate properties of elementary particles, associated symmetries, conservations and models	K5

Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	L	-	M	-	H	-
CO2	H	M	M	M	M	L	H	-
CO3	L	H	M	L	M	-	M	L
CO4	-	M	H	M	M	L	M	M
CO5	-	L	M	H	M	H	-	M

H-High; M-Medium; L-Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS615			Title	Batch:	2022 - 2025
				Core XI: Solid State Physics & Statistical Mechanics	Semester:	VI
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	5

Course Objective

To study the basic theory of crystal structure, composition and physical properties of crystalline materials. Study the electrical and magnetic properties of solids through classical and quantum statistics

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic structural parameters, characteristics and behavior of matter in whichever phase they are in	K1/K2
CO2	Apply theoretical insights on the external application of force and torque and also understanding the underlying theory in it	K3
CO3	Analyze the conceptual understanding of the facts through implications of Quantum statistical concept.	K4
CO4	Evaluate the application aspects of above-mentioned behavior in innovative research work	K5
CO5	Create experimental insights into material design and property evaluation using classical and quantum principles	K6

Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	L	-	M	-	H	-
CO2	M	H	M	L	H	-	H	L
CO3	L	M	H	M	M	L	M	M
CO4	-	L	M	H	M	M	-	H
CO5	-	L	M	M	M	H	-	H

H-High; M-Medium; L-Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS6E16			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-	Core Elective II: Digital Circuit systems & Microprocessor	Semester:	VI
					Credits:	5

Course Objective

To study the number system, Logic circuits and its application and to understand the architecture and instruction set of 8085 microprocessor

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understanding the operations of BCD numbers and memory allocation in computers	K2
CO2	Develop effective problem solving abilities	K3
CO3	Analyze electronic circuits	K4
CO4	Apply the concept of basic electronic devices to design various circuits	K5
CO5	Understand and to implement digital electronics and Microprocessor.	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	M	M	L	H	H	M
CO2	M	H	H	H	H	M	H	M
CO3	M	H	H	H	H	H	H	M
CO4	M	M	H	M	M	H	H	M
CO5	H	H	M	H	M	M	H	M

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS6E17			Title	Batch:	2022 – 2025
				Core Elective II : Biomedical Instrumentation	Semester:	VI
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To familiarize with the use of medical instruments and gain the knowledge in operation of modern biomedical instruments

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the structure of cell, physiology of different biological systems and their functions.	K1
CO2	Illustrate the types of electrodes and measurements of biological parameters.	K2
CO3	Explain the working of diagnostic instruments, therapeutic instruments and imaging systems.	K3
CO4	Analyse the different methods of measurements of biological parameters.	K4
CO5	Compare the different techniques of measurement in medical field.	K5

Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	L	M	M	L	H	H
CO2	H	M	L	H	M	H	H	H
CO3	H	M	M	L	H	H	M	M
CO4	H	M	M	M	H	M	H	M
CO5	H	M	L	H	H	H	M	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS6E18			Title	Batch:	2022 – 2025
				Core Elective II : Nanomaterials and applications	Semester:	VI
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.			Credits:	5

Course Objective

To lay foundation of Nano science and Nanotechnology.

To provide the fundamental knowledge of nano materials, their synthesis and fabrication, properties and applications.

To provoke the students to pursue research in the field of nanomaterials

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental of nanomaterials and nanotechnology	K1,K2
CO2	Synthesize nanomaterials using various physical and chemical methods	K3
CO3	Tune the size and shape of the nanomaterials for diverse applications	K4
CO4	Evaluate the properties of nanomaterials and defects nature of the materials	K4
CO5	Design nano materials-based devices and analysis their performance	K4,K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	L	M	M	L	M	L
CO2	M	H	M	M	L	H	H	M
CO3	H	H	H	H	M	H	H	H
CO4	M	M	M	H	H	M	M	H
CO5	M	M	L	M	H	L	L	M

H-High; M-Medium; L-Low

Programme Code:	B.Sc. PHY		Programme Title:	Bachelor of Physics	
Course Code:	22UPS6E19		Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	Core Elective III: C Programming & Information Security	Semester:	VI
				Credits:	5

Course Objective

To develop the skill to gain knowledge in Programming in C & Information Security

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of C programming and information security	K1/K2
CO2	Apply the concepts of C programming to solve problems in Physics	K3
CO3	Analyze the importance of operators, control statements, functions, structures and pointers in problem solving	K4
CO4	Evaluate the impact of various types of attacks on information leakage and security	K5
CO5	Create the advance perspectives on prevention through cyber-crime of wireless digital communications including internet and e-commerce	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	H	H	H	H	H
CO2	M	H	H	H	H	M	H	H
CO3	M	H	H	H	M	M	H	H
CO4	-	M	M	H	M	M	M	H
CO5	-	L	M	M	M	H	-	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS6E20			Title	Batch:	2022 – 2025
Lecture Hrs./Week	5	Tutorial Hrs./Sem.	-	Core Elective	Semester:	VI
				III : Industrial Instrumentation	Credits:	5

Course Objective

To make the student familiar with measurement techniques of physical quantities and analyze the data

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the principles of instruments used in different industrial sectors	K1
CO2	Elucidate the construction and working of various industrial devices in measuring physical quantities	K2
CO3	Analyze the performance and characteristics of each instrument	K3
CO4	Make the new models for calibration and configuration of instruments	K4
CO5	Formulate the instruments for specific applications in industries	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	M	H	M	L	H	H
CO2	H	H	L	H	M	H	H	H
CO3	H	M	M	H	H	H	M	M
CO4	H	H	M	H	M	H	M	M
CO5	H	M	L	M	H	H	M	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS6E21			Title	Batch:	2022 – 2025
				Core Elective III: Python Programming	Semester:	VI
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	-		Credits:	5

Course Objective

To provide fundamental knowledge of Python programming and create the ability to interpret physics oriented problems using Python

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics, structure and functions of Python programming as useful scripting language	K1 / K2
CO2	Plan to write the algorithm of a program with the knowledge of mathematical operators, logical operators, conditional and looping statements	K3
CO3	Categorize various statements of Python programming into the lists and tuples	K4
CO4	Explain clearly the importance of different function statements and pass the arguments between functions	K5
CO5	Implement and compile the python programming for application in the field of Physics	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	-	M	-	H	-
CO2	H	H	L	-	H	-	M	M
CO3	M	M	H	M	M	L	M	M
CO4	-	L	M	H	L	M	-	H
CO5	-	-	-	M	-	M	-	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS6AL2			Title	Batch:	2022 – 2025
Lecture Hrs./Week		Tutorial Hrs./Sem.		Advanced Learner Course - II - Problem Solving Skills in Physics II	Semester:	VI
					Credits:	5

Course Objective

Student will be introduced to solve problems in core physics. Every unit must contain minimum 20 problems based on various principles of Physics.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Get motivated to acquire problem solving skills in Physics	K1/K2
CO2	Apply the skills to solve in Magnetism, Quantum Mechanics, General Physics etc	K3
CO3	Select and use appropriate concepts and methods to solve problems effectively and creatively	K4
CO4	Interpret and use written, quantitative, and visual text effectively in presentation of solutions to problems	K5
CO5	Crack problems confidently in competitive examinations like JEST, JAM & TIFR	K6

Mapping

PO / PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	H	M	M	L	H	H
CO2	H	H	M	L	M	L	H	H
CO3	H	H	M	M	M	L	H	M
CO4	H	M	M	M	H	L	H	H
CO5	H	M	M	L	H	L	H	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS6S3			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	1	Tutorial Hrs./Sem.	-	Skill based Elective II: Environmental Instrumentation	Semester:	VI
					Credits:	2

Course Objective

To get adequate knowledge in thermal measurements and to understand the operational features, limitations and difficulties faced in the instrumentation

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Use the concept of measurement	K1
CO2	Understand the design and operation of instruments for measurements of various environmental factors.	K2
CO3	Use adequate equipment to determine the state of pollution in the environment	K3
CO4	Apply the technical and analytical skill for interpretation of environmental data	K4
CO5	Understand the living conditions in industrial areas	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	M	L	-	-	-	-	L	-
CO2	H	H	L	H	-	M	M	-
CO3	M	M	-	M	M	H	-	M
CO4	M	H	M	H	-	-	M	H
CO5	-	M	-	M	M	-	M	-

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS6S4			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	1	Tutorial Hrs./Sem.	-	Skill based Elective II: Fundamentals of Astrophysics	Semester:	VI
					Credits:	2

Course Objective

To explore the basic knowledge and recent aspects of Space science, Quasars and Cosmology

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recollect the origin and destiny of universe, astronomy, stars, quasars, cosmology	K1
CO2	Acquire the fundamental ideas of observational astronomy, stars, white dwarfs, nature of black holes and big bang theory	K2
CO3	Implement the phenomena and processes associated with galaxy, stellar and formation of planetary systems, dark matter and energy	K3
CO4	Figure out the concept of red shift, expansion of universe, accelerating universe is essential for scientific and research applications	K4
CO5	Elucidate the origin of universe and various models based on cosmological principles	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	-	-	-	-	H	-
CO2	H	M	-	L	L	-	M	-
CO3	M	M	M	-	M	-	M	-
CO4	-	-	M	M	M	M	-	M
CO5	-	M	-	-	-	L	-	-

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS622			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	3	Tutorial Hrs./Sem.	-	Core XII: Electronics Lab	Semester:	V & VI
					Credits:	3

Course Objective

To provide a basic knowledge in the field of Electronics and to familiarize their operations

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles of Electronics	K1/K2
CO2	Apply the principle in circuit designing	K3
CO3	Analyze the characteristics of transistor, FET and Op-amp	K4
CO4	Evaluate the working of Electronic devices	K5
CO5	Design circuits and verify its operation	K6

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	M	H	M	M	H	H
CO2	M	H	M	H	H	H	H	H
CO3	M	M	H	H	H	H	H	H
CO4	M	H	M	M	H	H	H	H
CO5	M	H	M	M	H	H	H	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Physics	
Course Code:	22UPS623			Title	Batch:	2022 – 2025
Lecture Hrs./Week or Practical Hrs./Week	3	Tutorial Hrs./Sem.	-	Core XIII: Digital & Microprocessor Lab	Semester:	V & VI
					Credits:	3

Course Objective

To be acquainted with the basics and working of Electronic Digital circuits and Microprocessor.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the working conditions of logic circuits and its applications	K2
CO2	Construct and demonstrate of flip flop and digital circuits	K3
CO3	Determine the behavior of a digital logic circuit	K4
CO4	Translate the Boolean equations/expressions to efficient combinational and sequential circuits.	K5
CO5	Execute simple programmes using 8085 microprocessor	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	H	M	H	M	H	H	M
CO2	H	H	M	H	M	H	H	-
CO3	H	M	M	H	L	H	H	M
CO4	M	H	M	H	L	H	M	M
HCO5	H	H	H	H	M	H	H	H

H – High; M – Medium; L – Low

Programme Code:	B.Sc. PHY			Programme Title:	Bachelor of Science	
Course Code:	22UPS624			Title	Batch:	2022 – 2025
Lecture Hrs./Week	2	Tutorial Hrs./Sem.	-	Core XIV : Computer lab in C	Semester:	VI
					Credits:	2

Course Objective

To develop the skill to gain knowledge in C language

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand and become familiar with C programs	K1
CO2	Apply the statements to write the programs	K2
CO3	Demonstrate the use of functions and arguments in C language	K3
CO4	Explain the concepts of conditional and looping statements	K4
CO5	Write new programs for application in various field of Physics	K5

Mapping

PO /PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	L	M	M	L	H	L	M	H
CO2	L	L	H	L	H	M	M	H
CO3	L	L	H	L	M	M	M	H
CO4	M	M	H	L	H	M	M	H
CO5	M	M	H	M	H	H	H	H

H – High; M – Medium; L – Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	21UMS3A3/ 21UCY3A3	Title	Batch:	2022 - 2025
		Physics for Mathematics and Chemistry - I	Semester:	III
Hrs/Week:	5		Credits:	4

Course Objective

To acquire the knowledge in concepts of applied physics

Course outcomes

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic principles in mechanics	K1/K2
CO2	To apply knowledge in estimating the mechanical parameters	K3
CO3	To analyze the knowledge in applications	K4
CO4	To evaluate the principles of physics in mathematics and chemistry	K5
CO5	To create a different types of lasers and fibers related this studies	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	H	H	M	H	H	H
CO2	M	H	M	M	H	H	-	M
CO3	H	H	M	H	L	L	H	-
CO4	M	L	H	H	M	H	M	M
CO5	H	M	-	M	H	M	H	L

H – High; M – Medium; L – Low

Programme code:	BSc PHY	Programme Title :	Bachelor of Science	
Course Code:	21 UMS 4A4 / 21 UCY 4A4	Title	Batch :	2022 - 2025
		Physics For Mathematics & Chemistry- II	Semester	IV
Hrs/Week:	5		Credits:	4

Course Objective

To develop the basic concepts of physics applied in chemistry and mathematics

Course outcomes

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic concepts of physics in electricity, semiconductors, optics and digital electronics	K1/K2
CO2	To apply analog and digital systems	K3
CO3	To analyze knowledge on number systems and logical expressions	K4
CO4	To evaluate the expressions into useful circuits	K5
CO5	To create logic gates circuits	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	H	H	M	H	M	H
CO2	M	-	M	M	H	H	-	M
CO3	H	H	M	M	L	L	H	-
CO4	M	L	H	H	M	H	M	M
CO5	H	M	-	M	H	-	H	L

H-High; M-Medium; L-Low

Programme Code:	BSc PHY	Programme Title:	Bachelor of Science	
Course Code:	21UMS4A5 / 21UCY4A5	Title	Batch:	2022 - 2025
		Physics Lab For Mathematics & Chemistry	Semester:	III & IV
Hrs/Week:	3		Credits:	4

Course Objective

To enable the student to gain practical knowledge in Physics instruments

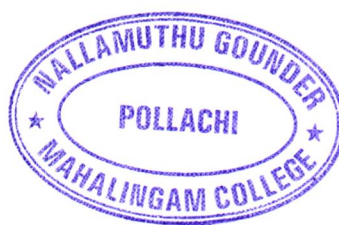
Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	To remember depth knowledge in Elasticity of rigid materials	K1/K2
CO2	To analyze the concepts of physics on measurements and instrumentations of physical experiments	K3
CO3	To apply practical skills in analog and digital measurements	K4
CO4	To evaluate concepts of logic gates	K5
CO5	To create various logic gates using Ics	K6

Mapping

PO/PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PO6	PSO1	PSO2
CO1	H	M	H	M	M	H	M	H
CO2	M	-	M	M	H	H	-	M
CO3	H	H	M	-	M	-	H	-
CO4	M	L	H	H	H	H	M	H

H-High; M-Medium; L-Low



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