

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:	BSC	Programme Title:	Bachelor of Science	
Course Code:	20UPS101	Title	Batch:	2020-2023
		Core I: Properties of Matter	Semester:	I
Hrs/Week:	6		Credits:	3

Course Objective

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

Course outcomes

K1	CO1	To understand the dynamics and gravitation
K2	CO2	To understand the applications of the elastic properties of solids
K3	CO3	To explain the molecular theory of surface tension, viscosity and diffusion
K4	CO4	Familiarize with general terms in acoustics like intensity, loudness, reverberation etc, and study in detail about production, detection, properties and uses of ultrasonic waves

Mapping

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

H – High; M – Medium; L – Low

Programme Code:	BSc	Programme Title:	Bachelor of Science	
Course Code:	20UPS202	Title	Batch:	2020-2023
		Core II: Heat & Thermodynamics	Semester:	II
Hrs/Week:	5		Credits:	5

Course Objective

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

Course outcomes

K1	CO1	To recognize the difference between heat and temperature
K2	CO2	To understand the fundamental laws and principles of heat transfer and theory of gases
K3	CO3	To acquire working knowledge on low temperature physics and its domestic applications
K4	CO4	To analyse and evaluate various thermodynamic cycles used for energy productions

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	H
CO2	H	M	H	H	M
CO3	M	H	H	H	H
CO4	H	M	H	M	H

H – High; M – Medium; L – Low

Programme code:	BSC	Programme Title :	Bachelor of Science	
Course Code:	20UPS203	Title	Batch :	2020-2023
		Core III: Physics Lab I	Semester	I & II
Hrs/Week:	3		Credits:	3

Course Objective

- To develop the skill to gain knowledge in Physics Lab I

Course Outcomes

K3	CO1	To recollect the basic principles taught
K4	CO2	To understand and apply the knowledge of theory to experiments
K5	CO3	To validate the experiment with theory

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H
CO2	H	H	H	H	L
CO3	H	H	M	H	H

H – High; M – Medium; L – Low

Programme code:	BSC	Programme Title :	Bachelor of Science	
Course Code:	20UPS203	Title	Batch :	2020-2023
		Core III: Physics Lab I	Semester	I & II
Hrs/Week:	3		Credits:	3

Course Objective

- To develop the skill to gain knowledge in Physics Lab I

Course Outcomes

K3	CO1	To recollect the basic principles taught
K4	CO2	To understand and apply the knowledge of theory to experiments
K5	CO3	To validate the experiment with theory

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H
CO2	H	H	H	H	L
CO3	H	H	M	H	H

H – High; M – Medium; L – Low

Programme Code:	BSc	Programme Title:	Bachelor of Science	
Course Code:	19UPS3N1	Title	Batch:	2019-2022
		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

K1	CO1	To acquire basic knowledge on renewable energy sources
K2	CO2	To get the idea about astrophysics and the energy resources
K3	CO3	To implement the environmental impacts on the concepts of physics
K4	CO4	To effectively use energy sources based on the required applications

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	H	S	S
CO2	S	H	S	H	M
CO3	M	S	S	M	S
CO4	S	S	S	H	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	19UPS405	Title	Batch:	2019-2022
		Core VI: Optics & Spectroscopy	Semester:	IV
Hrs/Week:	5		Credits:	5

Course Objective

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

Course outcomes

K1	CO1	To gain knowledge about fundamental properties light, electromagnetic spectrum and splitting of spectral lines.
K2	CO2	To apply the energy transfer for absorption and emission spectra
K3	CO3	To determine structure of the molecules
K4	CO4	To evaluate bond angle and bond length etc.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	S	H
CO2	S	M	S	H	M
CO3	M	H	H	M	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	19UPS407	Title	Batch:	2019-2022
		Core VII: Physics Lab II	Semester:	III & IV
Hrs/Week:	3		Credits:	3

Course objective

- To understand the theory with hands-on experience.

Course outcomes

K3	CO1	Able to understand optics and electromagnetic field
K4	CO2	Able to determine earth's constant M & H
K5	CO3	Understanding the principles behind every experiments

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S
CO2	M	S	H	S	H
CO3	M	S	S	S	S

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	19UPS4N3	Title	Batch:	2019-2022
		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

K1	CO1	To recollect the basic knowledge about portable devices
K2	CO2	To understand the central concepts of electric and optical devices
K3	CO3	To apply the basic physical phenomena on the operating features of scientific devices
K4	CO4	To figure out the applications of the physical quantities

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	S	S	S
CO2	M	S	S	H	S
CO3	S	H	H	S	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS508	Title	Batch:	2018-2021
		Core VIII: Classical Dynamics	Semester:	V
Hrs/Week:	5		Credits:	5

Course Objective

- To understand the fundamental concepts in the dynamic of a particle and system of particles.

Course outcomes

K1	CO1	To recollect the mechanics of a particle
K2	CO2	To define and demonstrate knowledge of the different formalisms in classical dynamics of a system
K3	CO3	To apply these formalisms to obtain equations of motion for simple systems
K4	CO4	To represent these formalisms for mechanical systems

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:	BSC	Programme Title :	Bachelor of Science	
Course Code:	18UPS509	Title	Batch :	2018-2021
		Core IX: Relativity & Quantum Mechanics	Semester	V
Hrs/Week:	5		Credits:	5

Course Objective

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

Course Outcomes

K1	CO1	To keep in mind the concepts and the consequences of special and general theory of relativity
K2	CO2	To understand the basic concepts of Quantum theory and the wave properties of particles
K3	CO3	To apply the wave equation to solve simple problems
K4	CO4	To interpret the different types of quantum numbers

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	S	H
CO2	S	H	S	H	S
CO3	S	H	H	H	S
CO4	S	H	S	H	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS510	Title	Batch:	2018-2021
		Major Elective I: Basic Electronics & Circuit System	Semester:	V
Hrs/Week:	5		Credits:	5

Course Objective

- To understand the basic concepts of electronics and to implement the electronic circuits to various industrial applications.

Course outcomes

K1	CO1	To recollect the fundamental concepts and developments of electronics
K2	CO2	To understand the construction and operations of semiconductor devices
K3	CO3	To apply the knowledge of basic theorems in analog circuits
K4	CO4	To design electronic and optoelectronic circuits and interpret the output

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	S	H
CO2	S	M	S	H	M
CO3	M	H	H	M	S
CO4	H	S	H	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS511	Title	Batch:	2018-2021
		Major Elective II: Digital Principles and its applications	Semester:	V
Hrs/Week:	5		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

K2	CO1	Understanding the operations of BCD numbers and memory allocation in computers
K5	CO2	Develop effective problem solving abilities
K4	CO3	Analyze electronic circuits
K3	CO4	Apply the concept of basic electronic devices to design various circuits

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	L
CO2	M	S	S	S	H
CO3	M	S	S	S	S
CO4	M	M	S	M	M

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS5S1	Title	Batch:	2018-2021
		Skill based Elective I: Mechanical Measurements	Semester:	V
Hrs/Week:	1		Credits:	2

Course Objective

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

Course outcomes

K1	CO1	To understand the operational features, limitations and difficulties inherent in the instruments
K2	CO2	To apply the basic principle to develop the mechanical measurement systems
K3	CO3	To implement the operation and construction to infer the instrument characteristics
K4	CO4	To evaluate the accuracy, error and calibration of an instrument

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	S	H
CO2	H	M	S	H	M
CO3	M	H	H	M	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS5S2	Title	Batch:	2018-2021
		Skill based Elective I: Fundamentals of Biophysics	Semester:	V
Hrs/Week:	1		Credits:	2

Course Objective

- To develop the basic knowledge about Biophysics and its Applications

Course outcomes

K1	CO1	To understand the physical principles of the biological phenomena.
K2	CO2	To apply the separation and physico-chemical techniques to study biological structure
K3	CO3	To implement the characteristics of a biological system using the concept of physics and chemistry
K4	CO4	To evaluate the physical and chemical properties of biological applications

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	H
CO2	S	H	S	H	M
CO3	M	H	H	H	S
CO4	S	S	M	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS612	Title	Batch:	2018-2021
		Core X: Mathematical Physics	Semester:	VI
Hrs/Week:	5		Credits:	5

Course objective

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

Course outcomes

K1	CO1	To enrich the knowledge about mathematical concepts in Physics
K4	CO2	Able to relate mathematics and physics to understand nature
K3	CO3	Able to apply skills of mathematical modeling in applied fields
K3	CO4	To implement numerical methods in research fields

• Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	M	M	S	M
CO4	M	M	M	M	S

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS613	Title	Batch:	2018-2021
		Core XI: Atomic & Nuclear Physics	Semester:	VI
Hrs/Week:	5		Credits:	5

Course Objective

- To understand the structure and properties of electron and the nucleus

Course outcomes

K1	CO1	Develop understanding about the electronic and nuclear structure of atoms
K2	CO2	Appreciate the influence of X-rays, atomic and nuclear physics on modern scientific developments
K3	CO3	Analyze the key areas in which atomic and nuclear physics affects our everyday living
K4	CO4	Apply various tools and techniques to examine and understand the processes within material industry and medical applications of nuclear phenomena

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	M	S
CO2	S	M	S	M	S
CO3	S	M	S	M	L
CO4	S	S	S	L	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS614	Title	Batch:	2018-2021
		Core XII: Condensed Matter Physics & Statistical Mechanics	Semester:	VI
Hrs/Week:	5		Credits:	5

Course objective

- To understand the electrical and magnetic properties of solids through classical and quantum statistics

Course outcomes

K1	CO1	Have knowledge of general structure, characteristics and behavior of matter in whichever phase they are in
K2	CO2	Have knowledge of effect of external application of force and torque and also understanding the underlying theory in it
K3	CO3	To find the application of above mentioned behavior in innovative research work
K4	CO4	Realize the conceptual understanding of the facts through implications of Quantum statistical concept.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	S	H
CO2	S	M	S	H	M
CO3	M	H	H	M	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Programme code:	BSC	Programme Title :	Bachelor of Science	
Course Code:	18UPS615	Title	Batch :	2018-2021
		C Programming & Information Security	Semester	VI
Hrs/Week:	5		Credits:	5

Course Objective

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

Course Outcomes (CO)

K1	CO1	To remember the basic concepts of C programming language
K2	CO2	To understand the role of control statements in C
K3	CO3	To apply the concept of functions, structures and pointers in C
K4	CO4	To review the need for information security

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	S	H
CO2	S	S	S	H	H
CO3	S	H	H	H	S
CO4	S	S	S	H	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS616	Title	Batch:	2018-2021
		Core XIII: Electronics Lab	Semester:	V & VI
Hrs/Week:	3		Credits:	3

Course objective

- To provide a basic grounding in the field of Electronics and to serve as a hint for the student to the more advance techniques.

Course outcomes

K3	CO1	To get elementary knowledge of components used in concepts of electronic circuits
K4	CO2	To get familiarize with the electronics through experiment
K5	CO3	To understand the function of amplifiers, oscillators etc

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S
CO2	M	S	H	S	H
CO3	M	S	S	S	S

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS617	Title	Batch:	2018-2021
		Core XIV: Digital & Microprocessor Lab	Semester:	V & VI
Hrs/Week:	3		Credits:	3

Course Objective

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

Course outcomes

K3	CO1	Determine the behavior of a digital logic circuit
K4	CO2	Translate the Boolean equations/expressions to efficient combinational and sequential circuits.
K5	CO3	Write simple programmes to run an 8085 microprocessor.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	S
CO2	H	S	M	M	S
CO3	M	M	H	H	S

S – Strong; H – High; M – Medium; L – Low

Programme code:	BSC	Programme Title :	Bachelor of Science	
Course Code:	18UPS618	Title	Batch :	2018-2021
		Computer Lab in C	Semester	VI
Hrs/Week:	2		Credits:	2

Course Objective

- To develop the skill to gain knowledge in C

Course Outcomes (CO)

K3	CO1	To keep in mind the basics of C programming
K4	CO2	To understand and become familiar with C programs
K5	CO3	To verify the concepts through simple programs

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	S	H
CO2	S	H	S	H	H
CO3	H	H	H	H	S

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS6S3	Title	Batch:	2018-2021
		Skill based Elective II: Environmental Instrumentation	Semester:	VI
Hrs/Week:	1		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

K1	CO1	Understand the design and operation of instruments for measurements of various environmental factors.
K2	CO2	Analyze the systems in terms of the functional model.
K3	CO3	Develop knowledge to select and use appropriate instrumentation to gather data under varying environmental conditions.
K4	CO4	Apply the technical and analytical skills for interpretation of environmental data

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	H	M	H
CO2	S	H	S	H	M
CO3	M	H	H	S	S
CO4	S	M	S	M	H

S – Strong; H – High; M – Medium; L – Low

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS6S4	Title	Batch:	2018-2021
		Skill based Elective II: Fundamentals of Astrophysics	Semester:	VI
Hrs/Week:	1		Credits:	2

Course Objective

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

Course outcomes

K1	CO1	To recollect the origin and destiny of universe, astronomy, stars, quasars, cosmology etc.,
K2	CO2	To get the fundamental ideas of observational astronomy, stars, white dwarfs, nature of black holes and big bang theory.
K3	CO3	To implement the phenomena and processes associated with galaxy, stellar and formation of planetary systems, dark matter and energy
K4	CO4	To figure out the concept of red shift, expansion of universe, accelerating universe is essential for scientific and research applications

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	H	S	M
CO2	H	M	S	H	H
CO3	M	H	L	S	S
CO4	S	M	S	S	H

S – Strong; H – High; M – Medium; L – Low

Programme code:	BSc	Programme Title :	Bachelor of Science	
Course Code:	19 UMS 3A3 / 19 UCY 3A3	Title	Batch :	2019-2022
		Physics For Mathematics & Chemistry- I	Semester	III
Hrs/Week:	5		Credits:	4

Course Objective

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

Course outcomes

K1	CO1	To understand the basic concepts of physics in electricity, semiconductors, optics and digital electronics
K2	CO2	To differentiate analog and digital systems
K3	CO3	To gain an enhanced knowledge on number systems and logical expressions
K4	CO4	To convert the expressions into useful circuits

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	M	M	H	S	H
CO3	S	S	S	M	S
CO4	M	H	H	L	H

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

Programme Code:	BSc	Programme Title:	Bachelor of Science	
Course Code:	19UMS4A4 / 19UCY4A4	Title	Batch:	2019-2022
		Physics For Mathematics & Chemistry- II	Semester:	IV
Hrs/Week:	5		Credits:	4

Course Objective

- To develop basic knowledge in the field of fiber optics, atomic, nuclear and quantum physics

Course outcomes

K1	CO1	To understand the structure of atom and Nucleus
K2	CO2	Gain a basic knowledge of Quantum physics and special theory of relativity
K3	CO3	To get an insight in to the field of laser and fiber optics
K4	CO4	To appreciate the beauty of physics

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	M	M	H	S	H
CO3	H	S	S	M	M
CO4	M	H	H	L	H

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