

**PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES  
AND COURSE OUTCOMES**

**DEPARTMENT OF PHYSICS 2019-2022**

**B.Sc., PHYSICS**

<b>PSOs</b>	<b>PROGRAMME SPECIFIC OUTCOMES</b>
PSO1	Students will demonstrate an understanding of concepts of Physics
PSO2	Students will understand the interplay between theory and experiment
PSO3	Students will exhibit curiosity and enthusiasm for learning science
PSO4	Students will demonstrate an ability to analyze problems
PSO5	Student will successfully carry out experiments to arrive at scientific results
PSO6	Students will successfully apply computing tools to problems
PSO7	Students will communicate well orally and in writing in scientific context
PSO8	Students will be able to use laboratory devices and electronics in scientific applications.

**B.Sc., PHYSICS /PROGRAMMES OUTCOMES**

<b>POs</b>	<b>Description of POs</b>
PO1	Students will demonstrate an understanding of core knowledge in physics.
PO2	Students will show that they have learned laboratory skills, enabling them to take measurements in a Physics laboratory and analyze the measurements to draw valid conclusions.
PO3	Students will demonstrate written and oral communication skills in communicating Physics-related topics.
PO4	Students will pursue their higher studies and undertake research
PO5	Students will take up future academic carrier and establish themselves in global scenario.

## B.Sc., PHYSICS / COURSE OUTCOMES

### Description of Cos

**K1-Remebering, K2- Understanding, K3-Applying, K4-Analysing & K5 –Evaluating**

#### MUPC1 - Mechanics and Properties of Matter

COs	Description of Cos	Bloom's Taxonomy level
CO1	Get the knowledge about forces in daily life and under the Principle of rocket propulsion	K3
CO2	Provide the information the about rolling concepts	K2
CO3	Learn the basic concepts of gravitation laws.	K1
CO4	Identify the type of forces, type of supports and the reactions	K4
CO5	Understand the principles, basic equations and their applications.	K5

#### MUPC2 - Electricity and Electromagnetism

CO	Statement	Blooms Taxonomy level
CO1	Use the concepts of electricity and magnetism to express physical processes and related technical improvements.	K1
CO2	Apply Maxwell's equations for electromagnetic wave propagation.	K3
CO3	Calculate inductances	K2
CO4	Apply Gauss, Ampere's and Faraday's laws in the context of advanced electrical devices.	K4
CO5	Design, setup and carry out experiments and compare with theoretical predictions.	K5

#### Allied I: MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS - MUPA1, MUPA3

CO	Statement	Blooms Taxonomy level
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<b>CO1</b>	<b>Gain deeper understanding of electrostatics</b>	<b>K2</b>
<b>CO2</b>	<b>Acquire knowledge on elementary ideas of electricity and logic gates</b>	<b>K2</b>
<b>CO3</b>	<b>Understand the working of Junction diode , Zener diode and transistor</b>	<b>K3</b>
<b>CO4</b>	<b>Use the electronic devices for doing experiments in the laboratory</b>	<b>K4</b>
<b>CO5</b>	<b>Demonstrate fundamental knowledge and insight into geometrical optics in the areas of lenses, aberrations and physical optics</b>	<b>K3</b>

### **SBC I - Waves and Oscillations –MUPWO1**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Understand the significance of longitudinal and transverse waves</b>	<b>K2</b>
<b>CO2</b>	<b>Distinguish between the phase velocity of a travelling wave and the group velocity of a wave group</b>	<b>K3</b>
<b>CO3</b>	<b>Derive and solve the equations of motions for physical systems that undergo SHM.</b>	<b>K3</b>
<b>CO4</b>	<b>Demonstrate the laws of transverse vibration of a stretched string using sonometer</b>	<b>K4</b>
<b>CO5</b>	<b>Know the production and applications of ultrasonic waves, factors affecting acoustics of buildings</b>	<b>K5</b>

## Thermal Physics– MUPC3

CO	Statement	Blooms Taxonomy level
CO1	Understand the equation, theorem and degrees of freedom of a thermodynamical system	K2
CO2	Apply the concepts of low temperature physics in liquefaction of gases	K3
CO3	Apply the concepts and laws of thermodynamics to solve problems in thermodynamics systems such as gases, heat engines etc.,	K3
CO4	Use the principles of black body radiation to analyse radiation process in thermodynamical systems.	K4
CO5	Familiarize with the properties of systems close to absolute zero	K5

## CORE PRACTICAL PAPER-I - MUPPI

CO	Statement	Blooms Taxonomy level
CO1	Apply knowledge of mathematics, physics and instrumentation	K1 & K3
CO2	Apply the basic laws and theories to determine various properties of the materials given.	K3
CO3	Gain knowledge in the scientific methods and learn the process of measuring different Physical variables	K3
CO4	Understand the application side of the experiments	K2
CO5	Use standard methods to calibrate the given measuring instruments	K3

**Allied II : ELECTRICITY, ELECTRONICS AND OPTICS- MUPA2,  
MUPA4**

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	<b>Gain deeper understanding of electrostatics</b>	<b>K2</b>
<b>CO2</b>	<b>Acquire knowledge on elementary ideas of electricity and logic gates</b>	<b>K2</b>
<b>CO3</b>	<b>Understand the working of Junction diode , Zener diode and transistor</b>	<b>K3</b>
<b>CO4</b>	<b>Use the electronic devices for doing experiments in the laboratory</b>	<b>K4</b>
<b>CO5</b>	<b>Demonstrate fundamental knowledge and insight into geometrical optics in the areas of lenses, aberrations and physical optics</b>	<b>K3</b>

**ANCILLARY PHYSICS PRATICALS – MUPAP**

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	Gain knowledge in the scientific methods and learn the process of measuring different Physical variables	<b>A</b>
<b>CO2</b>	Understand the given concepts and its physical significance	<b>U</b>
<b>CO3</b>	<b>Have a deep knowledge of fundamentals of optics and electric circuits</b>	<b>U</b>

<b>CO4</b>	<b>Use standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance of the given coil and various physical quantities</b>	<b>A</b>
<b>CO5</b>	<b>Apply the theory to design the basic electrical circuits</b>	<b>A</b>

### **SBC II - Computer Fundamentals and MS Office – MUPCM2**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Describe the usage of computers and why computers are essential components in business and society.</b>	<b>K2</b>
<b>CO2</b>	<b>Work with the basic features of Word, create high quality document designs and layouts.</b>	<b>K3</b>
<b>CO3</b>	<b>Be able to modify worksheet data and structure and format data in a Worksheet</b>	<b>K4</b>
<b>CO4</b>	<b>Be able to sort data, manipulate data using formulas and functions and add and modify charts in a worksheet</b>	<b>K4</b>
<b>CO5</b>	<b>Solve common business problems using appropriate Information Technology applications and systems.</b>	<b>K5</b>

### **Optics– MUPC4**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Know about lenses and different defects arising while using lenses.</b>	<b>K1</b>
<b>CO2</b>	<b>Know to use lenses in constructing eyepieces and the formation of rainbows.</b>	<b>K3</b>
<b>CO3</b>	<b>Understand the function of interferometers.</b>	<b>K2</b>
<b>CO4</b>	<b>Understand the concept of diffraction and the theory of diffraction grating.</b>	<b>K2</b>

CO5	Understand the phenomenon of polarization and apply the concept of optical activity in polarimeters.	K3
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### SBC III - Material Science - MUPMS3

CO	Statement	Blooms Taxonomy level
CO1	<b>Understand the conducting properties of metals, insulators and semiconductors based on band theory</b>	K2
CO2	<b>Acquire knowledge about the behaviour of different types of dielectric materials</b>	K2
CO3	<b>Know the function of optical devices like LED, LCD, Photoconductor etc,</b>	K3
CO4	<b>Understand the physical properties of nanomaterials and advanced ceramic materials</b>	K3, K4
CO5	<b>Apply the behaviour of various modern engineering materials like Polymers, Biomaterials, and Non-linear materials in recent development</b>	K5

### NME I - Astrophysics – MUPN1

CO	Statement	Blooms Taxonomy level
CO1	<b>Learn fundamental concepts in astrophysics that will equip them to better understand new scientific discoveries made in the coming years</b>	K2
CO2	<b>Apply basic physical principles from a broad range of topics in physics to astronomical situations</b>	K3
CO3	<b>Come to view science as a constantly evolving process instead of a static set of rules and equations</b>	K3
CO4	<b>Clearly understand about stars and our galaxy</b>	K2

<b>CO5</b>	<b>Understand astrophysics as a way to describe our real physical world</b>	<b>K3, K4</b>
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### **Basic Electronics– MUPC5**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Acquire the knowledge of basic semiconductors Physics</b>	<b>K2</b>
<b>CO2</b>	<b>Analyze the characteristics of various electronic devices like diode, transistor etc,</b>	<b>K4</b>
<b>CO3</b>	<b>Classify and analyze the various circuits configurations of transistors</b>	<b>K2 &amp; K4</b>
<b>CO4</b>	<b>Analyze simple circuits like rectifiers, amplifiers and oscillators</b>	<b>K4</b>
<b>CO5</b>	<b>have awareness of the latest technological changes in electronic devices.</b>	<b>K5</b>

### **Relativity & Atomic Physics– MUPC6**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Understand the concepts of relative motion of different bodies in different frame of references</b>	<b>K2</b>
<b>CO2</b>	<b>Understand the critical potential and its experimental determination</b>	<b>K2, K3</b>
<b>CO3</b>	<b>Know the structure of atoms</b>	<b>K2</b>
<b>CO4</b>	<b>Learn the photoelectric effect and photoelectric cells</b>	<b>K1</b>
<b>CO5</b>	<b>Analyze the diffraction of X-rays and Compton effect</b>	<b>K4</b>

## CORE PRACTICAL PAPER – II – MUPP2

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	<b>Apply knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems</b>	K1 & K3
<b>CO2</b>	Understand the usage of basic laws and theories to determine various properties of the materials given.	K3
<b>CO3</b>	<b>Gain knowledge in the scientific methods and learn the process of measuring different Physical variables</b>	K3
<b>CO4</b>	<b>Understand the application side of the experiments by using spectrometers, Microscopes and learned to construct electrical bridges</b>	K2
<b>CO5</b>	<b>Acquire practical knowledge about many theories related to lenses, aberrations, refractive indices, wavelengths, capacitances and resistances</b>	K3

## SBC IV - Nano Science & Nano Technology – MUPNN4

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	<b>Learn about the background on Nanoscience</b>	K1
<b>CO2</b>	Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment	<b>K2</b>
<b>CO3</b>	<b>Apply their learned knowledge to develop Nanomaterials</b>	<b>K3</b>
<b>CO4</b>	<b>Impart the basics of Carbon nanotubes and its synthesis techniques</b>	<b>K4</b>

<b>CO5</b>	<b>Apply the applications of Nanotechnology in various fields</b>	<b>K5</b>
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### Advanced Mechanics– MUPC7

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	<b>Define and demonstrate the different formalism in classical dynamics of a system.</b>	<b>K2</b>
<b>CO2</b>	Apply the formalism to obtain equations of motion for simple systems.	<b>K3</b>
<b>CO3</b>	<b>Distinguish between different types of particles and statistics</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the matter waves and the uncertainty relation</b>	<b>K2</b>
<b>CO5</b>	<b>Understand the idea of wave function and to solve schrodinger equation for simple potential</b>	<b>K5</b>

### Digital Electronics– MUPC8

CO	Statement	Blooms Taxonomy level
<b>CO1</b>	<b>Understand the basic concepts of number system.</b>	<b>K2</b>
<b>CO2</b>	<b>Get the knowledge of logic gates and the applications of logic gates in different digital circuits.</b>	<b>K3</b>
<b>CO3</b>	<b>Gain the know-how of multivibrators</b>	<b>K4</b>

<b>CO4</b>	<b>Construct counters and registers using flipflops.</b>	<b>K5</b>
<b>CO5</b>	<b>Know basic concepts of operational amplifier and their applications.</b>	<b>K1, K3</b>

### **CORE ELECTIVE I - Computer Programming in 'C' -MUPE1**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Get a basic knowledge of fundamental concepts of 'C' programming language</b>	<b>K1</b>
<b>CO2</b>	<b>Write algorithm and are able to draw flow charts.</b>	<b>K2</b>
<b>CO3</b>	<b>Know how to write simple programmes in 'C'</b>	<b>K3</b>
<b>CO4</b>	<b>Gain thorough knowledge of various control statements, if, if-else, do-while, while switch case</b>	<b>K2</b>
<b>CO5</b>	<b>Write programs with structure, union and pointers</b>	<b>K5</b>

### **Core elective - Fundamentals of Microprocessor- 8085**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Get a basic knowledge of fundamental of microcomputer and microprocessor 8085</b>	<b>K1</b>
<b>CO2</b>	<b>understand the instruction set of microprocessor 8085</b>	<b>K2</b>
<b>CO3</b>	<b>Know the various addressing modes</b>	<b>K3</b>

<b>CO4</b>	<b>Write simple assembly language programs</b>	<b>K4</b>
<b>CO5</b>	<b>Write programs for given case studies</b>	<b>K5</b>

### **CORE ELECTIVE II - Energy Physics - – MUPE2**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Acquire knowledge on energy sources available</b>	<b>K2</b>
<b>CO2</b>	<b>Understand solar energy collection and storage processes</b>	<b>K2</b>
<b>CO3</b>	<b>Apply solar energy in various house hold appliances</b>	<b>K3</b>
<b>CO4</b>	<b>Know the recent development in biomass conversion technologies</b>	<b>K4</b>
<b>CO5</b>	<b>Study the methods of ocean thermal electric power generation in various applications.</b>	<b>K5</b>

### **Core elective - Mathematical Physics**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Solve ordinary and partial differential equations in physical sciences.</b>	<b>K3</b>
<b>CO2</b>	<b>Use special functions</b>	<b>K2</b>
<b>CO3</b>	<b>Analyze the basic theory of vectors</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the concepts of matrices</b>	<b>K2</b>
<b>CO5</b>	<b>Acquire the knowledge of solving differential equations</b>	<b>K5</b>

### **SBC V - Computer Programming in 'C' –Practicals-MUPCP5**

CO	Statement	Blooms Taxonomy level
CO1	write simple programme in 'C'	K3
CO2	use control statements and simple if else statements in writing programmes	K3
CO3	write programs using switch case	K3
CO4	write programe using for loop	K4
CO5	write programe using functions	K5

### Solid State Physics – MUPC9

CO	Statement	Blooms Taxonomy level
CO1	Have a detailed idea of crystallography	K1
CO2	Study various defects in solids	K2
CO3	Gain knowledge of lattice vibrations in crystals.	K2
CO4	Explore various properties of different magnetic materials.	K3
CO5	Acquire knowledge of superconductors and their applications.	K4

### Nuclear and Particle Physics- MUPC10

CO	Statement	Blooms Taxonomy level
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<b>CO1</b>	<b>Gain a clear picture of nuclear composition and various nuclear models</b>	<b>K2</b>
<b>CO2</b>	<b>Have a deep knowledge about Radio activity, nuclear Fission, Nuclear Fusion and nuclear transformation.</b>	<b>K3</b>
<b>CO3</b>	<b>Understand the working of nuclear detectors and counters and the importance of Cosmic rays</b>	<b>K2</b>
<b>CO4</b>	<b>Become familiar with nuclear particles and different particle accelerators</b>	<b>K3</b>
<b>CO5</b>	<b>classify different kinds of reactions between elementary particles</b>	<b>K4</b>

### **CORE ELECTIVE III - Laser, Fibre Optics & Spectroscopy– MUPE3**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Explore the Laser fundamentals</b>	<b>K2</b>
<b>CO2</b>	<b>Get adequate knowledge about Industrial and medical applications of laser for day-to-day applications</b>	<b>K3</b>
<b>CO3</b>	<b>Recognize and classify the structure of Optical fibre</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the Optical sensors and their applications</b>	<b>K2, K3</b>
<b>CO5</b>	<b>Recognize different types of spectroscopy and their applications</b>	<b>K3, K4</b>

### **Core elective III- Communication Electronics**

CO	Statement	Blooms Taxonomy level
CO1	<b>Acquire knowledge on recent developments in the scientific and technological fields based on electronic principles</b>	<b>K2</b>
CO2	<b>Apply different modulation and demodulation techniques in advanced electronic communications</b>	<b>K3</b>
CO3	<b>Analyze generation and detection of AM and FM signals and comparison between them</b>	<b>K4</b>
CO4	<b>Identify different radio receiver circuits and role of AGC.</b>	<b>K4</b>
CO5	<b>Apply the recent developments in the field of information technology and internet</b>	<b>K5</b>

### **CORE PRACTICAL - PAPER III - MUPP3**

CO	Statement	Blooms Taxonomy level
CO1	<b>Impart the broad knowledge of experimental methods and measurements</b>	<b>K1</b>
CO2	<b>Gain knowledge and understanding the components and handling equipments</b>	<b>K1</b>
CO3	<b>Familiarize with the experimental techniques</b>	<b>K1</b>
CO4	<b>Get the idea about experimental setup and arrangement of devices</b>	<b>K3</b>
CO5	<b>Verify the experimental results with theoretical values</b>	<b>K3</b>

### **CORE PRACTICAL - PAPER IV – MUPP4**

CO	Statement	Blooms Taxonomy level
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<b>CO1</b>	<b>Remember the applications of semiconductor devices</b>	<b>K1</b>
<b>CO2</b>	<b>Gain the idea and principles of electronics practically</b>	<b>K1</b>
<b>CO3</b>	<b>Access the action of electronic devices such as diode, transistor etc.,</b>	<b>K1</b>
<b>CO4</b>	<b>Impart the broad knowledge of experimental methods and measurements</b>	<b>K3</b>
<b>CO5</b>	<b>Gain knowledge and understanding the components and handling equipments</b>	<b>K3</b>

### **SBC VI - Project – MUPPR**

### **NME II - Types of Energy & their Utilization -MUPN2**

<b>CO</b>	<b>Statement</b>	<b>Blooms Taxonomy level</b>
<b>CO1</b>	<b>Learn fundamental concepts of energy</b>	<b>K2</b>
<b>CO2</b>	<b>Impart the usage of non-renewable energy sources</b>	<b>K3</b>
<b>CO3</b>	<b>Apply basic characteristics of renewable sources of energy and technologies for their utilization</b>	<b>K3</b>
<b>CO4</b>	<b>Give review on utilization trends of renewable sources of energy</b>	<b>K4</b>
<b>CO5</b>	<b>Interpret the advantages and disadvantages of different renewable and non-renewable sources of energy</b>	<b>K5</b>

**VALUE ADDED COURSE I - TECHNICAL TRAINING FOR LAB  
EQUIPMENTS**

CO	Statement	Blooms Taxonomy level
CO1	Know about the basic concepts for measurement of physical quantities.	K1
CO2	Acquire knowledge to design and analyses electrical and electronic instruments	K2
CO3	Apply the principles of power supplies in various circuits.	K3
CO4	Remember the basic principles of transformers	K2
CO5	Analyse frequency responses in various circuits using oscillators.	K3

**VALUE ADDED COURSE II - Designing & Fabrication of PCB**

CO	Statement	Blooms Taxonomy level
CO1	Learn about the basics of PCB	K1
CO2	Understand the types of PCB	K2
CO3	Apply their learned knowledge to develop Layout	K3
CO4	To discuss the concept of laminates and printing	K2
CO5	Apply their learned knowledge to develop Etching and Soldering	K3

**VALUE ADDED COURSE III - OPTOELECTRONICS DEVICES**

CO	Statement	Blooms Taxonomy level
CO1	To understand LEDs their working, advantages and applications	K1
CO2	To know about LCD, their working and uses	K3
CO3	Understand the function of different semiconductor opto devices	K2
CO4	To discuss the concept of different photo detecting devices	K2
CO5	To learn about the working of CRO	K3