Department of Physics 2023-24

F. Y. B. Sc.

Undergraduate Certificate in the field of Physics

Revised as per

NEP 2020

Programme Outcomes

Sr. No.	After completion of B.Sc. program students will acquire	Graduate Attribute
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyse, and interpret data and use scientific judgment to draw conclusions.	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyse and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking

PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

Department of Physics 2023-24
F. Y. B. Sc.
Course Outcomes (COs)
SEM I

Course: Physics Major-1,
Classical Physics, Mathematical Physics
Course Code: USC1PH1

CO1 Summarize properties of matter, vectors algebra.

CO2 Apply laws of vector algebra, elasticity, fluid dynamics concepts in various physical situations.

CO3 Explain crystal system, crystal planes and its direction, different coordinate system and interconversion between them, mechanical properties of matter and fluid with its application

CO4 Solve sums based on miller indices, Bravais lattices, vector algebra, elasticity, fluid dynamics

Course: Physics Major-1,
Practical
Course Code: USC1PHP1

CO1 Understand measuring devices such as Vernier Calliper, Screw Gauge, Travelling Microscope.

CO2 Measure different mechanical properties of Solids like the Moment of Inertia, Modulus of Elasticity, Coefficient of Viscosity, temperature coefficient of resistance of Thermistor and Joule's Constant

CO3 Demonstrate experiments related to mechanics & crystal

Course: OE
Basics of Electricity for wiring
Course Code: UOE1BEW

CO1 Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, power supplies.

CO2 Design and trouble shoots the basic electrical circuits through hands-on mode

CO3 Identify the basic components used for Electronic & Electrical experiments

Course: Physics Major 2,
D. C. Circuits and Digital Electronics
Course Code: USC1PH2

CO1 Apply Thevenin's Theorem and Norton's Theorem to simplify complex circuits and calculate equivalent circuits with respect to a specific load.

CO2 develop critical thinking skills by analyzing various circuit configurations and choosing appropriate methods to solve complex circuit problems.

CO3 differentiate between series and parallel D.C. circuits, calculating equivalent resistances and current/voltage distribution..

CO4 develop strong problem-solving skills in circuit analysis, enabling them to approach complex D.C. circuit problems methodically and confidently

CO5 analyze logic gates (AND, OR, NOT, XOR, etc.).

CO6 Design combinational logic circuits using logic gates

Course: Physics Major-2,
Practical
Course Code: USC1PHP2

CO1 Analyze complex circuits and simplify them using Thevenin equivalents.

CO2 Analyze the rectification process in AC to DC conversion.

CO3 Understand the basic concepts of logic gates, including their types (AND, OR, NOT, NAND, NOR, XOR, etc.) and how they function.

CO4 Design voltage regulation circuits using Zener diodes.

Course: OE (B. COM)
Computer Hardware-1
Course Code: UOE1CH

CO1 analyze simple electronic circuits using Ohm's law and Kirchhoff's laws, calculating voltages, currents, and resistances.

CO2 develop critical thinking skills by diagnosing and rectifying common electronic circuit issues and malfunctions.

CO3 measure voltage and current accurately using appropriate tools such as multimeters.

Course: Vocational Skill Course Theory
Fundamentals of Arduino using simulations
Course Code: UVSC1FAS

CO1	Explain basic components used with Arduino kit like breadboard, various basic electrical Components & Arduino
CO2	Acquire basic of basic electrical circuits, basic Arduino programs using simulations.
CO3	Design the basic Arduino programs for practical applications

Course: Vocational Skill Course (practical)
Fundamentals of Arduino using simulations
Course Code: UVSC1FAS

CO1	Acquire hands-on experience in the usage of breadboard, various basic electrical Components.
CO2	Design and trouble shoots the basic electrical circuits, basic Arduino programs using simulations.
CO3	Design the basic Arduino programs for practical applications and execute it

Course :Skill Enhancement Course (Theory)
Instrumentation Techniques in Physics
Course Code: USEC1ITP

CO1	Learn and acquire the knowledge of various measuring instruments and their uses.
CO2	To acquire basic working knowledge of Oscillation , fluid dynamics
CO3	Learn and acquire skill to use mechanical tools to make simple measurement of length, height, time, area and volume & to use spectrometer, lens

Course :Skill Enhancement Course (practical)
Instrumentation Techniques in Physics
Course Code: USEC1ITP

CO1 To get hands-on experience in usage of optical devices.

CO2 To acquire basic working knowledge of Oscillation , fluid dynamics

CO3 Learn and acquire skill to use mechanical tools to make simple measurement of length, height, time, area and volume & to use spectrometer, lens

Course: (IKS) Theory
Ancient Indian Astronomy
Course Code: UIKS1AIA

CO1 Analyze ancient Indian astronomical sources, evaluating the accuracy of observations, theories, and calculations based on the available historical records.

CO2 Compare contrast ancient Indian astronomical theories with those from other civilizations, understanding the cultural and scientific contexts.

CO3 Develop skills in analyzing ancient Indian astronomical observations,including star positions, planetary motions, eclipses, and celestial events.

F. Y. B. Sc.
Course Outcomes (COs)
SEM II

Course: Physics Major-1,
Optics, Applied Mathematics
Course Code: USC2PH1

CO1	Apply lens maker equation, concepts of differential equation in circuits.
CO2	Deduct current, charge in LR, RC circuit in terms of equation and graph, equivalent focal length, cardinal points for thin and thick lens.
CO3	Discuss natural physical processes related to light waves, lens system, aberration
CO4	Solve numerical problems related to homogenous and inhomogenous equations, lens, Aberration

Course: Physics Major-1,
Practical
Course Code: USC2PHP1

CO1	Utilise Optical Instruments such as the Spectrometer, Prism, Lenses for finding Optical properties like the Refractive Index of the material of the Prism, equivalent focal length.
CO2	Determine moment of inertia & acceleration due to gravity.
CO3	Apply skills experiment to optics and mechanics practicals

Course: OE
Solar Energy- Fundamentals & Its Applications-I
Course Code:UOE2SE

CO1	Learn and acquire knowledge the solar energy and its relevance.
CO2	Design basic solar systems
CO3	Identify the basic components used for Solar systems
CO4	Learn and acquire hands-on experience in the handling Solar / PV cells.
CO5	Design and trouble shoots the basic electrical circuits through hands-on mode
CO6	Familiarize Learners To determine the effect of several variables on the output of a photovoltaic cell.
CO7	Learners explores energy from the sun in terms of radiant energy to expand on the concept of electricity generation

Course: Physics Major 2,
A.C.Circuits and Modern Physics
Course Code: USC2PH2

CO1	compare quantum mechanics with classical mechanics, recognizing the limitations of classical physics and the novel concepts introduced by quantum mechanics.
CO2	explain how the Compton Effect is applied in fields such as X-ray crystallography, where it contributes to understanding the structure of materials.
CO3	analyze AC circuits, including phasor representation, impedance, admittance, and the concept of complex numbers..
CO4	Understand the working principles of AC bridges and their significance in precise measurement of resistance, capacitance, and inductance.

Course: Physics Major-2,
Practical
Course Code: USC1PHP2

CO1	Understand the working principle of Light Dependent Resistors (LDRs).
CO2	Calculate the angular and spatial distribution of light intensity in the diffraction pattern.
CO3	Measure the frequency of the AC mains using appropriate equipment.
CO4	Measure the unknown capacitance using de Sauty's bridge and compare it with theoretical values.

Course: OE (B. COM)
Computer Hardware- 2
Course Code: UOE2CH

CO1	Develop problem-solving skills to diagnose and troubleshoot common hardware issues, both in hardware and software interactions.
CO2	Understand the fundamental concepts of computer architecture, including the organization and structure of various hardware components.
CO3	Explain recent advancements in computer hardware, including trends in processors, memory technologies, storage solutions, and energy-efficient designs..

Course: Vocational Skill course(Theory)
Practical Applications Of Arduino based device -I
Course Code: UVSC2FAD

CO1	Explain various Sensors, program code of Arduino.
CO2	Acquire basic working knowledge of program code of Arduino UNO
CO3	Design program code in practical life using various basic sensors, various electronic outputs devices

Course: Vocational Skill Course(Practical)
Practical Applications Of Arduino based device -I
Course Code: UVSC2FAD

CO1	To get hands-on experience in usage of various Sensors.
CO2	To acquire basic working knowledge of program code of Arduino UNO.
CO3	Learn and acquire skill to apply program code in practical life using various basic sensors

Course: Skill Enhancement Course(Theory)
Basic of Electronics
Course Code:USEC2BE

CO1	Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, power supplies.
CO2	Design and trouble shoots the basic electrical circuits through hands-on mode .
CO3	Identify the basic components used for Electronic & Electrical experiments.

Course: Skill Enhancement Course (Practical)
Basic of Electronics
Course Code: USEC2BE

CO1 Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, power supplies.

CO2 Design and trouble shoots the basic electrical circuits through hands-on mode

CO3 Identify the basic components used for Electronic & Electrical experiments

Course: Physics Minor(Theory)

Digital Electronics

Course Code:USC2MIDE

CO1 Comprehend the fundamental principles of logic gates, including AND, OR, NOT, NAND, NOR, and XOR gates. They will grasp the concept of digital logic and its applications in various electronic devices and systems.

CO2 Gain a thorough understanding of different number systems, including binary, octal, decimal, and hexadecimal. They will learn to convert numbers between these systems and understand their significance in computer programming and digital electronics

CO3 Perform basic arithmetic operations (addition, subtraction, multiplication, and division) using binary numbers. They will also learn about binary-coded decimal (BCD) and its applications

Course: Physics Minor(Practical)
Digital Electronics

Course Code: USC2MIDE

CO1 construct truth tables of basic logic gates and understand their behavior.

CO2 Design combinational logic circuits using logic gates.