

DEPARTMENT OF PHYSICS

B.Sc. Physics

Course Outcomes

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

Course Code	Course Name	Course Outcomes
20UPHC1	Properties of matter and Sound	CO1: To understand the physical properties of different states of matter and to understand the elastic properties
		CO2: To study the concepts of surface tension and the various methods to determine the parameters experimentally.
		CO3: To study the basic concept of viscosity and the various methods to determine the parameters
		CO4: To analyse the characteristics of sound and requisites of good acoustics.
		CO5: To understand and apply the ultrasonic to find the depth of sea.
20UPHC2	Mechanics	CO1: Apply Newton's laws to direct and oblique impacts and to provide an ability to solve any problem on this topic.
		CO2: Impart knowledge on circular and rotational motion and apply them to study the motion individual particle
		CO3: Explore the fundamental concepts of moment of inertia and use it to calculate moment of inertia of simple objects of different shapes.
		CO4: Impart the knowledge about universal force (Newton's law of gravitation) acting between all matters and use it to calculate gravitational potential and field.
		CO5: Gain knowledge in the field of hydrostatics and hydrodynamics and its application in day to day life.
20UPHC1	Core Practical –I	CO1: Develop the ability to design and connect simple electronic circuits and to collect and analyse the data using these circuits. To develop skills in using electronic instruments like multimeter and oscilloscopes.
		CO2: Analyse the data to determine the desired physical quantity design and conduct experiments and interpret the experimental results and identify, formulate and solve physical problems.
		CO3: Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

		CO4: Analyze the physical principle involved in the various instruments; also relate the principle to new application.
		CO5: The various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of science.
20UMAAC1 /20UCHAC1 /19UHSAC1	Allied Physics -I	CO1:To understand the Young's modulus, Rigidity modulus and Bulk Modulus. Distinguish rigid materials by measuring moduli of elasticity.
		CO2:To learn the units and dimension of Viscosity and Surface tension of a liquid. Determine the co-efficient of viscosity using burette and Oswald's viscometer
		CO3:To Understand specific heat capacity of solids and liquids, and the different laws on radiation.
		CO4:To analyze the wavelength using Newton's Rings, and difference between diffraction and interference and to understand the properties and applications of light like reflection, refraction, diffraction and interference.
		CO5:To learn the fundamentals of Sonometer and Piezo-electric oscillator and to determine the frequency of a tuning fork and to Analyse production, detection of Ultrasonic waves and applications.
20UMAAQC/ 20UCHAQC/ 19UHSAQC	Allied Physics Practical	CO1: Develop skills in using instruments like travelling microscope, vernier caliper, screw gauge and multimeters.
		CO2: Apply the theory of heat, light, electricity and sound to laboratory experiments to arrive solutions to physical
		CO3: Understand and apply the theory of semiconductors to design and analyze electronic circuits
		CO4: Understand the working principle of potentiometer, spectrometer and sonometer instruments
		CO5: Acquire enhanced practical skills in digital
20UPHSC1	Skill Based- I: Electrical Circuits and Network Skills	CO1: Recall the basic concepts of electricity.
		CO2: Apply the concepts of electricity to solve problems.
		CO3: Understand and apply the basic concepts of a.c circuits
		CO 4: Acquire knowledge about network analysis and network theorems.
		CO5: Apply the principles of domestic wiring and earthing.
20UPHC3	Thermal Physics	CO1: Recognize the difference between Heat and Temperature
		CO2: Understand the principles of thermodynamics and heat transfer
		CO3: Acquire knowledge on low temperature Physics
		CO4: Understand the concept of entropy and calorimetry

		CO5: Realize the conceptual understanding of the facts through implications of quantum statistics
20UPHC4	Atomic Physics	CO1: Discuss the location and role of each of the subatomic particles: the proton, neutron and electron
		CO2: Impart knowledge about photoelectric effect and its application in day to day life
		CO3: Understand and distinguish between continuous and characteristics X-ray spectra and its applications
		CO4: Recognize the periodic table from the viewpoint of the electronic structure and understand the quantum
		CO5: Describe the origin of fine, hyperfine structure in atomic spectra and analyse atomic effect such as space quantization and Zeeman Effect
20UMAAC2 / 20UCHAC2/ 19UHSAC2	Allied Physics-II	CO1: Acquire the knowledge of fundamental concept of electrical quantities, working principle of potentiometer and
		CO2: Express the basic concepts about the electronic and nuclear structure of atoms and apply it to solve problems related it. Gain knowledge on radio isotopes, nuclear
		CO3: Acquire basic knowledge and working of semiconductors devices
		CO4: Gain knowledge about types of number systems, and their conversions. Understand the symbols, Truth tables of logic gates and Boolean equations.
		CO5: Having a scientific background about the nature of Laser light and different types of laser Sources and its
20UPHSC2	Skill Based-II: Basic Instrumentation Skills	CO1: Understand and apply the basic of measurements to electronic instruments.
		CO2: Acquire knowledge on the specifications and working principle of electronic voltmeter.
		CO3: Understand and apply the principle of operation of cathode ray oscilloscope for measuring frequency and time.
		CO4: Develop skills in using signal generators to analyze different waveforms.
		CO5: Acquire enhanced practical skills in digital measurements.
19UEVSC	Environmental Studies	CO1: Demonstrate critical thinking skills in relation to environmental issues.
		CO2: Develop an integrative approach to environmental issues with a focus on sustainability
		CO3: Bring an awareness, knowledge and appreciation of intrinsic values of ecological processes and communities.
		CO4: Reflect critically about their roles and identities as citizens, consumers and an environmentalist in the complex, interconnected world.

		CO5: Apply systems, concepts and methodologies to analyse and understand interactions between social and environmental processes.
		CO6: Understand the transactional character of environmental problems and ways of addressing them, including interactions across local to global scales.
19UPHC5	Optics	CO1: Understand the fundamental properties of light and inspire interest for the knowledge of concepts in physical & geometrical physics.
		CO2: Implement the knowledge of minimizing aberrations various optical instruments and its application in real life
		CO3: Understand and apply the various concepts of interference by theoretical/experimental level and apply it to solve any problems
		CO4: Distinguish between Fresnel and Fraunhofer diffraction, gain knowledge on diffraction, and understand the theory of plane transmission grating and its resolving power.
		CO5: Gain knowledge on production and detection of circularly and elliptically polarized light, construction of half wave plate. Analyze the intensity variation of light due to polarization, interference and diffraction. Apply the
19UPHC6	Medical Physics	CO1: Understand the functions of physiological systems and acquire the knowledge about the origin of bioelectric potentials
		CO2: Acquire knowledge on working principle of transducers and its applications in biomedical instruments.
		CO3: Understand the properties, production of X-rays and gain knowledge on the role X-rays in imaging techniques
		CO4: Impart knowledge on bio potential recorder and to analyze heart signals and its application in electrocardiography
		CO5: Understand the units of radiation exposure and gain knowledge of the working of radiation monitoring instrument and safety.
19UPHC2	Core Practical –II	CO1: Develop the ability to design and connect simple electronic circuits and to collect and analyse the data using these circuits. To develop skills in using electronic instruments like multimeters and oscilloscopes.
		CO2: Analyse the data to determine the desired physical quantity and conduct experiments and interpret the experimental results

		and identify, formulate and solve physical problems.
		CO3: Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results. Developed problem solving skills of a practical nature.
		CO4: Analyze the physical principle involved in the various instruments; also relate the principle to new application. Developed an awareness of the importance of accurate experimentation, particularly observation, record keeping.
		CO5: The various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of science.
19UPHSC3	Skill Based- III: Physics Workshop Skills	CO1: Understand the basics of physics and its conversion to SI and CGS - Familiarization with meter scale – Vernier Calliper- Screw gauge Measurement.
		CO2: To apply the application of Shaper, Drilling, Milling, Cutting tools and physical application involved in the various instruments.
		CO3: To design a system of the soldering, electronic switch and transistor circuits, be able to demonstrate a knowledge of experimental issues.
		CO4: Recognize the multimeter, television and electron microscope from the viewpoint of the electronic structure and understand their physical significance
		CO5: To execute the result of a Fixing of gears with motor mechanism and Lifting the weight using lever and safety, manufacturability and sustainability.
19UPHNEC1	Non Major Elective –I Energy Resources	CO1: Acquire basic knowledge on renewable and non-renewable energy sources and measure the prosperity of country.
		CO2 : Understand the fundamental concept of solar energy resources and its applications in everyday life
		CO3 : Recall the effective use of different types of energy sources based on the requirements and describe the primary renewable energy resources and technologies
		CO4: Analyze environmental legislation, laws, prevention and control of pollution. Aware of important acts and laws in respect of environment and apply critical reasoning skills to solve environmental problems

		CO5: Understand the environmental impacts and give the awareness among the public.
19UPHC7	Spectroscopy and Laser Physics	CO1: Recall about fundamental properties of light, Electromagnetic waves, emission and absorption spectra
		CO2: Gain knowledge about rotational spectra and vibrational spectra
		CO3: Understand the principles behind Laser action and get a depth of knowledge about uses of Laser and spectroscopy.
		CO 4: Analyze the working of different types of lasers
		CO5: Apply the theory of lasers in various applications
19UPHEC1	Physics of Nanomaterials	CO1: Understand the basic physics behind size and effect of nano materials.
		CO2: Gain knowledge in synthesizing.
		CO3: Impart the knowledge on characterization techniques.
		CO4: Analyze the magnetic, electrical, thermal and Mechanical properties.
		CO5: Develop new optic and electronic components and new materials for use in communications technology, sensor technology, catalysis, energy sector, and environmental safety.
19UPHSC4	Skill Based- IV: Renewable Energy Resources	CO1: Acquire the knowledge on fundamental concepts of Renewable energy resources and Non Renewable energy
		CO2: Understand and analyse the need for solar energy its resources, historical and latest developments.
		CO3: Gain knowledge on the fundamental principles in wind and geothermal energy
		CO4: Evaluate the basic and advanced techniques in the field of biomass energy and ocean thermal energy.
		CO5: Figure out the use of energy and its environmental impacts
19UPHNEC2	Non Major Elective II: Astrophysics	CO1: Understand the basic concepts of the phases of the moon and the solar, lunar eclipses
		CO2: Get the fundamental ideas about the features on the sun.
		CO 3: Know the basic features of the inner and outer planets, comets and asteroids.
		CO4: Get the fundamental ideas of the characters of stars and the tools of modern astronomy.

		CO5: Recollect the origin of the universe, different types of galaxies, theories, dark matter and energy.
18UPHC7	Electricity and Magnetism	CO1: Acquire the knowledge on fundamental concepts of electric field, potential and electromagnetic induction
		CO2: Apply the knowledge of electricity and magnetism in formulating and solving practical problems
		CO3: Recall the basic rules on ampere's swimming rule – Maxwell's cork screw rule – right hand clasp rule – magnetic field – magnetic inductions – Fleming's left hand rule
		CO4: Evaluate the basic and advanced problems in the field of transient current and alternating current
		CO5: Figure out the applications of magnetism
18UPHC8	Electronics	CO1: Understand and apply the Zener break down mechanism and Zener breakdown voltage to construct and analyse the regulated power supply using Zener diode
		CO2: Understand evaluate and analysis of a CE transistor amplifier using h-parameter and its approximate expression for current gain, voltage gain, input impedance, output impedance, power gain in decibels.
		CO3: Apply the knowledge about uni junction transistor (UJT), its application relaxation oscillator and to apply SCR as a switch
		CO4: Evaluate and create the amplifier circuits and to apply in the voltage amplifiers construction, for the precision and accurate output.
		CO5: Evaluate and create the operational amplifier circuits and to apply for the mathematical operations.
18UPHC9	Numerical Methods	CO1: Apply numerical methods to fit the data for getting best fit curve which can be used an aid for data visualization and to summarize the relationships among two or more variables
		CO2: Analyse and evaluate the numerical tools for solving non – linear equations
		CO3: Create the knowledge about numerical methods to obtain approximate solutions for linear equations.
		CO4: Derive numerical methods for various mathematical operations and tasks such as interpolation and differentiation
		CO5: Perform numerical integration for a definite integral
18UPHEC2	C Programming and C++	CO1: Remember the basic concepts of C programming.
		CO2: Understand the role of control statements in C
		CO3: Apply the concept of functions in C

		CO4: Review the need for Object Oriented Programming
		CO5: Develop algorithm, flowchart and programs in C.
18UPHQC3	Core Practical -III	CO1: Understand and analyze the experimental ideas related with matter, heat, electricity magnetism and electronics experiments.
		CO2: Identify the link between theory and designing workable circuits.
		CO3: Understand and apply the knowledge of theory to experiments, as well as to analyze and interpret data.
18UPHQC4	Core practical - IV	CO1: Apply the theory of heat, light, electricity and sound to laboratory experiments to arrive solutions to physical problems.
		CO2: To get familiarize with electronics through experiments.
		CO3: Understand the working principle of various instruments.
18UPHNSC1	Non Major Skill Based -1: Introductory Biophysics	CO1: Understand and apply the knowledge of atoms of living system-hydrogen, helium, carbon, nitrogen, oxygen and chlorine atoms, stable atoms, chemical bonds, ionic bonds, covalent bonds.
		CO2: Understand and apply the knowledge of first and second laws of thermodynamics, concept of free energy, living systems and equilibrium state and tertiary structures-super secondary and domain structure.
		CO3: Understand the knowledge about physics of membrane potentials, physical aspects of hearing and signal transduction.
		CO4: Apply and gain knowledge in the field of the lymphatic morphology, mechanics of lymphatic valve and the structure of the bone, bone fracture, joint stability and mobility.
		CO5: Acquire knowledge about the fluorescence, phosphorescence and analyse the bioluminescence.
18UPHC10	Solid State Physics	CO1: State the fundamental concepts of crystal structure and to solve problems related to it.
		CO2: Understand the diffraction principle, use of X-rays, experimental techniques and applications.
		CO3: Comprehend the types of magnetism, concepts of superconductivity and its applications.
		CO4: Acquire knowledge concerned to the electrical behaviour of dielectric materials.

		CO5: Understand the behavior of electrons and holes in semiconductors.
18UPHC11	Wave Mechanics and Nuclear Physics	CO1: Understand and use the ideas of wave-particle duality and the uncertainty principle to solve simple problems in quantum mechanics.
		CO2: Understand the concepts and the consequences of special and general theory of relativity and apply it to solve variety of problems
		CO3: Understand the concept of nuclear decay processes, origin and characteristics of α , β and γ spectra and their detection. Solve applied nuclear problems with critical thinking and analytical reasoning
		CO4: Gain knowledge in the field of nuclear fission and fusion reactions and its application in day to day life, demonstrate nuclear models and categorize different nuclear reactors. Understand the basic of nuclear safely Management
		CO5: Understand the classification of elementary particles and their quantum numbers
18UPHC12	Mathematical Physics	CO1: Apply matrices to solve simultaneous linear equations and evaluate eigen values and eigen vectors of a matrix.
		CO2: Develop the use of mathematical methods and apply for the formulation of physical theories
		CO3: Create the knowledge about complex variables.
		CO4: Apply special mathematical functions appropriately in solving problems arising in physics.
		CO5: Understand and analyse the basic concepts of errors and probability.
18UPHEC3	Digital Electronics And Communication	CO1: Understand the number systems and apply it for arithmetic operations, binary codes - BCD code, excess-3 code, graycodes, boolean algebra.
		CO2: Understand and analyse the working principles of the logic families and Karnaugh Map method.
		CO3: Apply, understand and analyse the knowledge about Design procedure, Half and Full adders.
		CO4: Understand and analyse knowledge in the field of the sequential logic.
		CO5: Understand the principle and analyse the counter operations such as ripple counters, design of synchronous counters and asynchronous counters synchronous BCD decade counter

18UPHNSC2	Non Major Skill Based - II: Physics in Everyday Life	CO1: Understand the basics of physics and its applications in everyday life.
		CO2: Remember the principles properties of matter, heat and mechanics.
		CO3: Analyse the characteristics of sound and requisites of good acoustics.
		CO4 : Recollect the physical properties of different states of matter and change of state
		CO5: Understand the role of optical instruments in day-to-day life