PROGRAMME OUTCOMES AND COURSE OUTCOMES

2022 – 2023

NAME OF THE PROGRAMME: B.Sc Physics **PROGRAMME CODE: UAPH**

Programme Outcomes:

PO1	Apply acquired scientific knowledge to solve complex issues.
PO2	Attain Analytical skills to solve complex cultural, societal and environmental issues
PO3	Employ latest and updated tools and technologies to analyse complex issues
PO4	Professional Ethics that foster Community, Nation and Environment Building Initiatives.

Course Outcomes:

Course Code	Course Title	Course Outcomes
19P1CC1	Mechanics And Properties Of Matter	CO1: Explain gravitational force, gravitational field, gravitational potential and gravitational energy CO2: Analyze the variation of 'g' with latitude, altitude, depth and rotation of earth and Identify the types of satellite orbits and compute

		the parameters of satellite motion. CO3:Discuss the elastic properties of materials and compute the Young's modulus of a beam CO4: Describe surface tension and capillarity property of liquids and identify its applications. CO5: Explain the dynamics of fluid motion and its applications and analyse the viscose property of liquids.
19P1CC2	Thermal Physics	CO1: Students will be able to analyse a microscopic approach and seek to account for the macroscopic properties of a gas in terms of properties of its molecules CO2: Students will be able to explain the classical Maxwell's distribution law of velocity and its inference. CO3: Students will be able to describe molecular collisions and its mean free path , understand the process of thermal conductivity, viscosity and diffusion in gases CO4: Students will be able to depict the manner in which the energy changes takes place and outline the different methods to produce low temperature

		CO5: Students will be able to demonstrate the liquefaction of gases and explain the nature of gases in the neighbourhood of absolute zero temperature.
19P1CC3	Major Practicals I	Students will be able to determine the properties of materials relevant to the theory learnt in core courses.
19P2CC4	Oscillations And Waves	CO1: Students will be able to understand simple harmonic motion and forced oscillations CO2: Students will be able to understand Principle of Superposition of waves CO3: Students will be able to apply interference, stationary waves and beats of sound waves CO4: Students will be able to ExplainDoppler effect in sound and identify relative motion and solve problems CO5: Students will be able to study the ultrasonic waves generation and application of the same and outline the physics of voice generation and hearing
19P2CC5	Applied Mechanics	CO1: Students will be able to demonstrate an understanding of central forces and explain Kepler's laws of Planetary motion

		CO2: Students will be able to compute the path of projectile launched with horizontal and vertical velocity components in the Earth's gravity CO3: Students will be able to evaluate the interrelationship between energy and work C04: Students will be able to describe the motion of the center of mass of an object, state the conservation principles involving momentum and explore its applications, analyse collisions between two objects CO5: Students will be able to apply law of conservation angular momentum appropriately in rigid body rotations, relate the rotational and translational parameters based on rotational kinematics.
19P2CC6	Major Practicals II	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P3CC7	Electromagnetism	CO1: students will be able to Calculate electric field for a distribution of charges by applying method of calculus. CO2: students will be able to Evaluate electric field for problems involving symmetry by using Gauss's law CO3: students will be able to Estimate the magnetic field of a current using BiotSavarat law and Ampere's law

		CO4: students will be able to Describe the working of generators and motors based on Faraday's law of induction and Lenz law. Also, they will be able to classify magnetic materials based on magnetic dipole moments CO5: students will be able to Comprehend Maxwell's equations and generation of electromagnetic waves
19P3CC8	Solid State Physics	CO1: Students will be able to Define the different parameters of crystal system and explain the basic concepts. CO2: Students will be able to Describe the various magnetic behaviours of solids CO3: Students will be able to Explain the working of dielectric materials. CO4: Students will be able to Understand the basic concepts in super conductivity. CO5: Students will be able to Describe working and various applications of superconductors.
19P3CC9	Major Practicals-III	Students will be able to Understand and Analyse electric, magnetic and electromagnetic principles and laws through experiments

19P4CC10	Analog Electronics	CO1: Students will be able to Acquire basic knowledge of PN junction diode, different rectifiers and filters CO2: Explain different transistor configuration and various biasing circuits CO3: Obtain the knowledge of transistor amplifier and analyse using DC and AC load line CO4: Elucidate the concept of feedback in amplifiers and design various types of oscillators CO5: Describe the parameters of OP-AMP and to design OP-AMP circuits
22P4CC11	Mathematical Physics	CO1: Students will be able to Analyze properties and determinants of matrix to solve problem CO2: Apply vector calculus to solve Physics Phenomena CO3: UtilizeFourier series to represent waves of different shapes CO4: Comprehend idea of modeling physics phenomena CO5: Analyse analytic function and to express trigonometric and hyperbolic functions.
19P4CC12	Major Practicals IV	Students will be able to Understand and electronics principles and

		laws through experiments
19P5CC13	Digital Electronics And Communication	CO1: Students will be able to Demonstrate the knowledge in Combinational logic circuits and Flip-Flops and apply skills in solving problems and drawing Karnaugh Maps. CO2: Students will be able to Analyse the working of different types of registers and counters CO3: Students will be able to Explain the concepts involved in D/A Conversion and A/D Conversion, continuous A/D conversion and A/D techniques CO4: Students will be able to Explicate the different types of analog modulation techniques in communication systems. CO5: Students will be able to Communicate clearly the principles of digital modulation and Satellite communication
19P5CC14	Optics	CO1: Students will be able Gain knowledge on interference of light waves and understand K1 PSO1& PSO2 the interference in a wedge shaped film, Newton's rings and describe interference of light due to division of wave front, CO2: Students will be able to Explain Diffraction of light, Diffraction at

		an opaque disc and the construction and working of zone plate.. CO3: Students will be able to Insight of the Fraunhofer diffraction at a single slit and double slit, Resolving Power of Prism, Grating, telescope and Microscope. CO4: Students will be able to Deduce the concepts of Polarization, Brewster's and Malus law and explain production and analysis of polarized light. CO5: Students will be able to Insight of the Infrared spectroscopy, ultraviolet spectroscopy,quartz spectrograph, Raman Spectroscopy,Quantum theory of Raman effect, Nuclear magnetic resonance.
19P5CC15	Major Practicals V (Electronics)	Students will be able to understand physical laws using appropriate equipments through experiments
19P5CC16	Major Practicals VI (Non Electronics)	Students will be able to understand electrical, thermal and optical measurements like Refractive index of a liquid, Determination of wavelength of Fraunhofer lines using Grating,Determination of using Hartmann's Interpolation Formula,determination of by forming Newtens rings and characteristics of a thermistor.

19P6CC17	Thermodynamics And Statistical Mechanics	CO1: Analyse the basics of thermodynamic systems and derive the internal energy equation as Pressure, Volume and Temperature as independent CO2: Explain the entropy and the second law of thermodynamics and deduce the Tds equations and discuss the properties of an ideal gas and Vander Waals gas CO3: Gain knowledge on thermodynamic potentials, Helmoltz and Gibbs functions and derive Maxwell's relations.. CO4: Distinguish Bose Einstein, Fermi-Dirac statistics, Maxwell-Boltzmann Statistics and study their distribution functions. CO5: Demonstrate and explain the application of quantum statistics
19P6CC18	Modern Physics	CO1: Describe the wave properties of particles CO2: Arrive at Schrodinger wave equations and apply it for accounting the behaviour of atoms, nuclei and particles on the basis of it. CO3: Explain the vector atom model and understand the role of spin in atomic phenomena CO4: Discuss the properties of atomic nuclei and interpret its behavior

		through detailed models like liquid drop and shell model CO5: Explain the concepts of relativity and explain the intimate relationships between space and time, mass and energy.
19P6CC19	Major Practicals VII (Electronics)	Students will be able to understand physical laws using appropriate equipments through experiments
19P6CC20	Major Practicals VIII (Non Electronics)	Students will be able to understand electrical, thermal and optical measurements like Refractive index of a liquid, Determination of groove spacing of CD,Determination of □ wavelength using biprism and calcite prism ,determination of thickness of the wire using Airwedge, numerical aperture of optical fiber, conversion of galvanometer into voltmeter etc.
21P1ACC1 / 21P3ACM1 / 21P3ACG1	Allied Physics - I	CO1: Students will be able to Define and discuss about the simple harmonic waves and its oscillations and laws of transverse vibrations of strings. CO2: Students will be able to Classify and describe the properties of matter such as electricity, viscosity and surface tension. CO3: Students will be able to Summarise the basic concepts of thermal

		physics and apply the laws of thermodynamics in higher learning concepts such as entropy and its reversible nd irreversible process. CO4: Students will be able to Explain the principles and laws used in electricity and magnetism those are useful in defining the energy of a capacitor and magnetic effect of electric current. CO5: Students will be able to Demonstrate the properties of geometrical optics and explain the refraction and dispersion through a prism.
21P1ACB1	Digital Principles And Applications	CO1: students will be able to Define the different types of number systems and explain the basic and universal logic circuits CO2: students will be able to Simplify the logic expressions using Boolean laws and Kmap CO3: students will be able to describe the principles behind the data processing and arithmetic circuits CO4: students will be able to explain the working of basic flipflops and design master slave flipflops students will be able to Understand the working of shift registers and counters

		CO5: students will be able to describe D/A and A/D conversion techniques
21P1ACC2 / 21P3ACM2 / 21P3ACG2	Allied Physics Practicals I	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
21P4ACM3 / 21P2ACC3 / 21P4ACG3	Allied Physics- II	CO1: Students will be able to categorize and clarify the different optical phenomena of interference, diffraction, polarization. CO2: Students will be able to explain the atom model and calculate the total energy of an atom and account for the spectral series of hydrogen atom. CO3: Students will be able to elucidate the models of nuclear structure and to learn the principle behind atom bomb, nuclear reactors. CO4: Students will be able to summarize the working principle of p-n junction diode in forward and reverse biasing, its V-I characteristics, the Zener Diode, n-p-n transistor in common emitter characteristics. CO5: Students will be able to classify the number system and

		demonstrate the skill in conversion of Number systems, Boolean algebra and its associated laws.
21M4ACM4/ 21P2ACC4 / 21P4ACG4	Allied Physics Practical II	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P6ME1	Microprocessor	CO1: Acquire knowledge of Microprocessor Architecture CO2: Comprehend the instructions in assembly language program CO3: Describe the various operations and debugging CO4: Understand the programming techniques in microcontroller CO5: Explore the role of counters and time delay
19P6ME2	Medical Physics	CO1: Acquire knowledge of terminologies, modeling and measurements in medical physics. Also application of low frequency and high frequency electricity in medicine . CO2: Comprehend properties of light in medicine and to study various

		applications of light in medicine CO3: Describe the role of nuclear medicine techniques for diagnosis and therapy C04: Understand the radiation protection in medicine CO5: Explore the role of computers in diagnosis, testing and therapy
19P6ME3	Opto Electronics	CO1: Define the different parameters of fiber optics system and explain the basic concepts. CO2: Solve the problems in various losses of fibers CO3; Understand the working of LED, semiconductor lasers and PN diode. CO4: Describe working and various parameters of photo detectors CO5: Understand the working and application of optical fiber sensors.
19P6ME4	Energy Physics	CO1: Distinguish the energy resources as conventional and nonconventional and describe each one of its types. CO2: Describe the physics behind harnessing solar radiation as

		renewable energy resource and its applications CO3: explain the basic concepts of geothermal energy, magnetohydrodynamics and fuel cell. CO4: describe the energy conversion principles of wind , biomass and ocean tides and waves CO5: suggest energy options for developing countries based on energy conservation approach.
19P1NME/ 19P2NME	Physics In Everyday Life	CO1: Discuss and illustrate the importance of paying attention to the basic units of physical quantities and the standards accepted for their measurement CO2: Describe the motion in terms of particle's position, velocity and acceleration and analyse the cause of motion CO3: Understand the concepts of heat and electromagnetic radiation waves, sound, electricity, magnetism and explore their nature. CO4: Explain the characteristics of Sound CO5: Comprehend the attributes of electricity and magnetism.

19P3SB1	Biomechanics	CO1: Students will be able to acquire a skill to apply the laws of kinematics to biological systems. CO2: Students will be able to Identify the anatomical pulleys and lever systems CO3: Students will be able to Access the types of levers in our body CO4: Students will be able to Explain how the biological machines inside our body CO5: Students will be able to Discuss different kinds of activities, equilibrium and stability of the body using law of physics
22P4SB2	Solar Cell and its Applications	CO1: Acquire a skill on various technologies of solar cell CO2: Acquire a knowledge on thin film technologies CO3: Gain knowledge about the Applications of PV cells CO4: Explain how to use solar in power plants CO5: Discuss about PV Solar Design
19P5SB3	Physics of Measuring Instruments	CO1: Describe the qualitative aspects of thermodynamic quantities temperature and its measurement techniques.

		CO2:Describe the qualitative aspects ofpressure , density and humidity and their measurement technique. CO3: Explain a basic idea of aircraft instrumentation CO4: list the factors affecting wind speed and gain insight on wind speed measurement techniques CO5: Discuss the mechanical and electrical measurements comprising of temperature transducers, biosensors, chemical and optical sensors.
19P5SB4	Physics of medical instruments	CO1: Explain the physics of some common lung disease and instrumentation of Sphygmomanometer CO2: Understand the application of sound in medicine and demonstrate the functioning of Stethoscope CO3: Study the application of Lasers in the field of medicine. CO4: Gain knowledge on the construction, working principle of instruments such as Ophthalmoscope &Keratometer CO5: Learn about the applications of the cardio vascular instrumentation and medical instrumentation utilising the principle of electricity within the body .

19P6SB5	Physics of Advanced Instrumentation	CO1: Discusses the basic physics behind astronomical measurements and material characterization CO2: Explains the principles behind astronomical instruments and their main parts CO3: Explains the principles behind astronomical measurement techniques CO4: Describes the principles and working of electron microscopy CO5: Characterizes the structural properties of materials using X ray diffraction measurements
19P6SB6	Physics of Advanced Medical Instruments	CO1: Understand the working principle of medical instruments used in X- ray, radiography and endoscopy CO2: Comprehend the Principle and application of Computed Tomography, Magnetic Resonance Imaging, Linear Accelerator in medicine CO3: Gain knowledge on the medical applications of Ultrasonography CO4: Acquire knowledge on applications of Nuclear Medicine such as Radio Therapy and the key factors of Radiation protection

		CO5: Understand the biomedical Computer Applications.
19UGSLP1	Nanoscience and Nanotechnology	CO1: Find suitable materials to prepare nanomaterials. CO2: Synthesis carbon nanotubes and apply them for various applications CO3: Describe Biological Imaging using Semiconductor nanocrystals. CO4: Explain about nanosensors. CO5: Understand the nanoshells, nanopores and Tectodendrimers.
21UGSLP2	Amazing Universe And Indian Space Missions	CO1: Understand about Astronomy and cosmology. CO2: Explain the Clustered objects in the Universe. CO3: Describe thE Indian Space Research Organisation. CO4: Understand basics in rockets. CO5: Explain the Satellites and Saris
21UGIDPB1	Fundamentals & Programming of Microprocessor 8085	CO1: Understand Evolution of Microprocessors and embedded Microprocessors. CO2: Explain the Microprocessor Architecture. CO3: Describe the various Instruction set of 8085. CO4: Write Assembly language programming.

		CO5: Write Programs using looping statements.
21UGIDPM1	Space Science	CO1: Understand Big Bang theory and cosmology. CO2: Describe the structure of galaxy. CO3: Explain basic features of the sun CO4: Explain the sidereal and synodic month and various phases of moon. CO5: Understand the eclipses, solar and lunar and conditions for the occurrences.
19UGVAP1	Digital Photography	CO1: Students will be able to Understand the basic phenomena of photography. CO2: Students will be able to comprehend the basic parts of camera, its important control parameters and composition techniques of photography CO3: Students will be able to handle SLR camera and apply various composition techniques and shoot professional photographs CO4: Students will be able to understand the modern technique of photoshop and develop skills to manipulate, edit and enhance the real time photographs using photoshop.

		CO5: Students will be able to prepare their own digital ids and greeting cards with photoshop
19UGVACP1	Mobile Servicing	CO1: Repair and diagnose the problem of all kinds of faults in Mobile Phone. CO2: Understand handsets in Hardware as well Software and rectify the faults using tools and equipment. CO3: Known to uses various softwares in the mobile. CO4: Identify the business opportunities in this sector to run a Mobile Handset Repairing unit CO5: Describe various repairing techniques and apps in the mobile.