PROGRAMME OUTCOMES AND COURSE OUTCOMES

2023 – 2024

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	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

Course Outcomes:

Course Code	Course Title	Course Outcomes
23P1CC1	Properties Of Matter and sound	Students will be able to CO1. Gain knowledge about elasticity and theory of bending of beams

		CO2. Appreciate the different cases of pressure in liquid drop, spherical surface and soap bubble while learning about phenomena of surface tension and capillarity. CO3.To Understand the concept of viscosity and appreciate the Method of Poiseuille for determining Coefficient of Viscosity CO4. Comprehend the meaning of simple harmonic motion and its properties CO5.To Understand the different methods of producing ultrasonic waves and its applications.
23P1CC2	Physics Practical I	Students will be able to Apply various physics concepts to understand properties of matter, set up experimentation to verify theories, quantify and analyse and correlate the results.
23P1GE2	Digital logic fundamentals	The student will be able to CO1.To define the different types of number systems and explain the basic and universal logic circuits CO2.To simplify the logic expressions using Boolean laws and Kmap CO3.To describe the principles behind the data processing and arithmetic circuits CO4.To explain the working of basic flipflops and design master slave flipflops

		CO5.To understand the working of shift registers and counters.Students will be able to describe D/A and A/D conversion techniques
23P1FC	Introductory Physics	students will be able to: CO1.Apply concept of vectors to understand concepts of Physics and solve problems CO2. Appreciate different forces present in Nature while learning about phenomena related to these different forces. CO3. Quantify energy in different process and relate momentum, velocity and energy CO4. Differentiate different types of motions they would encounter in various courses and understand their basis CO5. Relate various properties of matter with their behaviour and connect them with different physical parameters involved.
23P2CC3	Heat, Thermodynamics and Statistical Physics	The student will be able to CO1. comprehend the concept of calorimetry gaining knowledge on the determination of specific heat capacities of gases CO2. To understand the first and second law of thermodynamics and its application on efficiency of heat engines CO3. To describe the meaning of entropy and measure the change of entropy

		in adiabatic processes CO4. To explore into the physics of heat transfer, conduction and radiation CO5. To conceptualize the basics of statistical mechanics and compare and appreciate the three statistics
23P2CC4	Physics Practicals II	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
21P2SE3	Physics of measuring instruments	students will be able, CO1.To 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 affectingwind speed and gain insight on wind speed CO5. Discuss the mechanical and electrical instruments comprising of temperature and transducers
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 phenomenon 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	Students will be able to

	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	Students will be able to 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	Students will be able to understand physical laws using appropriate

	VII (Electronics)	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 aperature of optical fiber, conversion of galvanometer into voltmeter etc.
23P1GEM1 / 21P3ACM1 / 23P1GEG1	Allied Physics - I	CO1.Students will be able to Explain types of motion and extend their knowledge in the study of various dynamic motions analyze and demonstrate mathematically. Relate theory with practical applications in medical field. CO2.Students will be able to Explain their knowledge of understanding about materials and their behaviours and apply it to various situations in laboratory and real life. Connect droplet theory with Corona transmission. CO3.Students will be able to Comprehend basic concept of thermodynamics concept of entropy and associated theorems able to interpret the process of flow temperature physics in the background of growth of this technology. CO4.Students will be able to Articulate the knowledge about electric current resistance,capacitance in terms of potential electric field and electric correlatetheconnectionbetweenelectricfieldandmagneticfieldandanalyzethemmathematicallyverifycircuitsandapplytheconcepts to construct circuits and study them. CO5.Students will be able to Interpret the real life solutions using AND, OR, NOT basic logic gates and intend their ideas to universal building blocks. Infer operations using Boolean algebra and acquire elementary ideas of IC circuits.Acquire information about various Govt. programs/ institutions in this

		field.
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 CO5.students will be able to Understand the working of shift registers and counters. Students will be able to describe D/A and A/D conversion techniques
23P1GEM2 / 21P3ACM2 / 23P1GEG2	Allied Physics Practicals I	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
23P2GEM3 / 21P4ACM3 / 23P2GEG3	Allied Physics- II	CO1.Students will be able to explain the concepts of interference diffraction using principles of superposition of waves and rephrase the concept of polarization based on wave patterns 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. CO2.Students will be able to outline the basic foundation of different atom

		models and various experiments establishing quantum concepts. Relate the importance of interpreting improving theoretical models based on observation. Appreciate interdisciplinary nature of science and in solar energy related applications. CO3.Students will be able to Summarize the properties of nuclei, nuclear forces structure of atomic nucleus and nuclear models. Solve problems on delay rate half-life and mean-life.Interpret nuclear processes like fission and fusion. Understand the importance of nuclear energy, safety measures carried and get our Govt.agencies like DAE guiding the country in the nuclear field. CO4.Students will be able to To describe the basic concepts of relativity like equivalence principle, inertial frames and Lorentz transformation. Extend their knowledge on concepts of relativity and vice versa. Relate this with current research in this field and get an overview of research projects of National and International importance, like LIGO, ICTS, and opportunities available CO5.To Summarize the working of semiconductor devices like junction diode, Zener diode, transistors and practical devices we daily use like USB chargers and EV charging stations.
23P2GEM4 / 21P4ACM4 / 23P2GEG4	Allied Physics Practical II	Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P6ME1	Microprocessor	Students will be able to

		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	Students will be able to 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 CO4.Understand the radiation protection in medicine CO5.Explore the role of computers in diagnosis, testing and therapy
19P6ME3	Opto Electronics	Students will be able to 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	Students will be able to 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 geothermalenergy, 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.
23P1SE1/ 23P2SE2	Physics In Everyday Life	Students will be able to 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 optical instruments and lasers CO3.Understand the basic concepts of physics in home appliances Explain the characteristics of Sound CO4.Understand about the solar energy and its concepts CO5.Comprehend the attributes of Indian physicist and their contributions

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	Students will be able to 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	Students will be able to 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	Students will be able to 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	Students will be able to 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	Students will be able to 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	Students will be able to 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	Students will be able to CO1.Understsand about Astronomy and cosmology .

		CO2.Explain the Clustered objects in the Universe. CO3.Describe the The Indian Space Research Organisation. CO4.Understant basics in rockets. CO5.Explain the Satellites and Saris
21UGIDPB1	Fundamentals & Programming of Microprocessor 8085	Students will be able to 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	Students will be able to 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, solarandlunar 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	Students will be able to 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 software 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.