FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018
2020 - 2021

NAME OF THE PROGRAMME: B.SC PHYSICS **PROGRAMME CODE: UAPH**

PROGRAMME OUTCOMES:

Students will be able to

PO 1: Acquire knowledge on the concepts of general laws of physics governing the universe

PO 2: Relate the principles behind the fundamental theory of Physics including microscopic and macroscopic levels

PO 3: Develop technologies to meet the requirements of the society

PROGRAMME SPECIFIC OUTCOMES:

Students will

PSO 1: Acquire thorough knowledge of the basic concepts of the frontier areas of Physics comprising Mechanics, Properties of matter, Electromagnetism, Electronics, Thermodynamics, Modern Physics, optics, Medical Physics and opto electronics.

PSO 2: Understand and solve the physics problems in everyday life using the acquired basic knowledge.

PSO 3: develop skills to perform experiments based on the theoretical understanding

PSO 4: Apply the knowledge acquired to analyse and design models in the versatile realm of physics.

PSO 5: Equip with the essential foundations for higher education and research in physics.

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
19P1CC1	MECHNANICS AND PROPERTIES OF MATTER	Students will be able to **CO 1.** Understand in depth the gravitational force, field, potential and energy. **CO 2.** Study the acceleration due to gravity at various positions **CO 3.** Gain knowledge about the properties of matter and compute the same . **CO 4.** Discuss the mechanics of fluid motion and its applications
19P1CC2	THERMAL PHYSICS	**CO 1:** 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 **CO 2:** Students will be able to explain the classical Maxwell's distribution law of velocity and its inference. **CO 3:** Students will be able to describe molecular collisions and its mean free path , understand the process of thermal conductivity, viscosity and diffusion in gases **CO 4**: Students will be able to depict the manner in which the energy changes takes place and outline the different methods to produce low temperature **CO 5:** 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	**CO 1:** Students will be able to determine the properties of materials relevant to the theory learnt in core courses

19C1ACP1/ 19M3ACP1/ 19G3ACP1	ALLIED PHYSICS - I	**CO 1:** Students will be able to Define and discuss about the simple harmonic waves and its oscillations and laws of transverse vibrations of strings. **CO 2:** Students will be able to Classify and describe the properties of matter such as electricity, viscosity and surface tension. **CO 3:** 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 and irreversible process. **CO 4:** 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. **CO 5:** Students will be able to Demonstrate the properties of geometrical optics and explain the refraction and dispersion through a prism.

19C1ACP2 / 19M3ACP2/ 19G3ACP2	Allied Physics Practicals I	**CO 1:** Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P1NME/ 19P2NME	Physics in everyday Life	**CO 1:** Students will be able to understand the concepts of heat, waves, sound, electricity, magnetism and explore their nature.
19B1ACP1	Digital Principles and Applications	On completion of the course, students will be able to **CO 1:** Define the different types of number systems and explain the basic and universal logic circuits **CO 2:** Simplify the logic expressions using Boolean laws and Kmap **CO 3:** describe the principles behind the data processing and arithmetic circuits

		CO 4: explain the working of basic flipflops and design master slave flipflops **CO 5:** Understand the working of shift registers and counters **CO 6:** describe D/A and A/D conversion techniques
19P2CC4	Oscillations and Waves	**CO 1:** Students will be able to understand simple harmonic motion **CO 2:** Students will be able to understand Principle of Superposition and apply to derive mathematical representation of stationary waves, interference waves and beats. Determine the conditions for the same. **CO 3:** Students will be able to understand the Doppler effect in acoustics and apply the same and solve problems **CO 4:** Students will be able to distinguish the different range of acoustic waves.

		CO 5: Students will be able to study the ultrasonic waves generation and application of the same
19P2CC5	Applied Mechanics	**CO 1:** Students will be able to demonstrate an understanding of central forces and explain Kepler's laws of Planetary motion **CO 2:** Students will be able to compute the path of projectile launched with horizontal and vertical velocity components in the Earth's gravity **CO 3:** Students will be able to evaluate the interrelationship between energy and work **CO 4:** Students will be able to describe the motion of the centre of mass of an object, state the conservation principles involving momentum and explore its applications, analyse collisions between two objects **CO 5:** 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 Practical II	**CO 1:** Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19M4ACP3/ 19C2ACP3/ 19G4ACP3	ALLIED PHYSICS- II	**CO 1:** Students will be able to categorize and clarify the different optical phenomena of interference, diffraction, polarization. **CO 2:** 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. **CO 3:** Students will be able to elucidate the models of nuclear structure and to learn the principle behind atom bomb, nuclear reactors. **CO 4:** 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.

		CO 5: Students will be able to classify the number system and demonstrate the skill in conversion of Number systems, Boolean algebra and its associated laws.
19M4ACP4/ 19C2ACP4/ 19G4ACP4	Allied Physics Practical II	**CO 1:** Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P3CC7	Electromagnetism	**CO 1:** students will be able to Calculate electric field for a distribution of charges by applying method of calculus. **CO 2:** students will be able to Evaluate electric field for problems involving symmetry by using Gauss's law **CO 3:** students will be able to Estimate the magnetic field of a current using Biot Savarat law and Ampere's law **CO 4:** 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 **CO 5:** students will be able to Comprehend Maxwell's equations and generation of electromagnetic waves
19P3CC8	Solid State Physics	**CO 1:** Students will be able to Define the different parameters of crystal system and explain the basic concepts. **CO 2:** Students will be able to Describe the various magnetic behaviours of solids **CO 3:** Students will be able to Explain the working of dielectric materials. **CO 4:** Students will be able to Understand the basic concepts in super conductivity. **CO 5:** Students will be able to Describe working and various applications of superconductors.
19P3SB1	Biomechanics	**CO 1:** Students will be able to acquire a skill to apply the laws of kinematics to biological systems.

		CO 2: Students will be able to Identify the anatomical pulleys and lever systems **CO 3:** Students will be able to Access the types of levers in our body **CO 4**: Students will be able to Explain how the biological machines inside our body **CO 5:** Students will be able to Discuss different kinds of activities, equilibrium and stability of the body using law of physics
19P4CC9	Major Practicals-III	**CO 1:** Students will be able to Understand and Analyse electric, magnetic and electromagnetic principles and laws through experiments
19P4CC10	Analog Electronics	**CO 1:** Students will be able to Acquire basic knowledge of PN junction diode, different rectifiers and filters **CO 2**: Explain different transistor configuration and various biasing circuits

		CO 3: Obtain the knowledge of transistor amplifier and analyse using DC and AC load line **CO 4:** Elucidate the concept of feedback in amplifiers and design various types of oscillators **CO 5:** Describe the parameters of OP-AMP and to design OP-AMP circuits
19P4CC11	Material Science	**CO 1:** Students will be able to Explain the classical Maxwell's distribution law of velocity and its inference **CO 2:** Determine electrical conductivity, thermal conductivity of conducting materials **CO 3:** Gain the knowledge of properties of various materials **CO 4:** Explain theory of various magnetic and superconducting materials **CO 5:** Identify new materials that find diverse applications.
19P4CC12	Major Practicals IV	**CO 1:** Students will be able to Understand and electronics principles and laws through experiments

19P4SB2	Physics Of Stars	Students will be able to **CO 1**: On completion of the course, the student will be able to explain the life cycle of stars **CO 2:** Students will be able to discuss the spectral classification of stars **CO 3**: Students will be able to outline the nuclear reactions taking place in stars **CO 4:** Students will be able to distinguish between various mysterious objects of the universe like supernova, white dwarfs, pulsars, red giants, black holes etc **CO 5**: Students will be able to explain classification of galaxies, red and blue shift of spectral lines
P5CC9	Electronics And Communication	CO 1: This course aims at the fundamentals of digital electronics, flip-flops, registers, counters and D/A & A/D converters. It also exposes the students to modulation, satellite communication and fibre optics communication

P5CC10	Optics	CO 1: This course aims at giving a detailed study of interference, diffraction, polarization, Holography, Laser and Maser
P5SB3	Physics Of Measuring Instruments-1	CO 1: This course enable the students to learn the principles behind thermodynamical measurements and mechanical and electrical measurements.
P5SB4	Physics of Medical Instruments-I	CO 1: To enable the student learn the physics principles behind the medical instruments used for diagnosis especially pressure, sound, light and electricity
P6CC11	Thermodynamics and Statistical Mechanics	CO 1: The aim of this course is to deal with thermodynamics, entropy and thermodynamic potentials. This course also deals with statistical thermodynamics and applications of statistics to gases.

P6CC12	Modern Physics	CO 1: This course deals with the wave properties of particles and fundamentals of Quantum Mechanics. Nuclear models and special relativity are dealt with in detail.
P6CC13	Major Practicals-III	CO 1: This laboratory course explores the basic principles of electronics through experiments
P6CC14	Major Practicals-IV	CO 1: This laboratory course explores the basic principles of non-electronics through experiments
P6ME1/2	Microprocessor/ Medical Physics	CO 1 : Microprocessor: This course explores the assembly language program codes and simple microprocessor programs CO 2: Medical Physics: This course deals with the applications of electricity and magnetism in medicine, light in medicine, nuclear medicine, radiation protection in medicine and computers in medicine

P6ME2/3	Opto Electronics/ Energy Physics	CO 1: Optoelectronics: Optoelectronics is a recent field. This course aims at giving an idea about fibre optics systems and communication. This course also deals with the LEDs and stimulated emission in intrinsic semiconductors, photo detectors and modulation methods. CO 2: Energy Physics: This course covers the different sources of renewable energy sector and its applications.
P6SB5	Physics of Measuring Instruments - II	CO 1: This course enable the students to learn the physics principles behind astronomical measurements, electron microscopes and X-ray diffraction measurements
P6SB6	Physics of Medical Instruments-II	CO 2: This course enable the students to learn the working principles of medical instruments used in radiography and nuclear medicine.