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

CRITERION 1 - CURRICULAR ASPECTS

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes(PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

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	Nature of the Course (Local/ National /Regional/ Global)	Course Description	Course Outcomes
19P1CC1	MECHNANICS AND PROPERTIES OF MATTER	National	The objective of this course is to understand the basic properties of matter and mechanics of fluids	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	National	The course provides a conceptually	CO 1: Students will be able to analyse a microscopic approach and seek

			based exposure to the fundamental principles and processes of significant topics of thermal physics like Kinetic theory of gases, Transport phenomena in gases and Liquefaction of gases.	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	National	This course offers opportunity to handle the laboratory equipment and develop skills to determine elastic properties, thermal properties, surface tension	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	National	The course provides a conceptually based exposure to the fundamental principal and processes of significant topics of physics like Waves and Oscillations, Properties of matter, Electricity and Magnetism and Geometrical Optics.	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	National	This course enables the students to develop basic lab skills.	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	National	Aim of this course is to enable the student to understand the	CO 1: Students will be able to understand the concepts of heat, waves, sound, electricity,

			physics concepts in day today life.	magnetism and explore their nature.
19B1ACP1	Digital Principles and Applications	National	Aim of this course is to enable the students to understand 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	National	To understand waves, oscillations and its applications in human ear, musical instruments. To know about Doppler effect, Ultrasonic and various applications of them	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	National	The course enables the students to understand the fundamental and advanced concepts of Central force, Projectile motion, interrelationship	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

			between energy and work, linear momentum and angular momentum	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	National	This course offers opportunity to handle the laboratory equipment and develop skills to determine elastic properties, thermal properties, surface tension	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	National	The course provides a conceptually based exposure to the fundamental principal and	CO 1: Students will be able to categorize and clarify the different optical phenomena of interference, diffraction, polarization.

			processes of significant topics of physics like geometrical Optics, Atomic Physics, Nuclear Physics and Electronics.	CO 1: 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 2: Students will be able to elucidate the models of nuclear structure and to learn the principle behind atom bomb, nuclear reactors. CO 3: 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 4: 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	National	This course enables the student to develop broad array of basic skills and tools of experimental physics	CO 1: Students will be able to determine the properties of materials relevant to the theory learnt in core courses
19P3CC7	Electromagnetism	Global	This course imparts a sound knowledge in 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	National	This course aims at giving an idea about crystal structure and various properties of solids like magnetic and dielectric behaviours. This course also deals with the super conductors	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.

			and their applications	
19P3SB1	Biomechanics	National	This course aims to introduce the Biomechanical concepts and to give an idea about the anatomic pulleys and lever systems	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	National	This laboratory course explores the basic principles of electricity and magnetism, basic elements of electric circuits through experiments	CO 1: Students will be able to Understand and Analyse electric, magnetic and electromagnetic principles and laws through experiments
19P4CC10	Analog Electronics	National	The aim of this course is to provide a	CO 1: Students will be able to Acquire basic knowledge of PN junction diode, different rectifiers and filters

			basic knowledge in semiconductor, transistor, amplifier, oscillator and digital electronics	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	National	The course provides concept based exposure to conducting,	CO 1: Students will be able to Explain the classical Maxwell's distribution law of velocity and its inference

			dielectric, magnetic, superconducting and other emerging new materials	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	National	This laboratory course explores the basic principles of electronics	CO 1: Students will be able to Understand and electronics principles and laws through experiments

			through experiments	
19P4SB2	Physics Of Stars	National	This course briefly explains the life cycle of a star. It throws light on various nuclear reactions taking place in a star. It explains about the mysterious objects of the universe. It creates	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

			passion for Astronomy among the students	CO 5: Students will be able to explain classification of galaxies, red and blue shift of spectral lines
P5CC9	Electronics And Communication	National	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	National	CO 1: This course aims at giving a detailed study of interference, diffraction, polarization, Holography, Laser and Maser	
P5SB3	Physics Of Measuring Instruments-1	National	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	National	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	National	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	Global	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	National	CO 1: This laboratory course explores the basic principles of electronics through experiments
P6CC14	Major Practicals-IV	National	CO 1: This laboratory course explores the basic principles of non-electronics through experiments

P6ME1/2	Microprocessor/ Medical Physics	Global	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	National	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	National	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	National	CO 2: This course enable the students to learn the working principles of medical instruments used in radiography and nuclear medicine.