Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) (2019-2020 Onwards)

DEPARTMENT OF PHYSICS

B. Sc-Physics

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To provide the students with academic excellence, leadership qualities and professional ethics to address the needs of the scientific community
PEO2	To motivate the students to pursue higher education in well-renowned institutions.
PEO3	To acquire placement in educational institutions, engineering and industrial firms.
PEO4	To provide the students with creative and analytical skills for the sustainable development and nation-building initiatives

PROGRAMME OUTCOMES (POs)

Pos	Programme Outcome On completion of B. Sc Physics Programme, the students will be able to,
PO1	To intensify the student's academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens.
PO2	To explain the fundamental laws involved in physics.
PO3	To understand the theory and consequence of the various physical occurrences.
PO4	To carry out experiments to interpret the laws and concepts of physics.
PO5	To relate the theories learned and the skills procured to solve enduring problems

COURSE OUTCOMES (COs)

Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS Course Code: 19UPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the basic ideas of elasticity and to assesses the bending movement of a beam in the form of cantilever and girders	**K1**
CO2	Explain the simple harmonic motion and its composition	**K2**
CO3	Develop the equation of wave motion and analyze its modes of vibration	**K3**
CO4	Apply the properties of surface tension in fluids and analyze the capillarity nature in liquids.	**K3**
CO5	Illustrate the concepts of intensity of sound and to Calculate the Reverberation time and identify the factors affecting the acoustics of buildings	**K2**

Course Title: PHYSICS PRACTICAL – I Course Code: 19UPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Find the appropriate data accurately and keep a systematic record of laboratory activities.	**K1**
CO2	Demonstrate the usage of equipment for various measurements.	**K2**
CO3	Develop practical knowledge by applying the experimental methods to correlate with the Physics theory.	**K3**
CO4	Utilize standard methods to measure the Young's modulus of the given material.	**K3**
CO5	Build hands-on experience using various techniques.	**K3**

COURSE TITLE: MECHANICS AND RELATIVITY COURSE CODE: 19UPH2CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basic concepts of force, mass, acceleration, impulse and momentum.	**K1**
CO2	Demonstrate and compute simple harmonic motion.	**K2**
CO3	Illustrate the motion of rigid bodies and outline laws of gravitation.	**K2**
CO4	Make use of the ideas of frames of reference.	**K3**
CO5	Utilize the fundamental theories of special relativity.	**K3**

CRITERION I **POs and COs**

COURSE TITLE: PHYSICS PRACTICAL – II **COURSE CODE: 19UPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the usage of basic laws and theories to study properties of sound and fluids.	**K1**
CO2	Interpret findings using the correct physical scientific framework.	**K2**
CO3	Develop skills in handling equipment.	**K3**
CO4	Utilize standard methods to measure the refractive index of the given material.	**K3**
CO5	Build intellectual communication skills and discuss the basic principles of scientific concepts in a group.	**K3**

Signature Not Verified
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Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 10:43:50

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) (2020-2021 Onwards)

DEPARTMENT OF PHYSICS

B. Sc-Physics

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To provide the students with academic excellence, leadership qualities and professional ethics to address the needs of the scientific community
PEO2	To motivate the students to pursue higher education in well renowned institutions.
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PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of B. Sc Physics Programme, the students will be able to,
PO1	To intensify the students' academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens.
PO2	To explain the fundamentals laws involved in physics.
PO3	To understand the theory and consequence of the various physical occurrence.
PO4	To carryout experiments to interpret the laws and concepts of physics.
PO5	To relate the theories learnt and the skills procured to solve enduring problems.

COURSE OUTCOMES (COs)

Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS Course Code: 19UPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the basic ideas of elasticity and to assesses the bending movement of a beam in the form of cantilever and girders	**K1**
CO2	Explain the simple harmonic motion and its composition	**K2**
CO3	Develop the equation of wave motion and analyse its modes of vibration	**K3**
CO4	Apply the properties of surface tension in fluids and analyse the capillarity nature in liquids.	**K3**
CO5	Illustrate the concepts of intensity of sound and to Calculate the Reverberation time and identify the factors affecting the acoustics of buildings.	**K2**

Course Title: PHYSICS PRACTICAL - I Course Code: 19UPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Find the appropriate data accurately and keep systematic record of laboratory activities	**K1**
CO2	Demonstrate the usage of equipment's for various measurements.	**K2**
CO3	Develop practical knowledge by applying the experimental methods to correlate with the Physics theory.	**K3**
CO4	Utilize standard methods to measure the young's modulus of the given material.	**K3**
CO5	Build hands on experience using various techniques.	**K3**

COURSE TITLE: MECHANICS AND RELATIVITY COURSE CODE:19UPH2CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basic concepts of force, mass, acceleration, impulse and momentum.	**K1**
CO2	Demonstrate and compute simple harmonic motion.	**K2**
CO3	Illustrate the motion of rigid bodies and outline laws of gravitation.	**K2**
CO4	Make use of the ideas of frames of reference.	**K3**
CO5	Utilize the fundamental theories of special relativity	**K3**

COURSE TITLE: PHYSICS PRACTICAL – II COURSE CODE:19UPH2CC2P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the usage of basic laws and theories to study properties of sound and fluids.	**K1**
CO2	Interpret findings using the correct physical scientific framework.	**K2**
CO3	Develop skills in handling equipment.	**K3**
CO4	Utilize standard methods to measure the refractive index of the given material.	**K3**
CO5	Build intellectual communication skills and discuss the basic principles of scientific concepts in a group.	**K3**

COURSE TITLE: THERMAL PHYSICS AND STATISTICAL MECHANICS COURSE CODE: 19UPH3CC3		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define Laws of thermodynamics	**K1**
CO2	Interpret Maxwell thermodynamic relations	**K2**
CO3	Explain transmission of heat	**K2**
CO4	Summarize Statistical thermodynamics	**K2**
CO5	Apply the Specific heat of solids and gases	**K3**

COURSE TITLE: PHYSICS PRACTICAL-III COURSE CODE:19UPH3CC3P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the physics principle involved in the various instruments; also relate the principles to new application.	**K1**
CO2	Understand the theoretical concepts of transmission of heat with the experimental knowledge	**K2**
CO3	Use the theoretical ideas of spectrometer.	**K3**
CO4	Expand the creative skills that are essential for industrial applications	**K6**

CRITERION I **POs and COs**

COURSE TITLE: TROUBLESHOOTING OF ELECTRICAL APPLIANCES **COURSE CODE: 19UPH3NME1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Identify the electronic components in any given appliances.	**K2**
CO2	Understand the terminology of Soldering & De soldering technique.	**K2**
CO3	Understand the working function of electrical appliances	**K2**
CO4	Identification of problem arise in Home appliances Carry out fault rectification.	**K2**

COURSE TITLE: ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM **COURSE CODE: 19UPH4CC4**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Demonstrate a mastery of Coulomb's law for the electric field, and apply it to systems of point charges. Use the principle of superposition and law of Gauss to calculate the electrical forces and the intensity of the electric field in various electricity problems	**K2**
CO2	Understand the implications of Kirchhoff's rules . To calculate the magnetic forces that act on moving charges and the magnetic fields due to currents	**K2**
CO3	Identify the laws of magneto statics and the various properties of magnetic materials	**K3**
CO4	Build up strong problem solving skills by effectively formulate a circuit problem using Inductance, Resistance and capacitance.	**K3**
CO5	Develop the understanding of Dynamo and DC Motor using magnetization principle.	**K3**

COURSE TITLE: PHYSICS PRACTICAL- IV **COURSE CODE: 19UPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the principles of Wheatstone bridge and apply with P.O box.	**K1**
CO2	Understand the experimental knowledge of Potentiometer and its applications.	**K2**
CO3	Apply the theoretical ideas of Ballistic Galvanometer.	**K3**
CO4	Understand the applications of Spectrometer.	**K2**
CO5	Develop the understanding of resonance circuits.	**K3**

CRITERION I **POs and COs**

COURSE TITLE: AUDIO AND VIDEO SYSTEM **COURSE CODE: 19UPH4NME2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Describing the basic idea in audio and video	**K1**
CO2	Identifying the audio devices.	**K2**
CO3	Identifying the types of signals, correction in signals and know the transmission techniques.	**K2**
CO4	Understanding the video section fundamentals.	**K2**
CO5	Understanding the Gain and noise cancelling.	**K2**

COURSE TITLE: BIOMEDICAL INSTRUMENTATION **COURSE CODE: 19UPH4SBE1A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Tell the fundamental principle and working of the biomedical instruments system	**K1**
CO2	Explain about types of electrodes	**K2**
CO3	Illustrate about Instrumentation recording and monitoring.	**K2**
CO4	utilize knowledge in electrical safety in medical environment	**K3**
CO5	outline the basic principles in imaging techniques	**K2**

COURSE TITLE: PHOTOGRAPHY AND VIDEOGRAPHY **COURSE CODE: 19UPH4SBE1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Knowledge and skills in the use of basic tools, techniques, technologies and able to acquaint with basic camera operations.	**K1**
CO2	Understanding of special features and utility purposes of various types of lenses and able to choose an appropriate lens for the job concerned	**K1**
CO3	Demonstrate uses of cameras and lighting/digital technologies.	**K2**
CO4	Utilize the concept of correct exposure and identify correct and incorrect exposure in photographs.	**K3**
CO5	Apply understanding of aesthetics related to shooting and editing.	**K3**

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Programme Outcomes (POs) and Course Outcomes (COs) (2021-2022 Onwards)

DEPARTMENT OF PHYSICS

B. Sc-Physics

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Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS Course Code: 19UPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the basic ideas of elasticity and to assesses the bending movement of a beam in the form of cantilever and girders	**K1**
CO2	Explain the simple harmonic motion and its composition	**K2**
CO3	Develop the equation of wave motion and analyse its modes of vibration	**K3**
CO4	Apply the properties of surface tension in fluids and analyse the capillarity nature in liquids.	**K3**
CO5	Illustrate the concepts of intensity of sound and to Calculate the Reverberation time and identify the factors affecting the acoustics of buildings.	**K2**

Course Title: PHYSICS PRACTICAL - I Course Code: 19UPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Find the appropriate data accurately and keep systematic record of laboratory activities	**K1**
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CO4	Utilize standard methods to measure the young's modulus of the given material.	**K3**
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CO3	Illustrate the motion of rigid bodies and outline laws of gravitation.	**K2**
CO4	Make use of the ideas of frames of reference.	**K3**
CO5	Utilize the fundamental theories of special relativity	**K3**

CRITERION I **POs and COs**

COURSE TITLE: PHYSICS PRACTICAL – II **COURSE CODE:19UPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the usage of basic laws and theories to study properties of sound and fluids.	**K1**
CO2	Interpret findings using the correct physical scientific framework.	**K2**
CO3	Develop skills in handling equipment.	**K3**
CO4	Utilize standard methods to measure the refractive index of the given material.	**K3**
CO5	Build intellectual communication skills and discuss the basic principles of scientific concepts in a group.	**K3**

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CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
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CO2	Interpret Maxwell thermodynamic relations	**K2**
CO3	Explain transmission of heat	**K2**
CO4	Summarize Statistical thermodynamics	**K2**
CO5	Apply the Specific heat of solids and gases	**K3**

COURSE TITLE: PHYSICS PRACTICAL-III **COURSE CODE:19UPH3CC3P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the physics principle involved in the various instruments; also relate the principles to new application.	**K1**
CO2	Understand the theoretical concepts of transmission of heat with the experimental knowledge	**K2**
CO3	Use the theoretical ideas of spectrometer.	**K3**
CO4	Expand the creative skills that are essential for industrial applications	**K6**

CRITERION I **POs and COs**

COURSE TITLE: TROUBLESHOOTING OF ELECTRICAL APPLIANCES **COURSE CODE: 19UPH3NME1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
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CO2	Understand the terminology of Soldering & De soldering technique.	**K2**
CO3	Understand the working function of electrical appliances	**K2**
CO4	Identification of problem arise in Home appliances Carry out fault rectification.	**K2**

COURSE TITLE: ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM **COURSE CODE: 19UPH4CC4**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
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CO2	Understand the implications of Kirchhoff's rules . To calculate the magnetic forces that act on moving charges and the magnetic fields due to currents	**K2**
CO3	Identify the laws of magneto statics and the various properties of magnetic materials	**K3**
CO4	Build up strong problem solving skills by effectively formulate a circuit problem using Inductance, Resistance and capacitance.	**K3**
CO5	Develop the understanding of Dynamo and DC Motor using magnetization principle.	**K3**

COURSE TITLE: PHYSICS PRACTICAL- IV **COURSE CODE: 19UPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the principles of Wheatstone bridge and apply with P.O box.	**K1**
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CO4	Understand the applications of Spectrometer.	**K2**
CO5	Develop the understanding of resonance circuits.	**K3**

CRITERION I **POs and COs**

COURSE TITLE: AUDIO AND VIDEO SYSTEM **COURSE CODE: 19UPH4NME2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Describing the basic idea in audio and video	**K1**
CO2	Identifying the audio devices.	**K2**
CO3	Identifying the types of signals, correction in signals and know the transmission techniques.	**K2**
CO4	Understanding the video section fundamentals.	**K2**
CO5	Understanding the Gain and noise cancelling.	**K2**

COURSE TITLE: BIOMEDICAL INSTRUMENTATION **COURSE CODE: 19UPH4SBE1A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Tell the fundamental principle and working of the biomedical instruments system	**K1**
CO2	Explain about types of electrodes	**K2**
CO3	Illustrate about Instrumentation recording and monitoring.	**K2**
CO4	utilize knowledge in electrical safety in medical environment	**K3**
CO5	outline the basic principles in imaging techniques	**K2**

COURSE TITLE: PHOTOGRAPHY AND VIDEOGRAPHY **COURSE CODE: 19UPH4SBE1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Knowledge and skills in the use of basic tools, techniques, technologies and able to acquaint with basic camera operations.	**K1**
CO2	Understanding of special features and utility purposes of various types of lenses and able to choose an appropriate lens for the job concerned	**K1**
CO3	Demonstrate uses of cameras and lighting/digital technologies.	**K2**
CO4	Utilize the concept of correct exposure and identify correct and incorrect exposure in photographs.	**K3**
CO5	Apply understanding of aesthetics related to shooting and editing.	**K3**

CRITERION I **POs and COs**

COURSE TITLE: OPTICS **COURSE CODE: 19UPH5CC5**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the behaviour of light.	**K2**
CO2	Explain the various types of aberration.	**K2**
CO3	Demonstrate basic optical phenomena like interference, diffraction and polarization.	**K2**
CO4	Predict optical elements and set-up basic experiments.	**K3**
CO5	Apply the concepts of light.	**K3**

COURSE TITLE: ATOMIC AND NUCLEAR PHYSICS **COURSE CODE: 19UPH5CC6**		
CO1	Outline the knowledge of basic properties of Cathode rays and Tue rays. Calculate the values of e/m and Critical potential.	**K2**
CO2	Extend the concept of vector atom model to draw the electronic configuration of atoms and the Periodic classification.	**K2**
CO3	Apply the Quantum mechanical principles in Spectral transitions (Lande's g factor)	**K3**
CO4	Utilize the interaction of particle and matter to Solve the problem in nuclear physics.	**K3**
CO5	Analyze nuclear radio activities and Apply the concepts of radio isotopes in general field.	**K4**

COURSE TITLE: ANALOG ELECTRONICS **COURSE CODE: 19UPH5CC7**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain semiconductors, Rectifiers, and different types of diodes.	**K2**
CO2	Outline the idea of field effect transistors and special semiconductor diodes	**K2**
CO3	Identify the operation of transistor and its characteristics	**K3**
CO4	Construct the various mathematical operations of operational amplifier	**K3**
CO5	Analyze the amplitude and frequency response characteristics of common amplification circuits.	**K4**

COURSE TITLE: PHYSICS PRACTICAL – V COURSE CODE: 19UPH5CC5P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Verify the Optical and Spectral Properties of prism and Grating	**K2**
CO2	Apply the fundamental laws to determine the properties of the given material	**K2**
CO3	Construct and Apply the principles of semiconductor Devices as vibrators, Amplifiers and Oscillators	**K3**

COURSE TITLE: MATERIALS SCIENCE COURSE CODE: 19UPH5MBE1A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the different types of crystal structure and bonding in solids, and the physical ramifications of these differences. Give a type of bond, be able to explain its physical origin as well as strength	**K1**
CO2	Explain out the different kinds of technological properties of materials	**K2**
CO3	Classify the new materials in the material engineering and to understand their role in materials behavior	**K2**
CO4	Identify the materials defects and given a simple set on explaining the non – destructive testing in materials	**K3**
CO5	Explain the nuclear materials and uses of the materials in the space	**K4**

Course Title: LASER PHYSICS Course Code: 19UPH5MBE1B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the interaction of radiation with matter	**K1**
CO2	Explain the basic principle of laser	**K2**
CO3	Characterize the different types of laser	**K2**
CO4	Summarize Properties of laser	**K2**
CO5	Apply the laser principle in various field	**K3**

CRITERION I **POs and COs**

Course Title: PHYSICS CONCEPTS THROUGH SIMULATION **Course Code:19UPH5SBE2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Demonstrate the frame by frame animation using flash	**K2**
CO2	Explain the basic ideas of working with images	**K2**
CO3	Identify the basic Photoshop tool used in preparing the physics oriented objects	**K3**
CO4	Construct the animation of physics oriented objects using flash	**K3**
CO5	Construct the basic circuit diagram of physics using photoshop	**K3**

Course Title: CELL PHONE SERVICING **Course Code: 19UPH5SBE2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the fundamentals of cell phone	**K2**
CO2	Outline the chip level information of cell phone	**K2**
CO3	Identify the causes of problems in cell phone	**K3**
CO4	Identify the Problems in the cell phone and diagnose them	**K3**
CO5	Examine the basic concepts and tools used in servicing of Mobile phones	**K3**

Course Title: WEB DESIGNING **Course Code: 19UPH5SBE3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Discuss the basic ideas of create the web pag	**K2**
CO2	Demonstrate the structure and working in a website programme	**K2**
CO3	Develop the Animating web pages	**K3**
CO4	Illustrate formatting and linking website pages	**K3**
CO5	Utilization of website	**K3**

Course Title: ELECTRICAL WIRING **Course Code: 19UPH5SBE3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basic ideas of Electricity and Electric power generation	**K1**
CO2	Describe the wiring system and its types	**K2**
CO3	Illustrate Electrical Measuring instruments	**K2**
CO4	Explain different types of Electrical appliances	**K2**
CO5	Apply Safety Precaution in everyday life	**K3**

CRITERION I **POs and COs**

Course Title: DIGITAL ELECTRONICS AND MICROPROCESSOR FUNDAMENTALS **Course Code: 19UPH6CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify different number system	**K2**
CO2	Analyze different methods used for simplification of Boolean expressions.	**K3**
CO3	Develop Combinational logic circuits.	**K3**
CO4	Develop synchronous and asynchronous sequential circuits.	**K3**
CO5	Utilize the knowledge of programming concepts of 8085 for various applications.	**K4**

Course Title: CLASSICAL AND QUANTUM PHYSICS **Course Code: 19UPH6CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the concepts of Conservation Laws for a single particle, D'Alembert's Principle, Lagrange's equation and it's applications.	**K1**
CO2	Relate the different concepts of Hamilton's equation of motion.	**K2**
CO3	Classify the types of classical concepts and explain the De Broglie's matter waves.	**K2**
CO4	Identify the basic postulates of quantum mechanics.	**K3**
CO5	Develop the knowledge about solvable quantum states.	**K3**

Course Title: PHYSICS PRACTICAL VI **Course Code: 19UPH6CC6P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the Microprocessor concept mathematical to obtain quantitative results for arithmetic progression	**K1**
CO2	Demonstrate the Basic and the Universal gates	**K2**
CO3	Construct and analyses the concepts of multiplexers, shift registers and counters.	**K3**
CO4	Apply the concepts of digital electronics and verify the results	**K3**

CRITERION I **POs and COs**

Course Title: COMMUNICATION PHYSICS **Course Code:19UPH6MBE2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic concepts of modulation and demodulation	**K1**
CO2	Critique the ideas of radar system and its applications	**K3**
CO3	Predict the parameters such as total internal reflection, acceptance angle and numerical aperture in order to formulate the optical sensor	**K3**
CO4	Utilization of GSM, Cell, FAX, Modem and Wi–Fi in mobile communication system	**K3**
CO5	Design and analysis of satellite communication systems	**K4**

Course Title: COMPUTATIONAL PHYSICS **Course Code: 19UPH6MBE2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	To understand the basic programming techniques in MATLAB.	**K1**
CO2	To address analytically intractable problem errors	**K2**
CO3	Create a user-interface graphics objects in MAT LAB	**K2**
CO4	To understand various numerical techniques	**K2**
CO5	To show how physics can be applied in a much broader context than discussed in traditional curriculum	**K3**

Course Title: MEDICAL PHYSICS **Course Code: 19UPH6MBE3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	List out the importance of physics in medicine.	**K1**
CO2	Explain the concept of mechanics of a human body.	**K2**
CO3	Compare the principles of ECG EMG and EEG.	**K2**
CO4	Explain the production, types and application of lasers in medicine.	**K2**
CO5	Summarize the ultrasound imaging method and its application in medical field.	**K2**
CO6	Make use of medical imaging techniques in day today life.	**K3**

CRITERION I **POs and COs**

Course Title: ASTROPHYSICS AND COSMOLOGY **Course Code: 19UPH6MBE3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the major constituents of the universe and planets	**K1**
CO2	Explain the stellar astronomy	**K2**
CO3	Analyse the milky way galaxy	**K2**
CO4	Analyse the clusters in galaxy	**K2**
CO5	Derive the Big bang theory	**K3**

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Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 10:43:51

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) (2022-2023 Onwards)

DEPARTMENT OF PHYSICS

B. Sc-Physics

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	**LEARNING ENVIRONMENT** To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields
PEO2	**ACADEMIC EXCELLENCE** To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	**EMPLOYABILITY** To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains
PEO4	**PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY** To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation
PEO5	**GREEN SUSTAINABILITY** To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of B. Sc Physics Programme, the students will be able to,
PO1	Domain Knowledge: Analyse, design and develop solutions by applying firm fundamental concepts of basic sciences and expertise in discipline.
PO2	Ability to think rationally, analyse and solve problems adequately with practical knowledge to assess the environmental issues
PO3	Develop prudent decision-making skills and mobility to work in teams to solve multifaceted problems
PO4	Self-study acclimatize them to observe effective interactive practices for practical learning enabling them to be a successful science graduate.
PO5	Assure consistent improvement in the performance and arouse interest to pursue higher studies in premium institutions.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Specific Outcomes Students of B. Sc Physics will be able to	POs Addressed
PSO1	Intensify the student academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens	**PO1, PO2, PO4**
PSO2	Explain the fundamentals laws involved in physics.	**PO1, PO5**
PSO3	Understand the theory and consequence of the various physical occurrence	**PO1, PO2, PO3, PO5**
PSO4	Carry out experiments to interpret the laws and concepts of Physics.	**PO1, PO2, PO5**
PSO5	Relate the theories learnt and the skills procured to solve enduring problems.	**PO1, PO2, PO3, PO5**

COURSE OUTCOMES (COs)

Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS Course Code: 22UPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic ideas of Physical properties of different states of matter and sound	**K1, K2**
CO2	Analyze the characteristics of elasticity, Simple Harmonic motion, viscosity, surface tension and the requisites of good acoustics	**K3**
CO3	Evaluate the ideas of elasticity, Harmonic oscillations and excess pressure of surface tension in fluids and analyze the capillarity nature in liquids	**K4**
CO4	Apply the concepts of moduli of elasticity, surface tension, viscosity, waves and acoustics	**K3, K5**
CO5	Develop the idea of bending of beams, composition of Harmonic oscillation, empirical relations between surface tension and temperature, stokes formula, frequency of vibration of strings and factors affecting the architectural acoustics	**K4**

Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS P) Course Code: 22UPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Select the equipment and get the necessary accessories	**K1**
CO2	Demonstrate the use of equipment for various measures	**K2**
CO3	Construct the experiment by arranging and assembling the equipment	**K3**
CO4	Solve the physical quantity using the relevant formula after gathering accurate data through observations. Keep a detailed record of all laboratory activities.	**K3**
CO5	Apply experimental approaches to correlate with physics theory to develop practical understanding	**K3**

COURSE TITLE: MECHANICS AND RELATIVITY COURSE CODE: 22UPH2CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the effects of a change in the position of any physical object or event	**K1**
CO2	Demonstrate laws and principles in physics.	**K2**
CO3	Apply the mathematical tools in understanding physics.	**K3**
CO4	Make use of simple concepts of mechanics in daily life.	**K3**
CO5	Analyse the principles behind the mechanics of objects travelling at relativistic speeds.	**K4**

CRITERION I **POs and COs**

COURSE TITLE: MECHANICS AND DIGITAL ELECTRONICS (P) **COURSE CODE: 22UPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Select the equipment and get the necessary accessories.	**K1**
CO2	Explain the experiment's fundamental concepts	**K2**
CO3	Make use of fundamental principles and experiment circumstances	**K3**
CO4	Experiment with the laboratory norms.	**K3**
CO5	Examine the applications.	**K4**

COURSE TITLE: INTRODUCTION TO DIGITAL ELECTRONICS **COURSE CODE: 22UPH2CC3**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define number system and convert one number system to other number systems and to select the most suitable one for specific application.	**K1**
CO2	Interpret logic circuits and thereby develop equivalent circuits.	**K2**
CO3	Develop combinational logic circuits.	**K3**
CO4	Examine different arithmetic and logic functions with appropriate selection of inputs and check the possible outputs for arithmetic and logic circuits.	**K4**
CO5	Simplify Boolean expressions and design logic circuits.	**K4**

COURSE TITLE: THERMAL PHYSICS AND STATISTICAL MECHANICS **COURSE CODE: 19UPH3CC3**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define Laws of thermodynamics	**K1**
CO2	Interpret Maxwell thermodynamic relations	**K2**
CO3	Explain transmission of heat	**K2**
CO4	Summarize Statistical thermodynamics	**K2**
CO5	Apply the Specific heat of solids and gases	**K3**

COURSE TITLE: PHYSICS PRACTICAL-III COURSE CODE: 19UPH3CC3P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the physics principle involved in the various instruments; also relate the principles to new application.	**K1**
CO2	Understand the theoretical concepts of transmission of heat with the experimental knowledge	**K2**
CO3	Use the theoretical ideas of spectrometer	**K3**
CO4	Expand the creative skills that are essential for industrial applications	**K6**
CO5	Analyze experimental approaches to correlate with physics theory to develop practical understanding.	**K4**

COURSE TITLE: CHEMISTRY – I COURSE CODE: 19UPH3AC4		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the types of crystal structure and terms involved in kinetics and chemical equilibrium.	**K1**
CO2	Compare the theories of bonding with metal atoms.	**K2**
CO3	Discuss the properties of benzene, naphthalene and halogen compounds	**K2**
CO4	Apply the concepts of electron displacement effect in organic compounds	**K3**

COURSE TITLE: CHEMISTRY PRACTICAL – I COURSE CODE: 19UPH3AC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basic principles of volumetric analysis	**K1**
CO2	Demonstrate the experimental methods of volumetric analysis	**K2**
CO3	Compare the hardness present drinking water	**K2**

COURSE TITLE: TROUBLESHOOTING OF ELECTRICAL APPLIANCES COURSE CODE: 19UPH3NME1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Identify the electronic components in any given appliances.	**K2**
CO2	Understand the terminology of Soldering & Desoldering technique..	**K2**
CO3	Understand the working function of electrical appliances	**K2**
CO4	Identification of problem arise in Home appliances Carry out fault rectification.	**K2**

CRITERION I **POs and COs**

COURSE TITLE: ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM **COURSE CODE: 19UPH4CC4**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Demonstrate a mastery of Coulomb's law for the electric field, and apply it to systems of point charges. Use the principle of superposition and law of Gauss to calculate the electrical forces and the intensity of the electric field in various electricity problems	**K2**
CO2	Understand the implications of Kirchhoff's rules . To calculate the magnetic forces that act on moving charges and the magnetic fields due to currents	**K2**
CO3	Identify the laws of magneto statics and the various properties of magnetic materials.	**K2**
CO4	Build up strong problem solving skills by effectively formulate a circuit problem using Inductance, Resistance and capacitance.	**K3**
CO5	Develop the understanding of Dynamo and DC Motor using magnetization principle.	**K3**

COURSE TITLE: PHYSICS PRACTICAL- IV **COURSE CODE: 19UPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the principles of Wheatstone bridge and apply with P.O box.	**K1**
CO2	Understand the experimental knowledge of Potentiometer and its applications	**K2**
CO3	Apply the theoretical ideas of Ballistic Galvanometer	**K3**
CO4	Understand the applications of Spectrometer.	**K2**
CO5	Develop the understanding of resonance circuits	**K3**

COURSE TITLE: CHEMISTRY –II **COURSE CODE: 19UPH4AC5**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the properties and applications of carbohydrates, amino acids and proteins	**K1**
CO2	Understand the basics of nuclear chemistry	**K2**
CO3	Apply the basic concepts of photochemistry	**K3**
CO4	Analyze the concepts of electrochemistry and material science	**K4**

CRITERION I **POs and COs**

COURSE TITLE: AUDIO AND VIDEO SYSTEM **COURSE CODE: 19UPH4NME2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Describing the basic idea in audio and video.	**K1**
CO2	Identifying the audio devices	**K2**
CO3	Identifying the types of signals, correction in signals and know the transmission techniques.	**K2**
CO4	Understanding the video section fundamentals.	**K2**
CO5	Understanding the Gain and noise cancelling.	**K2**

COURSE TITLE: BIOMEDICAL INSTRUMENTATION **COURSE CODE: 19UPH4SBE1A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Tell the fundamental principle and working of the biomedical instruments system	**K1**
CO2	Explain about types of electrodes	**K2**
CO3	Illustrate about Instrumentation recording and monitoring.	**K2**
CO4	Utilize knowledge in electrical safety in medical environment	**K3**
CO5	Outline the basic principles in imaging techniques	**K2**

COURSE TITLE: PHOTOGRAPHY AND VIDEOGRAPHY **COURSE CODE: 19UPH4SBE1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Knowledge and skills in the use of basic tools, techniques, technologies and able to acquaint with basic camera operations	**K1**
CO2	Understanding of special features and utility purposes of various types of lenses and able to choose an appropriate lens for the job concerned	**K1**
CO3	Demonstrate uses of cameras and lighting/digital technologies.	**K2**
CO4	Utilize the concept of correct exposure and identify correct and incorrect exposure in photographs.	**K3**
CO5	Apply understanding of aesthetics related to shooting and editing.	**K3**

COURSE TITLE: OPTICS COURSE CODE: 19UPH5CC5		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the behaviour of light.	**K2**
CO2	Explain the various types of aberration.	**K2**
CO3	Demonstrate basic optical phenomena like interference, diffraction and polarization.	**K2**
CO4	Predict optical elements and set-up basic experiments.	**K3**
CO5	Apply the concepts of light.	**K3**

COURSE TITLE: ATOMIC AND NUCLEAR PHYSICS COURSE CODE: 19UPH5CC6		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the knowledge of basic properties of Cathode rays and Tue rays. Calculate the values of e/m and Critical potential.	**K1,K2**
CO2	Extend the concept of vector atom model to draw the electronic configuration of atoms and the Periodic classification	**K2,K3**
CO3	Apply the Quantum mechanical principles in Spectral transitions (Lande's g factor)	**K3,K4**
CO4	Utilize the interaction of particle and matter to Solve the problem in nuclear physics.	**K4,K5**
CO5	Analyze nuclear radio activities and Apply the concepts of radio isotopes in general field.	**K4,K5**

COURSE TITLE: ANALOG ELECTRONICS COURSE CODE: 19UPH5CC7		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain semiconductors, Rectifiers, and different types of diodes	**K2**
CO2	Outline the idea of field effect transistors and special semiconductor diodes	**K2**
CO3	Identify the operation of transistor and its characteristics	**K3**
CO4	Construct the various mathematical operations of operational amplifier	**K3**
CO5	Analyze the amplitude and frequency response characteristics of common amplification circuits.	**K4**

COURSE TITLE: PHYSICS PRACTICAL-V COURSE CODE: 19UPH5CC5P		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Verify the Optical and Spectral Properties of prism and Grating	**K1**
CO2	Apply the fundamental laws to determine the properties of the given material	**K1**
CO3	Construct and Apply the principles of semiconductor Devices as vibrators, Amplifiers and Oscillators	**K2,K3**

COURSE TITLE: MATERIALS SCIENCE COURSE CODE: 19UPH5MBE1A		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the different types of crystal structure and bonding in solids, and the physical ramifications of these differences. Give a type of bond, be able to explain its physical origin as well as strength	**K1**
CO2	Explain out the different kinds of technological properties of materials.	**K2**
CO3	Classify the new materials in the material engineering and to understand their role in materials behavior	**K2**
CO4	Identify the materials defects and given a simple set on explaining the non – destructive testing in materials	**K3**
CO5	Explain the nuclear materials and uses of the materials in the space	**K4**

COURSE TITLE: LASER PHYSICS COURSE CODE: 19UPH5MBE1B		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the interaction of radiation with matter	**K1**
CO2	Explain the basic principle of laser	**K2**
CO3	Characterize the different types of laser	**K2**
CO4	Summarize Properties of laser	**K2**
CO5	Apply the laser principle in various field	**K3**

COURSE TITLE: PHYSICS CONCEPTS THROUGH ANIMATION -PRACTICAL COURSE CODE: 20UPH5SBE2AP		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Develop the skills to simulate physics concepts	**K3**
CO2	Construct the animation of physics oriented objects using flash	**K3**
CO3	Construct the basic circuit diagram of physics using photoshop	**K3**

CRITERION I **POs and COs**

COURSE TITLE: HOUSEHOLD APPLIANCES SERVICING - PRACTICAL **COURSE CODE: 20UPH5SBE2BP**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the working function of each household appliances	**K2**
CO2	Analyse the capacity power consumption for each appliance	**K3**
CO3	Identify the problems arises in household appliances	**K3**

COURSE TITLE: WEB DESIGNING - PRACTICAL **COURSE CODE: 20UPH5SBE3AP**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Discuss the basic ideas for create the web page	**K2**
CO2	Demonstrate the structure and working in a website programme	**K2**
CO3	Utilize the website	**K3**
CO4	Develop and design the web pages	**K3**
CO5	Illustrate formatting and linking website pages	**K3**

COURSE TITLE: ELECTRICAL WIRING - PRACTICAL **COURSE CODE: 20UPH5SBE3BP**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the fundamental concepts involving electrical wiring	**K1**
CO2	Recognize basic electrical equipments.	**K1**
CO3	Explain domestic wiring procedures practically	**K2**
CO4	Construct different wiring system	**K3**
CO5	Build hands on experience to fabricate simple electrical appliance at home	**K3**

COURSE TITLE: DIGITAL ELECTRONICS AND MICROPROCESSOR FUNDAMENTALS **COURSE CODE: 19UPH6CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify different number system	**K1**
CO2	Analyze different methods used for simplification of Boolean expressions.	**K2**
CO3	Develop Combinational logic circuits	**K2**
CO4	Develop synchronous and asynchronous sequential circuits	**K3**
CO5	Utilize the knowledge of programming concepts of 8085 for various applications	**K3**

CRITERION I **POs and COs**

COURSE TITLE: CLASSICAL AND QUANTUM PHYSICS **COURSE CODE: 19UPH6CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the concepts of Conservation Laws for a single particle, D'Alembert's Principle, Lagrange's equation and it's applications.	**K1**
CO2	Relate the different concepts of Hamilton's equation of motion.	**K2**
CO3	Classify the types of classical concepts and explain the De Broglie's matter waves.	**K2**
CO4	Identify the basic postulates of quantum mechanics.	**K3**
CO5	Develop the knowledge about solvable quantum states.	**K3**

COURSE TITLE: PHYSICS PRACTICAL – VI **COURSE CODE: 19UPH6CC6P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the Microprocessor concept mathematical to obtain quantitative results for arithmetic progression	**K1,K2**
CO2	Demonstrate the Basic and the Universal gates	**K3**
CO3	Construct and analyses the concepts of multiplexers, shift registers and counters.	**K4**
CO4	Apply the concepts of digital electronics and verify the results	**K5**

COURSE TITLE: COMMUNICATION PHYSICS **COURSE CODE: 19UPH6MBE2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic concepts of modulation and demodulation	**K1**
CO2	Critique the ideas of radar system and its applications	**K3**
CO3	Predict the parameters such as total internal reflection, acceptance angle and numerical aperture in order to formulate the optical sensor	**K3**
CO4	Utilization of GSM, Cell, FAX, Modem and Wi–Fi in mobile communication system	**K3**
CO5	Design and analysis of satellite communication systems	**K4**

COURSE TITLE: COMPUTATIONAL PHYSICS **COURSE CODE: 19UPH6MBE2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	To understand the basic programming techniques in MATLAB.	**K1**
CO2	To address analytically intractable problem errors	**K2**
CO3	Create a user-interface graphics objects in MAT LAB	**K2**
CO4	To understand various numerical techniques	**K2**
CO5	To show how physics can be applied in a much broader context than discussed in traditional curriculum	**K3**

CRITERION I **POs and COs**

COURSE TITLE: MEDICAL PHYSICS **COURSE CODE: 19UPH6MBE3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	List out the importance of physics in medicine.	**K1**
CO2	Explain the concept of mechanics of a human body.	**K2**
CO3	Compare the principles of ECG EMG and EEG	**K2**
CO4	Explain the production, types and application of lasers in medicine.	**K2**
CO5	Summarize the ultrasound imaging method and its application in medical field.	**K3**

COURSE TITLE: ASTROPHYSICS AND COSMOLOGY **COURSE CODE: 19UPH6MBE3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the major constituents of the universe and planets	**K1**
CO2	Explain the steelar astronomy	**K2**
CO3	Analyse the milky way galaxy	**K2**
CO4	Analyse the clusters in galaxy	**K2**
CO5	Derive the Big bang theory	**K3**

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Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 10:43:51

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) (2023-2024 Onwards)

DEPARTMENT OF PHYSICS

B. Sc-Physics

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields
PEO2	To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation
PEO5	To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of B. Sc Physics Programme, the students will be able to,
PO1	**Domain Knowledge:** Analyse, design and develop solutions by applying firm fundamental concepts of basic sciences and expertise in discipline.
PO2	**Problem solving:** Ability to think rationally, analyse and solve problems adequately with practical knowledge to assess the environmental issues.
PO3	**Creative thinking and Team Work:** Develop prudent decision-making skills and mobility to work in teams to solve multifaceted problems
PO4	**Employability:** Self-study acclimatize them to observe effective interactive practices for practical learning enabling them to be a successful science graduate.
PO5	**Life Long Learning:** Assure consistent improvement in the performance and arouse interest to pursue higher studies in premium institutions.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Specific Outcomes Students of B. Sc Nutrition and Dietetics will be able to	POs Addressed
PSO1	Intensify the student academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens.	PO1, PO2, PO4
PSO2	Explain the fundamentals laws involved in physics.	PO1, PO5
PSO3	Understand the theory and consequence of the various physical occurrence	PO1, PO2, PO3, PO5
PSO4	Carryout experiments to interpret the laws and concepts of Physics.	PO1, PO2, PO5
PSO5	Relate the theories learnt and the skills procured to solve enduring problems.	PO1, PO2, PO3, PO5

COURSE OUTCOMES (COs)

Course Title: PROPERTIES OF MATTER, WAVES AND ACOUSTICS Course Code: 23UPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic ideas of Physical properties of different states of matter and sound	**K1, K2**
CO2	Analyze the characteristics of elasticity, viscosity, surface tension and the requisites of good acoustics	**K3**
CO3	Evaluate the ideas of elasticity and excess pressure of surface tension in fluids and analyze the capillarity nature in liquids	**K4**
CO4	Apply the concepts of moduli of elasticity, surface tension, viscosity, waves and acoustics	**K3, K5**
CO5	Develop the idea of bending of beams, empirical relations between surface tension and temperature, stokes formula, frequency of vibration of strings and factors affecting the architectural acoustics	**K4**

Course Title: PROPERTIES OF MATTER AND ACOUSTICS (P) Course Code: 23UPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Select the equipment and get the necessary accessories	**K1**
CO2	Demonstrate the use of equipment for various measures	**K2**
CO3	Construct the experiment by arranging and assembling the equipment.	**K3**
CO4	Solve the physical quantity using the relevant formula after gathering accurate data through observations. Keep a detailed record of all laboratory activities.	**K3**
CO5	Apply experimental approaches to correlate with physics theory to develop practical understanding.	**K3**

COURSE TITLE: MECHANICS AND RELATIVITY COURSE CODE: 22UPH2CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the effects of a change in the position of any physical object or event.	**K1**
CO2	Demonstrate laws and principles in physics.	**K2**
CO3	Apply the mathematical tools in understanding physics.	**K3**
CO4	Make use of simple concepts of mechanics in daily life.	**K3**
CO5	Analyse the principles behind the mechanics of objects traveling at relativistic speeds.	**K4**

COURSE TITLE: MECHANICS AND DIGITAL ELECTRONICS (P) COURSE CODE: 23UPH2CC2P		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Select the equipment and get the necessary accessories.	**K1**
CO2	Explain the experiment's fundamental concepts	**K2**
CO3	Make use of fundamental principles and experiment circumstances.	**K3**
CO4	Experiment with the laboratory norms.	**K3**
CO5	Examine the applications.	**K4**

COURSE TITLE: INTRODUCTION TO DIGITAL ELECTRONICS COURSE CODE: 23UPH2CC3		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic knowledge of Number system, Logic gates, Combinational circuit, Boolean expression and Flip flops	**K1**
CO2	Interpret the concept of number conversion, logic circuits and thereby develop equivalent circuits.	**K2**
CO3	Develop the concept of number conversion and combinational logic circuits.	**K3**
CO4	Examine different number system, arithmetic and logic functions with appropriate selection of inputs and check the possible outputs for arithmetic and logic circuits.	**K4**
CO5	Simplify the arithmetic operation of the number system. Apply the Boolean expressions in the K Map and design the flip flop.	**K5**

COURSE TITLE: THERMAL PHYSICS AND STATISTICAL MECHANICS COURSE CODE: 22UPH3CC4		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Learn the basic concepts of thermodynamics, radiation, and statistical mechanics, as well as their significance	**K1**
CO2	Understand the experimental procedures for producing low temperatures, measuring high temperatures, and determining the specific heats of solids, liquids, and gases	**K2**
CO3	Apply the theories related to low temperature, radiation and specific heat of solid, liquid and gas	**K3**
CO4	Examine the energy distribution in the black body spectrum, the system of bosons and fermions, and the temperature change of solids and gases' specific heats	**K4**
CO5	Solve the specific heat capacity of solid, liquid and gas theoretically.	**K5**

CRITERION I **POs and COs**

COURSE TITLE: THERMAL PHYSICS (P) **COURSE CODE: 22UPH3CC3P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the physics principle involved in the various instruments; also relate the principles to new application	**K1**
CO2	Understand the theoretical concepts of transmission of heat with the experimental knowledge	**K2**
CO3	Use the theoretical ideas of spectrometer	**K3**
CO4	Expand the creative skills that are essential for industrial applications	**K3**
CO5	Analyze experimental approaches to correlate with physics theory to develop practical understanding.	**K4**

COURSE TITLE: PHYSICS IN EVERYDAY LIFE **COURSE CODE: 22UPH3GEC1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basics of electricity	**K1**
CO2	Outline the risk factors and precautionary steps to avoid electric shock	**K2**
CO3	Understand the basics of electrical appliances	**K4**
CO4	Knowledge on handling home appliances.	**K3**
CO5	Explain the functioning of several home appliances.	**K5**

COURSE TITLE: ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM **COURSE CODE: 22UPH4CC5**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic laws of electrostatics, magnetostatics and Electromagnetism	**K1, K2**
CO2	Apply the Principles behind the electric and magnetic instruments.	**K3**
CO3	Analyze the behavior of circuits containing Inductance, Capacitance and Resistance connected in different combinations.	**K4**
CO4	Organize experiments to determine the absolute values of Q factor and power factor of LCR circuits.	**K5**
CO5	Interpret the circuit into a mathematical problem using circuit laws and theorems.	**K5**

CRITERION I **POs and COs**

COURSE TITLE: ELECTRICITY AND MAGNETISM (P) **COURSE CODE: 22UPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the physics principle involved in the various instruments and also relate the principles to new application.	**K1, K2**
CO2	Apply experimental approaches to correlate with physics theory to develop practical understanding.	**K2, K3**
CO3	Relate the concept of electricity to a real time application	**K4**
CO4	Demonstrate knowledge and understanding of experiments in Electricity and Magnetism	**K5**
CO5	Design and develop circuits which enhance the existing scientific knowledge.	**K5**

COURSE TITLE: PHOTOGRAPHY AND VIDEOGRAPHY **COURSE CODE: 22UPH4GEC2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Knowledge and skills in the use of basic tools, techniques, technologies and able to acquaint with basic camera operations.	**K1**
CO2	Understanding of special features and utility purposes of various types of lenses and able to choose an appropriate lens for the job concerned	**K2**
CO3	Demonstrate uses of cameras and lighting/digital technologies.	**K2**
CO4	Utilize the concept of correct exposure and identify correct andincorrect exposure in photographs.	**K3**
CO5	Apply understanding of aesthetics related to shooting and editing.	**K3**

COURSE TITLE: WEB DESIGNING (P) **COURSE CODE: 22UPH4SEC1P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Identify the basic tags used in an HTML document.	**K1**
CO2	Demonstrate the animating webpages.	**K2**
CO3	Develop HTML code for the webpage	**K3**
CO4	Create formatting and link webpages.	**K4**
CO5	Make their own web page.	**K5**

CRITERION I **POs and COs**

COURSE TITLE: OPTICS **COURSE CODE: 19UPH5CC5**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the behaviour of light.	**K2**
CO2	Explain the various types of aberration.	**K2**
CO3	Demonstrate basic optical phenomena like interference, diffraction and polarization.	**K2**
CO4	Predict optical elements and set-up basic experiments	**K3**
CO5	Apply the concepts of light.	**K3**

COURSE TITLE: ATOMIC AND NUCLEAR PHYSICS **COURSE CODE: 19UPH5CC6**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the knowledge of basic properties of Cathode rays and Tue rays. Calculate the values of e/m and Critical potential.	**K2**
CO2	Extend the concept of vector atom model to draw the electronic configuration of atoms and the Periodic classification	**K2**
CO3	Apply the Quantum mechanical principles in Spectral transitions (Lande's g factor)	**K3**
CO4	Utilize the interaction of particle and matter to Solve the problem in nuclear physics	**K3**
CO5	Analyze nuclear radio activities and Apply the concepts of radio isotopes in general field.	**K4**

COURSE TITLE: ANALOG ELECTRONICS **COURSE CODE: 19UPH5CC7**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain semiconductors, Rectifiers, and different types of diodes	**K2**
CO2	Outline the idea of field effect transistors and special semiconductor diodes	**K2**
CO3	Identify the operation of transistor and its characteristics	**K3**
CO4	Construct the various mathematical operations of operational amplifier	**K3**
CO5	Analyze the amplitude and frequency response characteristics of common amplification circuits.	**K4**

COURSE TITLE: PHYSICS PRACTICAL – V COURSE CODE: 19UPH5CC5P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Verify the Optical and Spectral Properties of prism and Grating	**K1**
CO2	Apply the fundamental laws to determine the properties of the given material	**K1**
CO3	Construct and Apply the principles of semiconductor Devices as vibrators, Amplifiers and Oscillators	**K2, K3**

Course Title: MATERIALS SCIENCE Course Code: 19UPH5MBE1A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the different types of crystal structure and bonding in solids, and the physical ramifications of these differences. Give a type of bond, be able to explain its physical origin as well as strength	**K1**
CO2	Explain out the different kinds of technological properties of materials	**K2**
CO3	Classify the new materials in the material engineering and to understand their role in materials behavior	**K2**
CO4	Identify the materials defects and given a simple set on explaining the non – destructive testing in materials	**K3**
CO5	Explain the nuclear materials and uses of the materials in the space	**K4**

Course Title: LASER PHYSICS Course Code: 19UPH5MBE1B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the interaction of radiation with matter	**K1**
CO2	Explain the basic principle of laser	**K2**
CO3	Characterize the different types of laser	**K2**
CO4	Summarize Properties of laser	**K2**
CO5	Apply the laser principle in various field	**K3**

Course Title: PHYSICS CONCEPTS THROUGH SIMULATION Course Code: 19UPH5SBE2A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Demonstrate the frame by frame animation using flash	**K2**
CO2	Explain the basic ideas of working with images	**K2**
CO3	Identify the basic Photoshop tool used in preparing the physics oriented objects	**K3**
CO4	Construct the animation of physics oriented objects using flash	**K3**
CO5	Construct the basic circuit diagram of physics using photoshop	**K3**

CRITERION I **POs and COs**

Course Title: CELL PHONE SERVICING **Course Code: 19UPH5SBE2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the fundamentals of cell phone	**K2**
CO2	Outline the chip level information of cell phone	**K2**
CO3	Identify the causes of problems in cell phone	**K3**
CO4	Identify the Problems in the cell phone and diagnose them	**K3**
CO5	Examine the basic concepts and tools used in servicing of Mobile phones	**K3**

Course Title: WEB DESIGNING **Course Code: 19UPH5SBE3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Discuss the basic ideas of create the web page	**K2**
CO2	Demonstrate the structure and working in a website programme	**K2**
CO3	Develop the Animating web pages	**K3**
CO4	Illustrate formatting and linking website pages	**K3**
CO5	Utilization of website	**K3**

Course Title: ELECTRICAL WIRING **Course Code: 19UPH5SBE3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall the basic ideas of Electricity and Electric power generation	**K1**
CO2	Describe the wiring system and its types	**K2**
CO3	Illustrate Electrical Measuring instruments	**K2**
CO4	Explain different types of Electrical appliances	**K2**
CO5	Apply Safety Precaution in everyday life	**K3**

Course Title: DIGITAL ELECTRONICS AND MICROPROCESSOR FUNDAMENTALS **Course Code: 19UPH6CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify different number system	**K2**
CO2	Analyze different methods used for simplification of Boolean expressions.	**K3**
CO3	Develop Combinational logic circuits.	**K3**
CO4	Develop synchronous and asynchronous sequential circuits.	**K3**
CO5	Utilize the knowledge of programming concepts of 8085 for various applications.	**K4**

CRITERION I **POs and COs**

Course Title: CLASSICAL AND QUANTUM PHYSICS **Course Code: 19UPH6CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the concepts of Conservation Laws for a single particle, D'Alembert's Principle, Lagrange's equation and it's applications.	**K1**
CO2	Relate the different concepts of Hamilton's equation of motion.	**K2**
CO3	Classify the types of classical concepts and explain the De Broglie's matter waves.	**K2**
CO4	Identify the basic postulates of quantum mechanics.	**K3**
CO5	Develop the knowledge about solvable quantum states.	**K3**

Course Title: PHYSICS PRACTICAL - VI **Course Code: 19UPH6CC6P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the Microprocessor concept mathematical to obtain quantitative results for arithmetic progression	**K1**
CO2	Demonstrate the Basic and the Universal gates	**K2**
CO3	Construct and analyses the concepts of multiplexers, shift registers and counters.	**K3**
CO4	Apply the concepts of digital electronics and verify the results	**K3**

Course Title: COMMUNICATION PHYSICS **Course Code: 19UPH6MBE2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic concepts of modulation and demodulation	**K1**
CO2	Critique the ideas of radar system and its applications	**K3**
CO3	Predict the parameters such as total internal reflection, acceptance angle and numerical aperture in order to formulate the optical sensor	**K3**
CO4	Utilization of GSM, Cell, FAX, Modem and Wi–Fi in mobile communication system	**K3**
CO5	Design and analysis of satellite communication systems	**K4**

Course Title: COMPUTATIONAL PHYSICS Course Code: 19UPH6MBE2B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	To understand the basic programming techniques in MATLAB.	**K1**
CO2	To address analytically intractable problem errors	**K2**
CO3	Create a user-interface graphics objects in MAT LAB	**K2**
CO4	To understand various numerical techniques	**K2**
CO5	To show how physics can be applied in a much broader context than discussed in traditional curriculum	**K3**

Course Title: MEDICAL PHYSICS Course Code: 19UPH6MBE3A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	List out the importance of physics in medicine.	**K1**
CO2	Explain the concept of mechanics of a human body.	**K2**
CO3	Compare the principles of ECG EMG and EEG.	**K2**
CO4	Explain the production, types and application of lasers in medicine.	**K2**
CO5	Summarize the ultrasound imaging method and its application in medical field.	**K2**
CO6	Make use of medical imaging techniques in day today life	**K3**

Course Title: ASTROPHYSICS AND COSMOLOGY Course Code: 19UPH6MBE3B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Define the major constituents of the universe and planets	**K1**
CO2	Explain the stellar astronomy	**K2**
CO3	Analyse the milky way galaxy	**K2**
CO4	Analyse the clusters in galaxy	**K2**
CO5	Derive the Big bang theory	**K3**

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) – (2019-2020 Onwards)

DEPARTMENT OF PHYSICS

M. Sc – PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To empower the students with an aptitude for creative learning and multiple learning, independent thinking and synergetic action that will equip them to meet the global challenges.
PEO2	To ignite the research thrust among the students.
PEO3	To acquire placement in various educational institutions, software companies and research laboratories.
PEO4	To enhance the students with analytical skills for the sustainable development of nation.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PO1	To intensify the student's academic capability, unique qualities and transferable which will give them an opportunity to evolve as responsible citizens.
PO2	To interpret the laws hypothesis and basic concept in Physics.
PO3	To apply the concept based problem-solving approach in various field of Physics.
PO4	To excel in research and materials characterization.
PO5	To apply the theories and skills acquired to solve the existing problem.

COURSE OUTCOMES (COs)

Course Title: MATHEMATICAL PHYSICS Course Code: 19PPH1CC1		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Solve the problems from the matrices and tensors calculus and its applications	**K2**
CO2	Demonstrate accurate and efficient use of group theory	**K2**
CO3	Acquire a sound knowledge in linear vector space which will be necessary to pursue other areas in physics	**K3**
CO4	Apply the complex analysis techniques to solve problem in physics, engineering and other mathematical contexts	**K3**
CO5	Understand the nature and applications of the Sturm– Liouville problem and analyze properties of special functions by their integral representations and symmetries.	**K3**

Course Title: CLASSICAL DYNAMICS AND RELATIVITY Course Code: 19PPH1CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Demonstrate and understand the basic classical mechanics concepts related to discrete and continuous mechanical systems	**K2**
CO2	Solve the mathematical Kepler problem	**K3**
CO3	Explain the applications of Hamiltonian's equation	**K5**
CO4	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**
CO5	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**

Course Title: ELECTRONICS Course Code: 19PPH1CC3		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the concepts of semiconductor devices	**K2**
CO2	Identify the logic and develop counters	**K3**
CO3	Examine the concepts of operational amplifier to solve differential and simultaneous equations	**K4**
CO4	Evaluate the problem related to semiconductor devices, digital and oscillator circuits	**K5**
CO5	Recommend projects in electronics relevant to industrial and R &D needs	**K5**

Course Title: QUANTUM MECHANICS-I Course Code: 19PPH1CC4		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time dependent Schrödinger equation	**K2**
CO2	Solve Commutation relations	**K3**
CO3	Examine the abstract formalism	**K4**
CO4	Compare the abstract and matrix representation	**K5**
CO5	Conceive the angular momentum	**K6**

Course Title: PHYSICS PRACTICAL – I (GENERAL AND ELECTRONICS) Course Code: 19PPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the basics of experimental physics.	**K2**
CO2	Understand the fundamental physics behind many scientific discoveries through hands on experience.	**K2**
CO3	Explore the concepts involved in the thermodynamic processes	**K3**
CO4	Verify experimentally the basic laws of physics	**K4**
CO5	Develop the skill in handling instruments.	**K6**

Course Title: ELECTROMAGNETIC THEORY Course Code: 19PPH2CC5		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Summarize the fundamentals of Electrostatics and Magnetostatics	**K2**
CO2	Identify the concept of Electrodynamic fields	**K3**
CO3	Apply the concept of electromagnetic theory in electromagnetic waves	**K3**
CO4	Categorize the transverse behaviour of electromagnetic waves in different geometrics of wave guides	**K4**
CO5	Evaluate electromagnetic wave equations for different propagating media and to determine the flow of energy and wave velocity	**K5**

Course Title: QUANTUM MECHANICS – II Course Code: 19PPH2CC6		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time-independent perturbation theory	**K2**
CO2	Solve One dimensional Schrödinger equation	**K3**
CO3	Apply the scattering theory	**K3**
CO4	Compare the Time-dependent perturbation theory	**K5**
CO5	Conceive the relativistic quantum mechanics	**K6**

Course Title: PHYSICS PRACTICAL – II (MICROPROCESSOR AND C++ PROGRAMMING) Course Code: 19PPH2CC2P		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic operations of 8085 and 8051.	**K2**
CO2	Impart the knowledge about the code conversions of 8085.	**K2**
CO3	Formulate skills in C++ Programming.	**K5**
CO4	Develop skills in decimal counting of 8085	**K6**

Course Title: MICROPROCESSOR AND MICROCONTROLLER Course Code: 19PPH2EC1A		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the architecture of 8085,8051 and impart the knowledge about the instruction set	**K2**
CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of microprocessor/Microcontroller	**K2**
CO3	Distinguish the instruction set of microprocessor and microcontroller	**K4**
CO4	Create program with microprocessor interfaces	**K5**
CO5	Develop skill in simple program writing for 8051 & 8085 applications	**K6**

Course Title: NON- DESTRUCTIVE EVALUATION TECHNIQUES Course Code: 19PPH2EC1B		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic working principles of various NDT methods and importance of NDT	**K2**
CO2	Demonstrate the limitations of NDT techniques and codes.	**K2**
CO3	Compare Non-destructive testing and Mechanical testing.	**K4**
CO4	Outline Real time Radiography Techniques	**K4**
CO5	Test the instrumentation techniques with the aid of basic Principles.	**K5**

Course Title: NUMERICAL METHODS AND C++ PROGRAMMING Course Code: 19PPH2EC2A		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the numerical concepts to find solutions and Eigen values of polynomial equations.	**K3**
CO2	Solve numerical problems of interpolation and determine the intermediate values of given data	**K3**
CO3	Compare the various methods of integration and differentiation value with numerical concepts	**K4**
CO4	Choose the boundary value problems for differential equation	**K5**
CO5	Compile the numerical concepts in C++ language.	**K6**

CRITERION I **POs and COs**

Course Title: BIOMECHANICS AND BIO PHYSICS **Course Code: 19PPH2EC2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the basic principles of physics to understand the biological systems	**K3**
CO2	Outline the concepts of Biophysics and Neuro physics	**K2**
CO3	Evaluate the specimens using Electron Microscopy and NMR Spectroscopy	**K5**
CO4	Explain the concepts of energy pathways	**K5**

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) – (2020-2021 Onwards)

DEPARTMENT OF PHYSICS

M. Sc – PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To empower the students with an aptitude for creative learning and multiple learning, independent thinking and synergetic action that will equip them to meet the global challenges.
PEO2	To ignite the research thrust among the students.
PEO3	To acquire placement in various educational institutions, software companies and research laboratories.
PEO4	To enhance the students with analytical skills for the sustainable development of nation.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PO1	To intensify the student's academic capability, unique qualities and transferable which will give them an opportunity to evolve as responsible citizens.
PO2	To interpret the laws hypothesis and basic concept in Physics.
PO3	To apply the concept based problem-solving approach in various field of Physics.
PO4	To excel in research and materials characterization.
PO5	To apply the theories and skills acquired to solve the existing problem.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PSO1	Develop specialization in a particular area of Physics for research development.
PSO2	Educate the students over analytical, experimental and computational techniques that can be applied in physics, in other scientific and technological domains.
PSO3	Inculcate logical reasoning among the students and help them to develop quantitative skills to solve a problem.
PSO4	Understand the nature in terms of the fundamental principles, hypotheses and laws of Physics.
PSO5	Acquire amount of knowledge regarding the overall progress in scientific and technological domains.

COURSE OUTCOMES (COs)

Course Title: MATHEMATICAL PHYSICS
Course Code: 19PPH1CC1

CO Number	CO Statement On the successful completion of the course, students will be able to,	Knowledge Level
CO1	Solve the problems from the matrices and tensors calculus and its applications	**K2**
CO2	Demonstrate accurate and efficient use of group theory	**K2**
CO3	Acquire a sound knowledge in linear vector space which will be necessary to pursue other areas in physics	**K3**
CO4	Apply the complex analysis techniques to solve problem in physics, engineering and other mathematical contexts	**K3**
CO5	Understand the nature and applications of the Sturm– Liouville problem and analyze properties of special functions by their integral representations and symmetries.	**K3**

Course Title: CLASSICAL DYNAMICS AND RELATIVITY
Course Code: 19PPH1CC2

CO Number	CO Statement On the successful completion of the course, students will be able to,	Knowledge Level
CO1	Demonstrate and understand the basic classical mechanics concepts related to discrete and continuous mechanical systems	**K2**
CO2	Solve the mathematical Kepler problem	**K3**
CO3	Explain the applications of Hamiltonian's equation	**K5**
CO4	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**
CO5	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**

Course Title: ELECTRONICS Course Code: 19PPH1CC3		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the concepts of semiconductor devices	**K2**
CO2	Identify the logic and develop counters	**K3**
CO3	Examine the concepts of operational amplifier to solve differential and simultaneous equations	**K4**
CO4	Evaluate the problem related to semiconductor devices, digital and oscillator circuits	**K5**
CO5	Recommend projects in electronics relevant to industrial and R &D needs	**K5**

Course Title: QUANTUM MECHANICS-I Course Code: 19PPH1CC4		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time dependent Schrödinger equation	**K2**
CO2	Solve Commutation relations	**K3**
CO3	Examine the abstract formalism	**K4**
CO4	Compare the abstract and matrix representation	**K5**
CO5	Conceive the angular momentum	**K6**

Course Title: PHYSICS PRACTICAL – I (GENERAL AND ELECTRONICS) Course Code: 19PPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the basics of experimental physics.	**K2**
CO2	Understand the fundamental physics behind many scientific discoveries through hands on experience.	**K2**
CO3	Explore the concepts involved in the thermodynamic processes	**K3**
CO4	Verify experimentally the basic laws of physics	**K4**
CO5	Develop the skill in handling instruments.	**K6**

Course Title: ELECTROMAGNETIC THEORY Course Code: 19PPH2CC5		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Summarize the fundamentals of Electrostatics and Magnetostatics	**K2**
CO2	Identify the concept of Electrodynamic fields	**K3**
CO3	Apply the concept of electromagnetic theory in electromagnetic waves	**K3**
CO4	Categorize the transverse behaviour of electromagnetic waves in different geometrics of wave guides	**K4**
CO5	Evaluate electromagnetic wave equations for different propagating media and to determine the flow of energy and wave velocity	**K5**

Course Title: QUANTUM MECHANICS – II **Course Code: 19PPH2CC6**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time-independent perturbation theory	**K2**
CO2	Solve One dimensional Schrödinger equation	**K3**
CO3	Apply the scattering theory	**K3**
CO4	Compare the Time-dependent perturbation theory	**K5**
CO5	Conceive the relativistic quantum mechanics	**K6**

Course Title: PHYSICS PRACTICAL – II (MICROPROCESSOR AND C++ PROGRAMMING) **Course Code: 19PPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic operations of 8085 and 8051.	**K2**
CO2	Impart the knowledge about the code conversions of 8085.	**K2**
CO3	Formulate skills in C++ Programming.	**K5**
CO4	Develop skills in decimal counting of 8085	**K6**

Course Title: MICROPROCESSOR AND MICROCONTROLLER **Course Code: 19PPH2EC1A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the architecture of 8085,8051 and impart the knowledge about the instruction set	**K2**
CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of microprocessor/Microcontroller	**K2**
CO3	Distinguish the instruction set of microprocessor and microcontroller	**K4**
CO4	Create program with microprocessor interfaces	**K5**
CO5	Develop skill in simple program writing for 8051 & 8085 applications	**K6**

Course Title: NON- DESTRUCTIVE EVALUATION TECHNIQUES **Course Code: 19PPH2EC1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic working principles of various NDT methods and importance of NDT	**K2**
CO2	Demonstrate the limitations of NDT techniques and codes.	**K2**
CO3	Compare Non-destructive testing and Mechanical testing.	**K4**
CO4	Outline Real time Radiography Techniques	**K4**
CO5	Test the instrumentation techniques with the aid of basic Principles.	**K5**

CRITERION I **POs and COs**

Course Title: NUMERICAL METHODS AND C++ PROGRAMMING **Course Code: 19PPH2EC2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the numerical concepts to find solutions and Eigen values of polynomial equations.	**K3**
CO2	Solve numerical problems of interpolation and determine the intermediate values of given data	**K3**
CO3	Compare the various methods of integration and differentiation value with numerical concepts	**K4**
CO4	Choose the boundary value problems for differential equation	**K5**
CO5	Compile the numerical concepts in C++ language.	**K6**

Course Title: BIOMECHANICS AND BIO PHYSICS **Course Code: 19PPH2EC2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the basic principles of physics to understand the biological systems	**K3**
CO2	Outline the concepts of Biophysics and Neuro physics	**K2**
CO3	Evaluate the specimens using Electron Microscopy and NMR Spectroscopy	**K5**
CO4	Explain the concepts of energy pathways	**K5**

Course Title: STATISTICAL MECHANICS **Course Code: 19PPH3CC7**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the concept of thermodynamics	**K2**
CO2	Evaluate the mean free path	**K4**
CO3	Explain the classical statistics	**K3**
CO4	Discuss the quantum statistics	**K2**
CO5	Distinguish phase transitions	**K5**

CRITERION I **POs and COs**

Course Title: SOLID STATE PHYSICS **Course Code: 19PPH3CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the fundamental principles and crystal structure of the solid materials	**K2**
CO2	Identify the mode of vibrations in the atoms	**K3**
CO3	List the materials behavior of the electric properties and category the ferroelectric crystals	**K4**
CO4	Explain the magnetic properties and its applications	**K5**
CO5	Develop the basic concepts of superconductors materials	**K6**

Course Title: PHYSICS FOR COMPETITIVE EXAMINATIONS **Course Code: 19PPH3CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the digital techniques and applications	**K2**
CO2	Evaluate the error analysis	**K4**
CO3	Explain the measurement methods	**K3**
CO4	Discuss the atomic & molecular physics	**K2**
CO5	Distinguish the different spectroscopies	**K5**

Course Title: PHYSICS PRACTICAL – III (GENERAL AND ELECTRONICS) **Course Code: 19PPH3CC3P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Study the electrical and magnetic behaviour of Semiconductor materials.	**K2**
CO2	Learn about the potential of optics applications in different areas of research and development	**K3**
CO3	Analyse and apply the characteristics of memory units and electrical circuit.	**K4**
CO4	Apply the concepts of operational amplifier to design differential amplifier.	**K5**

CRITERION I **POs and COs**

Course Title: CRYSTAL GROWTH AND THIN FILM PHYSICS **Course Code: 19PPH3EC3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic knowledge of growth phenomena and discuss the theoretical aspects of nucleation	**K2**
CO2	Apply the experimental ideas of low temperature solution growth mechanism	**K3**
CO3	Analyze the concepts on vapour growth techniques	**K4**
CO4	Explain the process of thin films sample preparation method	**K5**
CO5	Formulate the latest developments in characterization techniques and analyze the usage of materials.	**K6**

Course Title: MATERIAL CHARACTERIZATION AND MEASUREMENT TECHNIQUES **Course Code: 19PPH3EC3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Illustrate the basic knowledge of optical microscope and image formation	**K2**
CO2	Demonstration of X-ray diffractometer and its applications	**K3**
CO3	Analyze the concept on electron microscope	**K4**
CO4	Examine the formation of SEM&TEM images	**K5**
CO5	Discuss the latest developments in measurement techniques and to analyze the usage of materials	**K6**

Course Title: NUCLEAR AND PARTICLE PHYSICS **Course Code: 19PPH4CC10**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the models of nucleus	**K2**
CO2	Explain the properties of elementary particles	**K2**
CO3	Analyze the nuclear radioactivity and reactions	**K4**
CO4	Estimate the different kind of reactors	**K5**
CO5	Determine the classification of elementary particles	**K5**

Course Title: PHYSICS PRACTICAL – IV (ELECTRONICS) Course Code: 19PPH4CC4P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Acquire basic knowledge of digital logic levels and its application	**K2**
CO2	Analyse and construct combinational logic circuits	**K4**
CO3	Demonstrate practical skills in functioning and testing the digital system	**K5**
CO4	Take projects in electronics relevant to industrials.	**K6**

Course Title: NONLINEAR OPTICS Course Code: 19PPH4EC4A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain sources and propagation of optical electromagnetic waves.	**K2**
CO2	Illustrate nonlinear phenomena from the fundamental perspective of quantum mechanics.	**K2**
CO3	Develop a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics	**K3**
CO4	Develop a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics	**K4**
CO5	Appraise the ability to perform research and development projects using advanced theoretical and experimental skills and tools	**K5**

Course Title: SPACE PHYSICS Course Code: 19PPH4EC4B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain principal environments of the solar system.	**K2**
CO2	Illustrate the physical theories that control the qualitative properties of different space plasma phenomena	**K2**
CO3	Develop an understanding of how space physics has a practical impact on everyday life in the field of space weather	**K3**
CO4	Calculate the quantitative behaviour of different space physics phenomena using various analysis method.	**K4**
CO5	Identify ways in which experimental studies of space physics phenomena have advanced our understanding of basic plasma physics in the field of research	**K5**

CRITERION I **POs and COs**

Course Title: NANOPHYSICS **Course Code: 19PPH4EC5A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify the dimensional nanostructure materials	**K2**
CO2	Identify the carbon nanostructures and their properties	**K3**
CO3	Analyze the synthesis of nanomaterials	**K4**
CO4	Explain the characterization techniques used for nanomaterials	**K5**
CO5	Discuss the applications of nanomaterials	**K6**

Course Title: ASTROPHYSICS **Course Code: 19PPH4EC5B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Positional Astronomy: Measurement of distances, and angular positions of celestial objects	**K2**
CO2	Identify the Physical Principles involved in stellar processes. Structure and evolution of stars	**K3**
CO3	Examine the physics of the formation of White Dwarfs and Neutron stars. Dynamics of Binary stars	**K4**
CO4	Explain the Types of Galaxies, Dynamics of stars in a galaxy and its implication for dark matter	**K5**
CO5	Discuss the Expansion of the Universe and evolution of temperature in the Universe. 21 cm Cosmology	**K6**

Signature Not Verified
Digitally Signed
Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 12:00:06

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) – (2021-2022 Onwards)

DEPARTMENT OF PHYSICS

M. Sc – PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To empower the students with an aptitude for creative learning and multiple learning, independent thinking and synergetic action that will equip them to meet the global challenges.
PEO2	To ignite the research thrust among the students.
PEO3	To acquire placement in various educational institutions, software companies and research laboratories.
PEO4	To enhance the students with analytical skills for the sustainable development of nation.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PO1	To intensify the student's academic capability, unique qualities and transferable which will give them an opportunity to evolve as responsible citizens.
PO2	To interpret the laws hypothesis and basic concept in Physics.
PO3	To apply the concept based problem-solving approach in various field of Physics.
PO4	To excel in research and materials characterization.
PO5	To apply the theories and skills acquired to solve the existing problem.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PSO1	Develop specialization in a particular area of Physics for research development.
PSO2	Educate the students over analytical, experimental and computational techniques that can be applied in physics, in other scientific and technological domains.
PSO3	Inculcate logical reasoning among the students and help them to develop quantitative skills to solve a problem.
PSO4	Understand the nature in terms of the fundamental principles, hypotheses and laws of Physics.
PSO5	Acquire amount of knowledge regarding the overall progress in scientific and technological domains.

COURSE OUTCOMES (COs)

Course Title: MATHEMATICAL PHYSICS
Course Code: 19PPH1CC1

CO Number	CO Statement On the successful completion of the course, students will be able to,	Knowledge Level
CO1	Solve the problems from the matrices and tensors calculus and its applications	**K2**
CO2	Demonstrate accurate and efficient use of group theory	**K2**
CO3	Acquire a sound knowledge in linear vector space which will be necessary to pursue other areas in physics	**K3**
CO4	Apply the complex analysis techniques to solve problem in physics, engineering and other mathematical contexts	**K3**
CO5	Understand the nature and applications of the Sturm– Liouville problem and analyze properties of special functions by their integral representations and symmetries.	**K3**

Course Title: CLASSICAL DYNAMICS AND RELATIVITY
Course Code: 19PPH1CC2

CO Number	CO Statement On the successful completion of the course, students will be able to,	Knowledge Level
CO1	Demonstrate and understand the basic classical mechanics concepts related to discrete and continuous mechanical systems	**K2**
CO2	Solve the mathematical Kepler problem	**K3**
CO3	Explain the applications of Hamiltonian's equation	**K5**
CO4	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**
CO5	Determine the motion of a mechanical system using Lagrange-Hamilton formalism	**K5**

CRITERION I **POs and COs**

Course Title: ELECTRONICS **Course Code: 19PPH1CC3**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the concepts of semiconductor devices	**K2**
CO2	Identify the logic and develop counters	**K3**
CO3	Examine the concepts of operational amplifier to solve differential and simultaneous equations	**K4**
CO4	Evaluate the problem related to semiconductor devices, digital and oscillator circuits	**K5**
CO5	Recommend projects in electronics relevant to industrial and R &D needs	**K5**

Course Title: QUANTUM MECHANICS-I **Course Code: 19PPH1CC4**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time dependent Schrödinger equation	**K2**
CO2	Solve Commutation relations	**K3**
CO3	Examine the abstract formalism	**K4**
CO4	Compare the abstract and matrix representation	**K5**
CO5	Conceive the angular momentum	**K6**

Course Title: PHYSICS PRACTICAL – I (GENERAL AND ELECTRONICS) **Course Code: 19PPH1CC1P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the basics of experimental physics.	**K2**
CO2	Understand the fundamental physics behind many scientific discoveries through hands on experience.	**K2**
CO3	Explore the concepts involved in the thermodynamic processes	**K3**
CO4	Verify experimentally the basic laws of physics	**K4**
CO5	Develop the skill in handling instruments.	**K6**

Course Title: ELECTROMAGNETIC THEORY Course Code: 19PPH2CC5		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Summarize the fundamentals of Electrostatics and Magnetostatics	**K2**
CO2	Identify the concept of Electrodynamic fields	**K3**
CO3	Apply the concept of electromagnetic theory in electromagnetic waves	**K3**
CO4	Categorize the transverse behaviour of electromagnetic waves in different geometrics of wave guides	**K4**
CO5	Evaluate electromagnetic wave equations for different propagating media and to determine the flow of energy and wave velocity	**K5**

Course Title: QUANTUM MECHANICS – II Course Code: 19PPH2CC6		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Time-independent perturbation theory	**K2**
CO2	Solve One dimensional Schrödinger equation	**K3**
CO3	Apply the scattering theory	**K3**
CO4	Compare the Time-dependent perturbation theory	**K5**
CO5	Conceive the relativistic quantum mechanics	**K6**

Course Title: PHYSICS PRACTICAL – II (MICROPROCESSOR AND C++ PROGRAMMING) Course Code: 19PPH2CC2P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic operations of 8085 and 8051.	**K2**
CO2	Impart the knowledge about the code conversions of 8085.	**K2**
CO3	Formulate skills in C++ Programming.	**K5**
CO4	Develop skills in decimal counting of 8085	**K6**

Course Title: MICROPROCESSOR AND MICROCONTROLLER Course Code: 19PPH2EC1A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the architecture of 8085,8051 and impart the knowledge about the instruction set	**K2**
CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of microprocessor/Microcontroller	**K2**
CO3	Distinguish the instruction set of microprocessor and microcontroller	**K4**
CO4	Create program with microprocessor interfaces	**K5**
CO5	Develop skill in simple program writing for 8051 & 8085 applications	**K6**

CRITERION I **POs and COs**

Course Title: NON- DESTRUCTIVE EVALUATION TECHNIQUES **Course Code: 19PPH2EC1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic working principles of various NDT methods and importance of NDT	**K2**
CO2	Demonstrate the limitations of NDT techniques and codes.	**K2**
CO3	Compare Non-destructive testing and Mechanical testing.	**K4**
CO4	Outline Real time Radiography Techniques	**K4**
CO5	Test the instrumentation techniques with the aid of basic Principles.	**K5**

Course Title: NUMERICAL METHODS AND C++ PROGRAMMING **Course Code: 19PPH2EC2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the numerical concepts to find solutions and Eigen values of polynomial equations.	**K3**
CO2	Solve numerical problems of interpolation and determine the intermediate values of given data	**K3**
CO3	Compare the various methods of integration and differentiation value with numerical concepts	**K4**
CO4	Choose the boundary value problems for differential equation	**K5**
CO5	Compile the numerical concepts in C++ language.	**K6**

Course Title: BIOMECHANICS AND BIO PHYSICS **Course Code: 19PPH2EC2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the basic principles of physics to understand the biological systems	**K3**
CO2	Outline the concepts of Biophysics and Neuro physics	**K2**
CO3	Evaluate the specimens using Electron Microscopy and NMR Spectroscopy	**K5**
CO4	Explain the concepts of energy pathways	**K5**

CRITERION I **POs and COs**

Course Title: STATISTICAL MECHANICS **Course Code: 19PPH3CC7**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the concept of thermodynamics	**K2**
CO2	Evaluate the mean free path	**K4**
CO3	Explain the classical statistics	**K3**
CO4	Discuss the quantum statistics	**K2**
CO5	Distinguish phase transitions	**K5**

Course Title: SOLID STATE PHYSICS **Course Code: 19PPH3CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the fundamental principles and crystal structure of the solid materials	**K2**
CO2	Identify the mode of vibrations in the atoms	**K3**
CO3	List the materials behavior of the electric properties and category the ferroelectric crystals	**K4**
CO4	Explain the magnetic properties and its applications	**K5**
CO5	Develop the basic concepts of superconductors materials	**K6**

Course Title: PHYSICS FOR COMPETITIVE EXAMINATIONS **Course Code: 19PPH3CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the digital techniques and applications	**K2**
CO2	Evaluate the error analysis	**K4**
CO3	Explain the measurement methods	**K3**
CO4	Discuss the atomic & molecular physics	**K2**
CO5	Distinguish the different spectroscopies	**K5**

Course Title: PHYSICS PRACTICAL – III (GENERAL AND ELECTRONICS) Course Code: 19PPH3CC3P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Study the electrical and magnetic behaviour of Semiconductor materials.	**K2**
CO2	Learn about the potential of optics applications in different areas of research and development	**K3**
CO3	Analyse and apply the characteristics of memory units and electrical circuit.	**K4**
CO4	Apply the concepts of operational amplifier to design differential amplifier.	**K5**

Course Title: CRYSTAL GROWTH AND THIN FILM PHYSICS Course Code: 19PPH3EC3A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic knowledge of growth phenomena and discuss the theoretical aspects of nucleation	**K2**
CO2	Apply the experimental ideas of low temperature solution growth mechanism	**K3**
CO3	Analyze the concepts on vapour growth techniques	**K4**
CO4	Explain the process of thin films sample preparation method	**K5**
CO5	Formulate the latest developments in characterization techniques and analyze the usage of materials.	**K6**

Course Title: MATERIAL CHARACTERIZATION AND MEASUREMENT TECHNIQUES Course Code: 19PPH3EC3B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Illustrate the basic knowledge of optical microscope and image formation	**K2**
CO2	Demonstration of X-ray diffractometer and its applications	**K3**
CO3	Analyze the concept on electron microscope	**K4**
CO4	Examine the formation of SEM&TEM images	**K5**
CO5	Discuss the latest developments in measurement techniques and to analyze the usage of materials	**K6**

CRITERION I **POs and COs**

Course Title: NUCLEAR AND PARTICLE PHYSICS **Course Code: 19PPH4CC10**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the models of nucleus	**K2**
CO2	Explain the properties of elementary particles	**K2**
CO3	Analyze the nuclear radioactivity and reactions	**K4**
CO4	Estimate the different kind of reactors	**K5**
CO5	Determine the classification of elementary particles	**K5**

Course Title: PHYSICS PRACTICAL – IV (ELECTRONICS) **Course Code: 19PPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Acquire basic knowledge of digital logic levels and its application	**K2**
CO2	Analyse and construct combinational logic circuits	**K4**
CO3	Demonstrate practical skills in functioning and testing the digital system	**K5**
CO4	Take projects in electronics relevant to industrials.	**K6**

Course Title: NONLINEAR OPTICS **Course Code: 19PPH4EC4A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain sources and propagation of optical electromagnetic waves.	**K2**
CO2	Illustrate nonlinear phenomena from the fundamental perspective of quantum mechanics.	**K2**
CO3	Develop a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics	**K3**
CO4	Develop a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics	**K4**
CO5	Appraise the ability to perform research and development projects using advanced theoretical and experimental skills and tools	**K5**

CRITERION I **POs and COs**

Course Title: SPACE PHYSICS **Course Code: 19PPH4EC4B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain principal environments of the solar system.	**K2**
CO2	Illustrate the physical theories that control the qualitative properties of different space plasma phenomena	**K2**
CO3	Develop an understanding of how space physics has a practical impact on everyday life in the field of space weather	**K3**
CO4	Calculate the quantitative behaviour of different space physics phenomena using various analysis method.	**K4**
CO5	Identify ways in which experimental studies of space physics phenomena have advanced our understanding of basic plasma physics in the field of research	**K5**

Course Title: NANOPHYSICS **Course Code: 19PPH4EC5A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify the dimensional nanostructure materials	**K2**
CO2	Identify the carbon nanostructures and their properties	**K3**
CO3	Analyze the synthesis of nanomaterials	**K4**
CO4	Explain the characterization techniques used for nanomaterials	**K5**
CO5	Discuss the applications of nanomaterials	**K6**

Course Title: ASTROPHYSICS **Course Code: 19PPH4EC5B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Positional Astronomy: Measurement of distances, and angular positions of celestial objects	**K2**
CO2	Identify the Physical Principles involved in stellar processes. Structure and evolution of stars	**K3**
CO3	Examine the physics of the formation of White Dwarfs and Neutron stars. Dynamics of Binary stars	**K4**
CO4	Explain the Types of Galaxies, Dynamics of stars in a galaxy and its implication for dark matter	**K5**
CO5	Discuss the Expansion of the Universe and evolution of temperature in the Universe. 21 cm Cosmology	**K6**

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Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 12:00:06

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) – (2022-2023 Onwards)

DEPARTMENT OF PHYSICS

M. Sc – PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	To provide a conducive environment to unleash their hidden talents and to Nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains
PEO4	To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PO1	Problem Analysis: Provide opportunities to develop innovative design skills, including the ability to formulate problems, to think creatively, to synthesize information, and to communicate effectively.
PO2	Scientific Skills: Create and apply advanced techniques and tools to solve the societal environmental issues
PO3	Environment and sustainability: Ascertain eco- friendly approach for sustainable development and inculcate scientific temper in the society.
PO4	Ethics: Imbibe ethical and social values aiming towards holistic development of learners.
PO5	Lifelong learning: Instil critical thinking, communication, initiative which potentially leads to higher rates of employment and educational fulfilment.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Specific Outcomes Students of M. Sc PHYSICS will be able to	POs Addressed
PSO1	Demonstrate proficiency in the mathematical concepts needed for a proper understanding of Physics	**PO1, PO2, PO5**
PSO2	Understand the basic concepts of Physics particularly concepts in classical mechanics, quantum mechanics, electrodynamics and electronics to appreciate how diverse phenomena observed in nature follow from a small set of fundamental laws.	**PO2, PO5**
PSO3	Learn numerous numerical problem-solving approaches and the fundamentals of curve fittings.	**PO1, PO2**
PSO4	Learn about microprocessors and microcontrollers, as well as practical microprocessor programming abilities	**PO1, PO2**
PSO5	Provide students with broad theoretical and practical knowledge in all specializations of Physics with required qualitative and quantitative techniques.	**PO1, PO2, PO5**

COURSE OUTCOMES (COs)

Course Title: MATHEMATICAL PHYSICS **Course Code: 22PPH1CC1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the various mathematical concepts used in physics	**K1, K2**
CO2	Analyze mathematical tools like vector, matrix, group theory, complex integration, Fourier and Laplace series, special function will prepare the student to solve ODE; PDE's which model physical phenomena.	**K3**
CO3	Evaluate the vector, linear, simultaneous and differential equations which will be necessary to pursue other areas in physics.	**K4**
CO4	Apply mathematical methods to predict the problems in classical physics, statistical physics and quantum mechanics as well as electrodynamics	**K5**
CO5	Solve the physical problems using mathematical techniques	**K6**

Course Title: CLASSICAL DYNAMICS AND RELATIVITY Course Code: 22PPH1CC2		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the primary idea and principle governing the concept of tensor as well as the discrete and continuous mechanical systems related concepts in classical mechanics.	**K1, K2**
CO2	Analyze the constraints on mechanical systems and Interpret the importance of concepts such as generalized coordinates.	**K3**
CO3	Evaluate the ideas of rigid body dynamics and kinematics as well as the central force acting on the objects.	**K4**
CO4	Apply the Lagrangian and Hamiltonian formulation of classical mechanics, Poisson brackets and canonical transformations are used in order to simplify the methods to be used in solving physics problems.	**K5**
CO5	Create conclusions about classical dynamics, including matrix generalization and special relativity.	**K6**

Course Title: QUANTUM MECHANICS - I Course Code: 22PPH1CC3		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall and interpret the classical and quantum mechanics	**K1, K2**
CO2	Analyze the various applications of quantum mechanics	**K3**
CO3	Discover the formalism in quantum mechanics	**K4**
CO4	Apply the different type of approaches to solve quantum mechanical systems	**K5**
CO5	Elaborate the operators in both classical and Quantum Mechanics	**K6**

Course Title: GENERAL PHYSICS AND ELECTRONICS-I(P) Course Code: 22PPH1CC1P		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the basics of experimental physics.	**K2**
CO2	Understand the fundamental physics behind many scientific discoveries through hands on experience.	**K2**
CO3	Explore the concepts of spectrometry involved in the optic processes.	**K3**
CO4	Verify experimentally the basic laws of physics	**K4**
CO5	Develop the skill in handling instruments in the construction of circuits	**K6**

CRITERION I **POs and COs**

Course Title: MICROPROCESSOR AND MICROCONTROLLER **Course Code: 22PPH1DSE1A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the Basics of Microprocessor and impart the knowledge about the instruction set	**K1, K2**
CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of microprocessor/Micro controller	**K3**
CO3	Explain the data transfer schemes and interfacing devices	**K4**
CO4	Distinguish the instruction set of microprocessor and micro controller and Create program with Micro controller	**K5**
CO5	Develop programming skill using interfacing and Peripheral devices of Microprocessor	**K6**

Course Title: NON - DESTRUCTIVE EVALUATION TECHNIQUES **Course Code: 22PPH1DSE1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic working principles of various NDT methods and importance of NDT.	**K1, K2**
CO2	Identify and demonstrate the limitations of NDT techniques and codes	**K2, K3**
CO3	Analyze and Interpret Non-destructive testing and Mechanical testing.	**K4, K5**
CO4	Examine the Real time Radiography Techniques	**K4**
CO5	Test the instrumentation techniques with the aid of basic Principles	**K5**

Course Title: ASTROPHYSICS **Course Code: 22PPH1DSE1C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall & interpret the basic concepts of Astrophysics	**K1, K2**
CO2	Relate and identify the principles of physics in the study of astronomical objects	**K2, K3**
CO3	Analyse the celestial objects in the universe	**K4, K5**
CO4	Classify and explain the stars, galaxies and stellar evolution	**K4**
CO5	Discuss the knowledge of the physical universe and its evolution	**K5**

Course Title: ELECTROMAGNETIC THEORY Course Code: 22PPH2CC4		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the fundamentals of Electrostatics, Magneto statics and Electromagnetic waves.	**K1, K2**
CO2	Analyze the concept of Electrodynamic fields and electromagnetic theory in Electrostatics	**K3**
CO3	Evaluate the magnetic and electric field using various laws of magnetostatics and electrostatics.	**K4**
CO4	Apply the transverse behaviour of electromagnetic field equations for different propagating media and boundary value problems in electromagneto statics	**K5**
CO5	Create ability to evaluate electromagnetic wave equations and to solve problems in electro-magneto statics	**K6**

Course Title: Quantum Mechanics-II Course Code: 22PPH2CC5		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the perturbation theory to formulate problems for proper understanding of Physics	**K1, K2**
CO2	Analyze the advanced techniques in Physics to gain insights towards quantum mechanics	**K3**
CO3	Evaluate and ascertain the mathematical concepts behind fundamentals of quantum mechanics.	**K4**
CO4	Apply the development of mathematical skills and problem solving in perturbation theory	**K5**
CO5	Create the critical thinking over the relativistic quantum physics	**K6**

Course Title: ELECTRONICS Course Code: 22PPH2CCC1A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the concepts of semiconductor devices	**K1, K2**
CO2	Analyze the working function of Semiconductor and ICs	**K3**
CO3	Evaluate the basic concepts of Sensor, Transducers, operational amplifier, oscillator circuits and IC	**K4**
CO4	Apply the Principles and Concepts of Sensor, Transducers and Semiconductor devices in digital and analog circuits	**K5**
CO5	Recommend projects in electronics relevant to industrial and R &D needs	**K6**

CRITERION I **POs and COs**

Course Title: NONLINEAR DYNAMICS **Course Code: 22PPH2CCC1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understanding the concepts on the linear stability analysis	**K2**
CO2	Explain the basic bifurcations with suitable examples.	**K2**
CO3	Illustrate the various characterizing tools such as power spectrum and Lyapunov exponents	**K3**
CO4	Identify numerical experiment of Fermi, Pasta and Ulam and its outcome	**K4**
CO5	Analyze linear and nonlinear systems and appreciate the concept of nonlinearity	**K5, K6**

Course Title: SPECTROSCOPY **Course Code: 22PPH2CCC1C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand and explain the fundamental concepts and applications of microwave, IR, Raman and other spectroscopic methods	**K2**
CO2	Make use of electronic spectroscopy for chemical analysis	**K2**
CO3	Analyze the NMR and FTIR spectra of various samples and identify their chemical structure	**K3**
CO4	Choose suitable spectroscopic technique and examine the chemical composition of a material	**K4**
CO5	Apply the knowledge acquired and use spectroscopic instruments to examine and develop new materials	**K5, K6**

Course Title: MICROPROCESSOR AND PYTHON PROGRAMMING(P) **Course Code: 22PPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic operations of 8085	**K2**
CO2	Apply the knowledge about the code conversions of 8085	**K2**
CO3	Analyze the skills in decimal counting of 8085	**K3**
CO4	Evaluate the Numerical Problems using Python programming	**K4**
CO5	Develop skills in Python Programming	**K5, K6**

Course Title: NUMERICAL METHODS AND PYTHON PROGRAMMING Course Code: 22PPH2DSE2A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the Basics Concepts and impart the knowledge about the Numerical problems and Python	**K1, K2**
CO2	Apply and Demonstrate programming proficiency of Numerical Problems using Python	**K3, K4**
CO3	Explain to find the Solution of Boundary value problems and Eigen value problem, Interpolation, Differentiation and Integration	**K4, K5**
CO4	Distinguish the various methods of finding the Solution of Boundary value problems and Eigen value problem, Interpolation, Differentiation and Integration	**K5, K6**

Course Title: MATERIAL CHARACTERIZATION AND MEASUREMENT TECHNIQUES Course Code: 22PPH2DSE2C		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Summarize the knowledge in basic concepts and experimental methods.	**K2**
CO2	Make use of the knowledge of material characterization and measurement techniques	**K3**
CO3	Examine the instrumentation details of image formation techniques and application	**K4**
CO4	Explain structure of materials.	**K5**
CO5	Discuss the latest developments in measurement techniques and to analyze the usage of materials.	**K6**

Course Title: STATISTICAL MECHANICS Course Code: 19PPH3CC7		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the concept of thermodynamics	**K1, K2**
CO2	Evaluate the mean free path	**K3, K4**
CO3	Explain the classical statistics	**K4, K5**
CO4	Discuss the quantum statistics	**K5, K6**
CO5	Distinguish phase transitions	**K5, K6**

CRITERION I **POs and COs**

Course Title: SOLID STATE PHYSICS **Course Code: 19PPH3CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the fundamental principles and crystal structure of the solid materials	**K2**
CO2	Identify the mode of vibrations in the atoms	**K3**
CO3	List the materials behavior of the electric properties and category the ferroelectric crystals	**K4**
CO4	Explain the magnetic properties and its applications	**K5**
CO5	Develop the basic concepts of superconductors materials	**K6**

Course Title: PHYSICS FOR COMPETITIVE EXAMINATION **Course Code: 19PPH3CC9**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the digital techniques and applications	**K2**
CO2	Evaluate the error analysis	**K4**
CO3	Explain the measurement methods	**K3**
CO4	Discuss the atomic & molecular physics	**K2**
CO5	Distinguish the different spectroscopies	**K5**

Course Title: PHYSICS PRACTICALS – III (GENERAL AND ELECTRONICS) **Course Code: 19PPH3CC3P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Study the electrical and magnetic behaviour of Semiconductor materials.	**K2**
CO2	Learn about the potential of optics applications in different areas of research and development.	**K4**
CO3	Analyse and apply the characteristics of memory units and electrical circuit.	**K4**
CO4	Apply the concepts of operational amplifier to design differential amplifier.	**K5**

CRITERION I **POs and COs**

Course Title: CRYSTAL GROWTH AND THIN FILM PHYSICS **Course Code: 19PPH3EC3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic knowledge of growth phenomena and discuss the theoretical aspects of nucleation	**K2**
CO2	Apply the experimental ideas of low temperature solution growth mechanism	**K4**
CO3	Analyze the concepts on vapour growth techniques	**K4**
CO4	Explain the process of thin films sample preparation method	**K5**
CO5	Formulate the latest developments in characterization techniques and analyze the usage of materials.	**K6**

Course Title: MATERIAL CHARACTERIZATION AND MEASUREMENT TECHNIQUES **Course Code: 19PPH3EC3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Illustrate the basic knowledge of optical microscope and image formation	**K2**
CO2	Demonstration of X-ray diffractometer and its applications.	**K3**
CO3	Analyze the concept on electron microscope	**K4**
CO4	Examine the formation of SEM&TEM images	**K5**
CO5	Discuss the latest developments in measurement techniques and to analyze the usage of materials.	**K6**

Course Title: NUCLEAR AND PARTICLE PHYSICS **Course Code: 19PPH4CC10**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the models of nucleus	**K2**
CO2	Explain the properties of elementary particles	**K2**
CO3	Analyze the nuclear radioactivity and reactions	**K4**
CO4	Estimate the different kind of reactors	**K5**
CO5	Determine the classification of elementary particles	**K5**

CRITERION I **POs and COs**

Course Title: PHYSICS PRACTICALS -IV (ELECTRONICS) **Course Code: 19PPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Acquire basic knowledge of digital logic levels and its application.	**K2**
CO2	Analyse and construct combinational logic circuits	**K4**
CO3	Demonstrate practical skills in functioning and testing the digital system.	**K5**
CO4	Take projects in electronics relevant to industrials.	**K6**

Course Title: NONLINEAR OPTICS **Course Code: 19PPH4EC4A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain sources and propagation of optical electromagnetic waves.	**K2**
CO2	Illustrate nonlinear phenomena from the fundamental perspective of quantum mechanics.	**K2**
CO3	Develop a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in physics	**K3**
CO4	Analyze basic concepts and applications effectively.	**K4**
CO5	Appraise the ability to perform research and development projects using advanced theoretical and experimental skills and tools.	**K5**

Course Title: SPACE PHYSICS **Course Code: 19PPH4EC4B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain principal environments of the solar system.	**K2**
CO2	Illustrate the physical theories that control the qualitative properties of different space plasma phenomena.	**K2**
CO3	Develop an understanding of how space physics has a practical impact on everyday life in the field of space weather.	**K3**
CO4	Calculate the quantitative behaviour of different space physics phenomena using various analysis method.	**K4**
CO5	Identify ways in which experimental studies of space physics phenomena have advanced our understanding of basic plasma physics in the field of research.	**K5**

CRITERION I **POs and COs**

Course Title: NANO PHYSICS **Course Code: 19PPH4EC5A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Classify the dimensional nanostructure materials	**K2**
CO2	Identify the carbon nanostructures and their properties	**K3**
CO3	Analyze the synthesis of nanomaterials	**K4**
CO4	Explain the characterization techniques used for nanomaterials	**K5**
CO5	Discuss the applications of nanomaterials	**K6**

Course Title: ASTROPHYSICS **Course Code: 19PPH4EC5B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the Positional Astronomy: Measurement of distances, and angular positions of celestial objects	**K2**
CO2	Identify the Physical Principles involved in stellar processes. Structure and evolution of stars	**K3**
CO3	Examine the physics of the formation of White Dwarfs and Neutron stars. Dynamics of Binary stars	**K4**
CO4	Explain the Types of Galaxies, Dynamics of stars in a galaxy and its implication for dark matter.	**K5**
CO5	Discuss the Expansion of the Universe and evolution of temperature in the Universe. 21 cm Cosmology.	**K6**

Signature Not Verified
Digitally Signed
Signed by: Sujatha.V
Designation: Principal
Reason: NAAC
Location: Tiruchirappalli, Tamil Nadu, India
Date: 30-Sep-2024 12:00:06

Key Indicator - 1.1 Curriculum Design and Development

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

Programme Outcomes (POs) and Course Outcomes (COs) – (2023-2024 Onwards)

DEPARTMENT OF PHYSICS

M. Sc – PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	To provide a conducive environment to unleash their hidden talents and to Nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains
PEO4	To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES (POs)

POs	Programme Outcome On completion of M. Sc Physics Programme, the students will be able to,
PO1	**Problem Analysis:** Provide opportunities to develop innovative design skills, including the ability to formulate problems, to think creatively, to synthesize information, and to communicate effectively.
PO2	**Scientific** Skills: Create and apply advanced techniques and tools to Solve the societal environmental issues.
PO3	**Environment and sustainability:** Ascertain eco-friendly approach for sustainable development and inculcate scientific temper in the society.
PO4	**Ethics:** Imbibe ethical and social values aiming towards holistic Development of learners.
PO5	**Lifelong learning:** Instil critical thinking, communication, initiative which potentially leads to higher rates of employment and educational fulfilment

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs	Programme Specific Outcomes Students of M. Sc PHYSICS will be able to	POs Addressed
PSO1	Demonstrate proficiency in the mathematical concepts needed for a proper understanding of Physics	**PO1, PO2, PO5**
PSO2	Understand the basic concepts of Physics particularly concepts in classical mechanics, quantum mechanics, electrodynamics and electronics to appreciate how diverse phenomena observed in nature follow from a small set of fundamental laws.	**PO2, PO5**
PSO3	Learn numerous numerical problem-solving approaches and the fundamentals of curve fittings.	**PO1, PO2**
PSO4	Learn about microprocessors and microcontrollers, as well as practical microprocessor programming abilities	**PO1, PO2**
PSO5	Provide students with broad theoretical and practical knowledge in all specializations of Physics with required qualitative and quantitative techniques.	**PO1, PO2, PO5**

COURSE OUTCOMES (COs)

Course Title: MATHEMATICAL PHYSICS **Course Code: 23PPH1CC1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and understand the various mathematical concepts used in physics	**K1, K2**
CO2	Analyze mathematical tools like vector, matrix, group theory, complex integration, Fourier and Laplace series, special function will prepare the student to solve ODE; PDE's which model physical phenomena.	**K3**
CO3	Evaluate the vector, linear, simultaneous and differential equations which will be necessary to pursue other areas in physics.	**K4**
CO4	Apply mathematical methods to predict the problems in classical physics, statistical physics and quantum mechanics as well as electrodynamics	**K5**
CO5	Solve the physical problems using mathematical techniques	**K6**

CRITERION I **POs and COs**

Course Title: CLASSICAL MECHANICS AND RELATIVITY **Course Code: 23PPH1CC2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the fundamentals of classical mechanics.	**K1**
CO2	Apply the principles of Lagrangian and Hamiltonian mechanics to solve the equations of motion of physical systems.	**K2**
CO3	Apply the principles of Lagrangian and Hamiltonian mechanics to solve the equations of motion of physical systems.	**K3** **K5**
CO4	Analyze the small oscillations in systems and determine their normal modes of oscillations.	**K4, k5**
CO5	Understand and apply the principles of relativistic kinematics to the mechanical systems.	**K2, K3**

Course Title: LINEAR AND DIGITAL ICs AND APPLICATIONS **Course Code: 23PPH1CC3**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and understand the concepts of linear integrated circuits.	**K1,K2**
CO2	Analyze the linear and non-linear applications of operational amplifiers.	**K3**
CO3	Evaluate the basic concepts of operational amplifier, oscillator circuits and IC	**K4**
CO4	Apply the Principles and Concepts of waveform generation	**K5**
CO5	Recommend projects in electronics relevant to industrial and R &D needs	**K5**

Course Title: GENERAL PHYSICS AND ELECTRONICS-I(P) **Course Code: 23PPH1CC1P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the basics of experimental physics.	**K2**
CO2	Understand the fundamental physics behind many scientific discoveries through hands on experience.	**K2**
CO3	Explore the concepts of spectrometry involved in the optic processes.	**K3**
CO4	Verify experimentally the basic laws of physics	**K4**
CO5	Develop the skill in handling instruments in the construction of circuits	**K6**

Course Title: PHYSICS OF NANOSCIENCE AND TECHNOLOGY Course Code: 23PPH1DSE1A		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic of nanoscience and explore the different types of nanomaterials and should comprehend the surface effects of the nanomaterials.	**K1, K2**
CO2	To learn the structures and properties of nanomaterials	**K2**
CO3	Apply the process and mechanism of synthesis and fabrication of nanomaterials	**K3**
CO4	Analyze the various characterization of Nano-products through diffraction, spectroscopic, microscopic and other techniques.	**K4**
CO5	Evaluate and apply the concepts of nanoscience and technology in the field of sensors, robotics, purification of air and water and in the energy devices.	**K5,K6**

Course Title: ENERGY PHYSICS Course Code: 23PPH1DSE1B		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	To identify various forms of renewable and non-renewable energy sources	**K1**
CO2	Understand the principle of utilizing the oceanic energy and apply it for practical applications.	**K2**
CO3	Discuss the working of a windmill and analyze the advantages of wind energy.	**K3**
CO4	Distinguish aerobic digestion process from anaerobic digestion.	**K3, K4**
CO5	Understand the components of solar radiation, their measurement and apply them to utilize solar energy.	**K2, K5**

Course Title: DIGITAL COMMUNICATION Course Code: 23PPH1DSE1C		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Apply the techniques of Fourier transform, convolution and sampling theorems in signal processing	**K1, K3**
CO2	Apply different information theories in the process of study of coding of information, storage and communication	**K3**
CO3	Explain and compare the various methods of pulse modulation techniques	**K4**
CO4	Apply the error control coding techniques in detecting and correcting errors- able to discuss, analyze and compare the different error control coding	**K3, K4**
CO5	Apply, discuss and compare the spread spectrum techniques for secure communications	**K3, K5**

Course Title: ELECTROMAGNETIC THEORY Course Code: 22PPH2CC4		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the fundamentals of Electrostatics, Magneto statics and Electromagnetic waves.	**K1, K2**
CO2	Analyze the concept of Electrodynamic fields and electromagnetic theory in Electrostatics	**K3**
CO3	Evaluate the magnetic and electric field using various laws of magnetostatics and electrostatics.	**K4**
CO4	Apply the transverse behaviour of electromagnetic field equations for different propagating media and boundary value problems in electromagneto statics	**K5**
CO5	Create ability to evaluate electromagnetic wave equations and to solve problems in electro-magneto statics	**K6**

Course Title: Quantum Mechanics Course Code: 23PPH2CC5		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Analyze the advanced techniques in Physics to gain insights towards quantum mechanics	**K1, K2**
CO2	Apply principles of Quantum Mechanics to calculate observables for given wave functions	**K3**
CO3	Apply knowledge about fundamental quantum mechanical processes in Nature	**K4**
CO4	Ascertain the mathematical concepts behind fundamentals of quantum mechanics	**K5**
CO5	Develop the concepts in quantum mechanics and apply the development of mathematical skills and problem solving in quantum mechanics	**K6**

Course Title: MICROPROCESSOR AND MICROCONTROLLER Course Code: 23PPH2CCC1A		
CO Number	**CO Statement On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basics of microprocessor/microcontroller and impart the knowledge about the instruction set	**K1, K2**
CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of microprocessor/micro controller	**K3**
CO3	Explain the data transfer schemes of microprocessor/microcontroller and interfacing devices	**K4**
CO4	Distinguish the instruction set of microprocessor / micro controller and Create program with microprocessor/microcontroller	**K5**
CO5	Develop programming skill using interfacing and peripheral devices of microprocessor/microcontroller	**K6**

CRITERION I **POs and COs**

Course Title: NONLINEAR DYNAMICS **Course Code: 22PPH2CCC1B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understanding the concepts on the linear stability analysis	K2
CO2	Explain the basic bifurcations with suitable examples.	K2
CO3	Illustrate the various characterizing tools such as power spectrum and Lyapunov exponents	K3
CO4	Identify numerical experiment of Fermi, Pasta and Ulam and its outcome	K4
CO5	Analyze linear and nonlinear systems and appreciate the concept of nonlinearity	K5, K6

Course Title: PHYSICS OF SENSOR AND TRANSDUCER **Course Code: 23PPH2CCC1C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and Understand the Primary idea in Sensor and transducers in instrumentation	K1, K2
CO2	Analyze the different types of sensors and Transducers	K3
CO3	Evaluate the working function of sensor transducers for measurement of displacement, strain, velocity, acceleration etc	K4
CO4	Apply the function and view for the sensor, transducer construction, classification, principle of operation and characteristics in proper applications	K5
CO5	Create the Critical thinking in sensing and transducer devices	K6

Course Title: MICROPROCESSOR AND PYTHON PROGRAMMING(P) **Course Code: 22PPH2CC2P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic operations of 8085	**K2**
CO2	Apply the knowledge about the code conversions of 8085	**K3**
CO3	Analyze the skills in decimal counting of 8085	**K4**
CO4	Evaluate the Numerical Problems using Python programming	**K5**
CO5	Develop skills in Python Programming	**K6**

CRITERION I **POs and COs**

Course Title: NUMERICAL METHODS AND PYTHON PROGRAMMING **Course Code: 22PPH2DSE2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the Basics Concepts and impart the knowledge about the Numerical problems and Python	**K1, K2**
CO2	Apply and Demonstrate programming proficiency of Numerical Problems using Python	**K3, K4**
CO3	Explain to find the Solution of Boundary value problems and Eigen value problem, Interpolation, Differentiation and Integration	**K4, K5**
CO4	Distinguish the various methods of finding the Solution of Boundary value problems and Eigen value problem, Interpolation, Differentiation and Integration	**K5, K6**
CO5	Develop programming skill in Boundary value problems and Eigen value problem, Interpolation, Differentiation and Integration	**K5, K6**

Course Title: BIOMECHANICS AND BIOPHYSICS **Course Code: 23PPH2DSE2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and understand the fundamentals of Atomic & Molecular structures and thermodynamics	**K1, K2**
CO2	Analyze the principles of physical sciences to understand and solve biological complexities	**K3**
CO3	Recognize the biomechanics of human body.	**K4**
CO4	Apply the concepts of dynamics to analysis the metabolism of human body	**K5**
CO5	Evaluate the intramolecular processes and interactions.	**K5**

Course Title: MATERIAL CHARACTERIZATION AND MEASUREMENT TECHNIQUES **Course Code: 22PPH2DSE2C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Summarize the knowledge in basic concepts and experimental methods	**K2**
CO2	Make use of the knowledge of material characterization and measurement techniques	**K3**
CO3	Examine the instrumentation details of image formation techniques and application	**K4**
CO4	Explain the structure of the materials	**K5**
CO5	Discuss the latest developments in measurement techniques and to analyze the usage of materials	**K6**

Course Title: STATISTICAL MECHANICS **Course Code: 22PPH3CC6**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Differentiate between canonical and grand canonical ensembles and interpret the relation between thermodynamical quantities and partition Function	**K1, K2**
CO2	Justify the connection between thermodynamic quantities and classical statistical mechanics	**K3, K4**
CO3	Recall and apply the different statistical concepts to analyse the behaviour of ideal Fermi gas and ideal Bose gas and also to compare and distinguish between the three types of statistics	**K4, K5**
CO4	Analyse the kinetic theory and Transport phenomena	**K5**
CO5	Analyse the kinetic theory and Transport phenomena	**K5**

Course Title: SOLID STATE PHYSICS **Course Code: 22PPH3CC7**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember and understand the fundamental principles and crystal structure of the solid materials	**K2**
CO2	Analyze the mode of vibrations in the atoms	**K3**
CO3	Able to differentiate between dielectrics, ferroelectric and anti-ferroelectrics	**K4**
CO4	Develop and synthesize new materials for a requirement	**K5**
CO5	Elaborate the concepts of superconductors materials	**K6**

Course Title: CYBER SECURITY **Course Code: 22PGCS3CCC2A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the cyber security threat landscape	**K1, K2**
CO2	Develop a deeper understanding and familiarity with various types,cyber crimes, vulnerabilities, and remedies thereto.	**K2, K3**
CO3	Analyse and evaluate existing legal frameworks and laws on cyber security	**K4, K5**
CO4	Analyse and evaluate the digital payment system security and remedial measures	**K4, K5**
CO5	Analyse and evaluate the cyber security risks, plan suitable security controls	**K4, K5**

CRITERION I **POs and COs**

Course Title: COMMUNICATION ELECTRONICS **Course Code: 22PPH3CCC2B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Recall and Understand the propagation of electromagnetic waves through sky and on earth's surface	**K1, K2**
CO2	Apply the principle of radar in detecting locating, tracking, and recognizing objects of various kinds at considerable distances	**K3**
CO3	Analyze the methods of generation of microwaves analyze the propagation of microwaves through wave guides	**K4**
CO4	Compare the different types of optical fiber and also to justify the need of it-discover the use of optical fiber as wave guide	**K5**
CO5	Show the importance of satellite communication and various principle display techniques	**K6**

Course Title: PHYSICS OF SEMICONDUCTOR DEVICES **Course Code: 22PPH3CCC2C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Describe and outline the structure of semiconducting materials.	**K1, K2**
CO2	Apply the knowledge of basic semiconductor material physics and understand fabrication processes	**K3**
CO3	Examine the semiconducting devices and circuits, explain the working characteristics and use these principles in the complex circuits	**K4**
CO4	Assess the electronic device problems and recommend the solutions.	**K5**
CO5	Design new materials for semiconductor devices	**K6**

Course Title: GENERAL PHYSICS AND ELECTRONICS-II(P) **Course Code: 22PPH3CC3P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the aim of the study and the numerous inputs to the method for calculating a material's physical properties	**K2**
CO2	Construct and run the experiment.	**K3**
CO3	Make use ofthe correct formula to compute the physical quantity, after writing a list of your observations and repeating the experiment	**K3**
CO4	Examine and evaluate the results acquired, and sketch variations as needed.	**K4, K5**
CO5	Create and design electronic and electrical circuits for use in project work.	**K6**

CRITERION I **POs and COs**

Course Title: PHYSICS FOR COMPETITIVE EXAMINATIONS **Course Code: 22PPH3DSE3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the digital techniques and applications	**K1, K2**
CO2	Discuss the atomic &molecular physics	**K2**
CO3	Explain the measurement methods	**K3**
CO4	Evaluate the error analysis	**K4**
CO5	Distinguish the different spectroscopies	**K5**

Course Title: CRYSTAL GROWTH AND THIN FILM PHYSICS **Course Code: 22PPH3DSE3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Outline the basic knowledge of growth phenomena and Discuss the theoretical aspects of nucleation , Growth, Structural and Application	**K1, K2**
CO2	Apply the experimental ideas of low temperature solution growth mechanism and Melt Growth	**K3, K4**
CO3	Analyze the concepts on vapour growth techniques	**K3, K4**
CO4	Explain the process of thin films sample preparation method.	**K4, K5**
CO5	Formulate the latest developments in characterization techniques and analyze the usage of materials	**K4, K5**

Course Title: WEATHER FORECASTING **Course Code: 22PPH3DSE3C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Describe the basic concepts and physical parameters related to Atmosphere	**K1, K2**
CO2	Examine the techniques of weather measurements	**K3**
CO3	Explain the ideas and utilization of weather forecast monitoring	**K4**
CO4	Estimate the various steps, causes of global warming	**K5**
CO5	Make the awareness of various natural disorders	**K6**

CRITERION I **POs and COs**

Course Title: SCIENCE OF MATERIALS **Course Code: 22PPH3GEC1**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remembering and understanding of the different types of crystal structure and bonding in solids and the different kinds of materials and their testing methods.	**K1, K2**
CO2	Analyze the different kinds of technological properties of materials	**K2, K3**
CO3	Classify the new materials in the material engineering and to understand their role in materials behavior, analyze the type of bond, be able to explain its physical origin as well as strength	**K2, K3**
CO4	Evaluate the materials defects and given a simple set on explaining the non– destructive testing in materials	**K3, K4**
CO5	Analyze the nuclear materials and uses ofthe materials in the space	**K4, K5**

Course Title: NUCLEAR AND PARTICLE PHYSICS **Course Code: 22PPH4CC8**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the properties and stability of nucleus, nuclear models and nuclear forces	**K1, K2**
CO2	Apply the concept nuclear theory and analyze the construction of nuclear reactors.	**K3**
CO3	Analyze the theory and applications of various radioactive decays	**K4**
CO4	Analyze the elementary constituents of a nucleon based on several theories.	**K4**
CO5	Evaluate the energy released during nuclear fission and fusion reactions	**K5**

Course Title: ADVANCED OPTICS AND SPECTROSCOPY **Course Code: 22PPH4CCC3A**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand and explain the fundamental concepts and applications of spectroscopic methods	**K1, K2**
CO2	Illustrate nonlinear phenomena from the fundamental perspective of quantum mechanics.	**K2**
CO3	Examine a detailed physical and mathematical understanding of a variety of systems and processes in a range of advanced topics in optics.	**K4**
CO4	Apply the knowledge acquired and use spectroscopic instruments to examine and develop new materials.	**K3**
CO5	Appraise the ability to perform research and development projects using advanced theoretical and experimental skills and tools.	**K5**

CRITERION I **POs and COs**

Course Title: NANOPHYSICS **Course Code: 22PPH4CCC3B**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Understand the basic of nanoscience, nanostructures and explore the different types of nanomaterials that should comprehend the surface effects of the nanomaterials.	**K1, K2**
CO2	Understand the process of nanomaterials, formation of carbon nanostructures, fabrication of nanomaterials with their characterization techniques	**K2**
CO3	Apply the concepts on classification of nanomaterials, properties of nanostructures, synthesis techniques using physical, chemical approaches and the structural, microscopic effects of the nano-products with its application in energy conversions.	**K3**
CO4	Analyze the quantum confinement, properties of the nano-products, various characterization techniques and applications in storage devices.	**K4**
CO5	Analyze the concepts of nanoscience and technology, the structure of C60, the process and mechanism of synthesis, the spectroscopic characterization techniques and in the field of solar cells, batteries.	**K4, K5**

Course TITLE: SPACE PHYSICS **Course Code: 22PPH4CCC3C**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Explain the principal environments of the solar system.	**K1**
CO2	Illustrate the physical theories that control the qualitative properties of different space plasma phenomena.	**K2**
CO3	Develop an understanding of how space physics has a practical impact on everyday life in the field of space weather.	**K3**
CO4	Analyze the quantitative behavior of different space physics phenomena using various analysis methods.	**K4**
CO5	Identify ways in which experimental studies of space physics phenomena have advanced our understanding of basic plasma physics in the field of research.	**K5**

Course Title: ELECTRONICS(P) **Course Code: 22PPH4CC4P**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Acquire basic knowledge of digital logic levels and its application.	**K2**
CO2	Analyse and construct combinational logic circuits.	**K3, K4**
CO3	Demonstrate practical skills in functioning and testing the digital system	**K5**
CO4	Evaluate the results acquired	**K5**
CO5	Take projects in electronics relevant to industrials.	**K6**

CRITERION I **POs and COs**

Course Title: TROUBLESHOOTING AND REPAIRING DOMESTIC APPLIANCES **Course Code 22PPH4GEC2**		
CO Number	**CO Statement** **On the successful completion of the course, students will be able to,**	**Knowledge Level**
CO1	Remember the fundamental principles of electricity, electronics, and the operation of electrical equipment and applications	**K1**
CO2	Interpret the concepts of electronic hardware components and functions.	**K2**
CO3	Solve the issue of various domestic appliances.	**K3**
CO4	Analyze the problem of energy consumption in appliances.	**K4**
CO5	Estimate the energy consumption of domestic appliances based on electricity.	**K5**