

Name of the Department : DEPARTMENT OF PHYSICS

Academic Year : 2018-19

A. Program Outcome and Program Specific Outcomes

Name of the programme (UG/PG/M.Phil./ Diploma etc.)	Programme Outcomes Students will be able to	Program Specific Outcomes Students will be able to have
UG	1. Acquire knowledge on the concepts of general laws of physics governing the universe.	1. Thorough understanding of the basics of physics that includes mechanics, optics, electromagnetism and electronics.
	2. Relate the principles behind the fundamental theory of nature at both microscopic and macroscopic levels.	2. Practical knowledge behind the theory papers through laboratory experiments.
	3. Debate on the developing technologies to meet out the needs of the society	3. Skills to explore and identify the frontiers of modern technologies
PG	1. Gain exposure on the analysis and interpretation of mathematical models behind the problems of physics.	1. Wide opportunities to continue their career in the advancing research areas.
	2. Relate the mechanics in classical scale with the quantum level of matter.	2. Intelligence and competence to appear and clear competitive examinations in regard to their future upliftment.
	3. Survey the errors involved in an experimental work and make recommendations based on the results in an effective manner.	3. Exposure to inspect and resolve social issues by employing themselves in energy sectors, automobile industries and other core sectors.

Name of the programme (UG/PG/M.Phil./ Diploma etc.)	Programme Outcomes Students will be able to	Program Specific Outcomes Students will be able to acquire
M.Phil.	1. Develop new research methodologies through analytical thinking.	1 Professional skills to establish their teaching and Research standards.
	2. Figure out the principles behind the physical and mathematical techniques involved in solving scientific problems.	2 Expertise to handle various sophisticated software and instruments to characterize and examine the research outputs.
	3 Come up with innovative thoughts in promoting research to the advanced level.	

B1. Course Outcomes of all Programmes Offered by the Department

Name of the Programme : B.Sc. Physics

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
1.	Core – I: Properties of Matter	U16PH101	1 Classify the varying material properties like elasticity, mass, viscosity, surface tension etc.
			2 Explore the fundamental gravitational force and its application in the nature.
			3 Comprehend the basics behind the Sound.
2	Core – II: Mechanics	U16PH202	1 Recall the perception behind the various concepts of statics and hydrostatics.
			2 Demonstrate the functioning of projectile and simple harmonic oscillators
			3 Calculate the energy of rolling bodies and the acceleration due to gravity.
3	Core – III: Thermal Physics	U16PH3P3	1 Explain the laws of thermodynamics
			2 Clearly elucidate the concepts of low temperature physics and the theory of specific heat capacity.
			3 Acquire knowledge about classical and quantum theory of Radiation
			4 Analyse the distribution of micro particles on the basics of statistical Mechanics
4	Core – IV: Optics	U16PH404	1 Discuss the principles of interference, diffraction and polarization.
			2 Acquire knowledge about the aberrations caused in lenses and suggest some methods to reduce aberrations
			3 Develop the skill to operate and calculate various parameters using optical instruments.
5	Core – V: Electricity Magnetism and Electromagnetism	U16PH505	1 Recognize the fundamentals of electricity, magnetism and electromagnetism.
			2 Draw the vector diagram to find the voltage in an AC circuit and evaluate the power factor.
			3 Explain the concepts of electromagnetic theory on the basis of Maxwell's equations

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
6	Core – VI: Electronic Devices	U16PH506	1 Acquire knowledge about semiconductors and distinguish between p – type and n – type semiconductors.
			2 Design effective circuits to convert digital signal to analog and vice – versa using operational amplifier.
			3 Discuss on the applications of electronic devices in amplifiers, rectifiers, filters and oscillators.
7	Core – VII: Nuclear Physics, Wave Mechanics and Relativity	U16PH607	1 Deal with the fundamental properties of nucleus and their models.
			2 Interpret the concepts of particle physics, relativity and quantum mechanics.
			3 Predict the position of microparticles by implementing Schrodinger wave equations.
			4 Generate wave equations for some practical oscillators.
8	Core – VIII: Solid State Physics	U16PH608	1 Comprehend the concepts of Crystallography, bonding, structure and properties of crystals.
			2 Explain the structure of bonding in ionic, metallic and molecular bonding.
			3 Apply mathematical tools to calculate the energy for the formation of bonds
			4 Acquire knowledge about semiconductor and super conductor.
9	Elective – I: Atomic Physics	U16PH5:1	1 Classify the elements based on the quantum numbers and electronic configuration
			2 Analyse on the concepts of positive rays and identify the fine structure and spectral lines.
			3 Explain the concept of photo electric effect and apply it for various applications.
			4 Characterize the structural properties of crystals using X – Rays.
10	Elective – I: Communication System	U16PH5:2	1 Draw idea about the aspects of communication both digital and analog.
			2 Discuss the types of modulation implemented in modern communication systems.
			3 Familiarize with the fibre optic communication systems and their applications.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
11	Elective – II: Digital Electronics	U16PH6:1	1 Classify the various types of number system and give a description on logic gates and Boolean algebra.
			2 Describe on the combinational and sequential logic systems and construct flip – flops and counters using logic gates.
			3 Develop microprocessor program to solve simple mathematical problems.
12	Elective – II: Crystal growth and thinfilm physics	U16PH6:2	1 Acquire knowledge about the basics of growing crystals and preparing thin films by different techniques
			2 Predict the conditions required to grow crystals and to deposit thinfilm.
			3 Fabricate solar cells, active devices and integrated circuits.
13	Elective – III: Programming in C	U16PH6:3	1 Acquire knowledge about the computer language C and its functions.
			2 Write the syntax for various input/output operators and statements used in the program
			3 Develop C program on their own
14	Elective – III: Spectroscopy and Lasers	U16PH6:4	1 Elaborate the basic concepts of microwave, IR and Raman spectroscopy and the associated measurement techniques.
			2 Interpret Raman spectra and determine the structure of the molecules using Raman and IR spectroscopy.
			3 Explain the fundamentals of laser and its applications.
15	SBEC – I: Biophysics and Biomedical Instrumentation	U16PH2S1	1 Describe the underlying physical principles of the biological phenomena
			2 Obtain knowledge about the design and functioning of various Biomedical instruments
			3 Design electrodes for biosensors and other biological applications.
16	SBEC – II: Concepts Through Animation (Theory and Practicals)	U16PHPS2	1 Describe the flash package and explain flash oriented physics animations.
			2 Implement the Photoshop tools to prepare physics oriented objects.
			3 Design the premier package for editing and publishing a movie.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
17	SBEC – III: Web Designing (Theory and Practicals)	U16PHPS3	1 Inculcate computer knowledge and impart designing skill through the webpage.
			2 Create animations in the webpage
			3 Publish physics related concepts through the webpage.
18	NMEC – I: Electrical Appliances	U16PH3E1	1 Illustrate the basic ideas behind electrical appliances and its applications for domestic usage.
			2 Design wiring for a house and an industry.
			3 Apply the concept of electromagnetics to operate motors.
19	NMEC – II: Audio and Video Systems	U16PH4E2	1 Acquire in - depth knowledge about audio and video systems
			2 Elucidate the working principles and main features of audio and video devices
			3 Describe the design and operation of digital television.
20	Allied Physics – I: Mechanics, Sound, Thermal physics and Optics	U18PHY01	1 Acquire knowledge about the important branches of physics
			2 Explain the basic concepts in mechanics, sound, thermal physics and Optics.
			3 Determine the parameters of different kinds of materials.
21	Allied Physics – II: Electricity, Atomic and Nuclear Physics and Electronics	U16PHY02	1 Acquire an overview about the important branches of physics.
			2 Explains the basic concepts of electrostatics, electricity, Atomic physics and Nuclear Physics..
			3 Describes the band theory and types of semiconductors.
22	Allied Physics – I: Mechanics, Sound, Thermal physics and Optics	U18PHY33	1 Acquire knowledge about the important branches of physics
			2 Explain the basic concepts in mechanics, sound, thermal physics and Optics.
			3 Determine the parameters of different kinds of materials.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
23	Allied Physics – II: Electricity, Atomic and Nuclear Physics and Electronics	U16PHY44	1 Deal with the important branches of physics
			2 Explain the basic concepts in atomic, nuclear and electronics.
			3 Describe the concepts of band theory and distinguish between the types of semiconductors.
24	Applied Physics – II: Solid State Devices and Microprocessors	U16PHZ45	1 Acquire knowledge about diodes, transistors and FET.
			2 Explain the various modes of op-amp
			3 Develop knowledge to write programs using Intel 8085 assembly languages.
25	Core Pract – I: Major Practicals -I		1 Perform experiments on the principles of mechanics and optics.
			2 Determine the basic parameter such as length, radius elastic constants etc., accurately.
			3 Develop skills to handle various instruments to verify the laws of sound, light and fluid dynamics.
26	Core Pract – II: Major Practicals –II		1 Perform experiments on the principles of mechanics and optics.
			2 Estimate the physical quantities of different types of matter.
			3 Cultivate technical skills to troubleshoot the errors in various instruments and determine accurate results.
27	Core Pract – III: Major Practicals -III		1 Perform experiments on the principles of thermal physics and optics.
			2 Determine the physical quantities such as dispersive nature of biomaterials.
			3 Cultivate technical skills to troubleshoot the errors in various instruments and determine accurate results.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
28	Core Pract – IV: Major Practicals -IV		1 Perform experiments on the principles of thermal physics and optics.
			2 Analyze the microstructural nature of biomolecules.
			3 Cultivate technical skills to troubleshoot the errors in various instruments and determine accurate results.
29	Core Pract – V: Major Practicals -V	U16PH5P5	1 Perform experiments on the principles of electricity, magnetism, electronics and optics.
			2 Evaluate the effect of sterilization using IR radiation on Micro organism
			3 Develop skills to write simple mathematical and logical problems using C language.
30	Core Pract – VI: Major Practicals -VI	U16PH6P6	1 Gain knowledge on the principles of electronics and semiconductor devices.
			2 Analyze the impedance and dielectric properties of certain solids and liquids.
			3 Improve skills to write assembly language program to solve simple mathematical and logical problems using microprocessor INTEL 8085.
31	Allied Physics Practicals (For Maths)	U16PHYP1	1 Perform experiments on the principles of mechanics, electricity, magnetism, thermal physics and optics.
			2 Estimate the physical quantities of different types of matter.
			3 Cultivate technical skills to characterize the semiconductor devices and construct digital circuits using discrete components.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
32	Allied Physics Practicals (For Chemistry)	U16PHYP1	1 Perform experiments on the principles of mechanics, electricity, magnetism, thermal physics and optics.
			2 Estimate the physical quantities of different types of matter.
			3 Cultivate technical skills to characterize the semiconductor devices and construct digital circuits using discrete components.
33	Applied Physics Practicals	U16PHZP1	1 Analyse the characteristics of semiconductor devices.
			2 Determine the magnetic properties of materials using deflection magnetometer.
			3 Construct digital circuits using discrete components.
34	Digital Electronics And Micro Processors Lab	U15CS6P6	1 Develop skills to create analog and digital circuits
			2 Write assembly language program to solve simple mathematical and logical problems using microprocessor INTEL 8085.
			3 Perform experiments to operate shift registers, asynchronous counters using flip – flops.

B2. Course Outcomes of all Programmes Offered by the Department

Name of the Programme : M.Sc. Physics

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
1	Core – I: Mathematical Physics – I	P16PH101	1 Gain mathematical knowledge behind physics Problems
			2 Develop problem solving ability related to practical Applications.
			3 Improve skills to solve integration and differentiation by numerical methods
2	Core – II: Classical Dynamics	P16PH102	1 Comprehend different formulations of classical dynamics with their applications.
			2 Explain the frontier topics of Non-linear dynamics.
			3 Realize the theories governing Relativity.
3	Core – III: Statistical Mechanics	P17PH103	1 Acquire the consequences of laws of thermodynamics.
			2 Recall the principles and application of classical and quantum statistical mechanics.
			3 Analyse the basic concepts involved in phase transition.
4	Elective – I: Analog and Digital Electronics	P18PH1:1	1 Characterise some important solid -state devices.
			2 Deduce basic ideas about communications through optic fiber cables.
			3 Distinguish analog and digital electronics and apply them for various applications in modern era.
5	Elective – I: Modern Communication Systems	P16PH1:2	1 Have knowledge of theories involving modulation and demodulation.
			2 Explain the principles of communications.
			3 Analyse the parameters required for broad band, satellite and mobile communications.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
6	Core – IV: Mathematical Physics	P16PH204	1 Analyze the importance of complex variables in Physical entities.
			2 Apply Fourier integrals and Laplace transformation in solving engineering problems.
			3 Comprehend the role of special functions and group theory in day to day applications.
7	Core – V: Electromagnetic Theory	P16PH205	1 Get the thorough knowledge in electrostatics and magnetostatics.
			2 Relate the laws associated with electromagnetism to its applications.
			3 Explain the nature of electromagnetic wave propagation in different medium.
8	Elective – II: Atomic and Molecular Physics	P16PH2:1	1 Predict and analyse the atomic spectra and Quantum Chemistry of molecules.
			2 Infer and relate the applications of Microwave, Infrared, Raman and Resonance spectroscopy with their principles.
			3 Interpret on the Raman and NMR spectra of molecules
9	NMEC – Virtual Labs	P16PHPE1	1 Enhance their ability to perform physics experiments on their own
			2 Manage System around the Virtual Labs and explain the various tools for learning, including additional web-resources, video-lectures, animated demonstrations and self-evaluation.
			3 Develop artificial neural networks through virtual laboratory experiments
10	Core – VI: Quantum Mechanics	P16PH306	1 Have clear understanding on the fundamental concepts of quantum mechanics.
			2 Utilise different methods for studying quantum mechanical systems.
			3 Derive Schrodinger wave equations for various practical systems.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
11	Core – VII: Solid State Physics	P16PH307	1 Identify crystals, its periodic structure and its defects.
			2 Explain the properties that result from the distribution of electrons in metals, semiconductors and insulators.
			3 Make use of concepts of defects and dislocations in crystals for higher research areas.
12	Core – VIII: Microprocessor and Microcontroller	P16PH307	1 Study the Architecture of 8086 microprocessor.
			2 Design the aspects of I/O and Memory Interfacing circuits.
			3 Explain about communication and bus interfacing.
13	Elective – III: Nuclear Physics	P16PH3:1	1 Depict the atomic nucleus, nuclear reactions and radioactive decays.
			2 Acquire knowledge about classification of elementary particles.
			3 Identify the hazardous and applications of nuclear fission and fusion.
14	Core – IX: Quantum Mechanics- II	P16PH409	1 Extend their idea and knowledge on the matrix formulation of Quantum Mechanics and the concept of angular momentum.
			2 Have thorough knowledge of relativistic Quantum Mechanics and Quantum field theory.
			3 Describe the Lagrangian and Hamiltonian formulations
15	Core – X: Solid State Physics	P16PH410	1 Relate and differentiate the basic theories to explain the behaviour of various materials like dielectric, ferroelectric, dia, para, ferro and ferri magnetic materials.
			2 Acquire knowledge about superconductivity and the various optical properties of materials.
			3 Characterize the optical properties of various materials.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
16	Elective – IV: Crystal Growth, Thin Film and Nano Science	P16PH4:1	1 Develop skills in research activities particularly in experimental physics.
			2 Appreciate qualitative idea on the fundamentals of growing crystals, coating thin films, Synthesis of nano materials and characterizing the prepared samples.
			3 Interpret on the structural, optical, electrical and morphological properties of thinfilms, crystals and nanomaterials.
17	Core Prac. – I: Major Practicals – I	P16PH1P1	1 Gain practical exposure about theoretical Concepts and investigate the principles.
			2 See through directly the effects of optics and electromagnetism.
			3 Cultivate technical skills to troubleshoot the errors in various instruments and determine accurate results.
18	Core Prac. – II: Major Practicals – II	P16PH2P2	1 Perform experiments on the theoretical Concepts of electronics and optics
			2 .Investigate the characteristics of semiconductor devices.
			3 Cultivate technical skills to troubleshoot the errors in various instruments and determine accurate results.
19	Core Prac. – III: Major Practicals – III	P16PH3P3	1 Perform experiments on the theoretical Concepts of electronics and material science
			2 Interpret the science behind the material properties.
			3 Enhance the technical skills to troubleshoot the system errors and determine accurate results.

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
20	Core Prac. – IV: Major Practicals	P16PH4P4	<ol style="list-style-type: none"> <li data-bbox="813 401 1380 485">1 Develop programs relevant to microprocessor. <li data-bbox="813 485 1380 583">2 Write C program to solve complicated equations through numerical methods. <li data-bbox="813 583 1380 705">3 Enhance the technical skills to troubleshoot the system errors and determine accurate results.

B3. Course Outcomes of all Programmes Offered by the Department

Name of the Programme : M.Phil. Physics

Sl. No.	Name of the Course	Course Code	Program Specific Outcomes (After completing this course, the students will be able to)
1	Core Paper –I Research Methodology	M18PH101	1 Adopt the complete theoretical knowledge involved in mathematical physics
			2 Elevate their scientific writing skills.
			3 Skills to extend the frontier of their understanding
2	Core Paper – II Advanced Physics	M18PH102	1 See through the advancements in crystallography
			2 Apply the grasped context in day – to – day applications
			3 Gain exposure on the working principles of sophisticated instruments.
3	Elective – I Recent Trends In Thin Film Technology	M18PH:01	1 Extend their ideas on the methodology to prepare thinfilms
			2 Achieve efficient thinfilms for various applications
			3 Track advancements and technologies related to recent research areas.
4	Elective – II Nonlinear Dynamics and its application in fiber optics	M18PH:02	1 Relate the dynamics of linear and non-linear optics
			2 Develop wave equations on the basis of non – linear dynamics.
			3 Solve the physics problems using various software.

