



Department of Physics

B.Sc. Physics

S.No.	Course Code	Course Name	Course Outcomes
SEMESTER- I			
1.	21UPHC11	Core Course - I: Properties of Matter and Mechanics	CO1[K1]: define the elasticity of a material, viscosity of the liquid, surface tension, laws of gravitation and dynamics of a rigid body CO2[K2]: explain the elasticity of a material, viscosity of the liquid, surface tension, gravitational field, potential and dynamics of a rigid body CO3[K3]: calculate moduli of elasticity, viscosity, excess pressure of a liquid drop, the value of 'g' at various places of earth and moment of inertia of different bodies CO4[K4]: compare the elasticity of different materials, viscosity of two liquids, surface tension of a liquid drop and bubble, the value of g at different points and moment of inertia of different bodies CO5[K4]: examine the physical parameters related to properties of matter and mechanics



S.No.	Course Code	Course Name	Course Outcomes
2.	21UPHC1P	Core Course - II: Practical: Properties of Matter and Mechanics	C01[K1]: identify the concepts of properties of matter and mechanics underlying in the experiments C02[K2]: demonstrate the concepts of properties of matter and mechanics underlying in the experiments C03[K3]: calculate the physical parameters of a matter from the experimental data C04[K4]: analyze the experimental results C05[K5]: evaluate the physical parameters of a matter
3.	21UPHS1P	Skill Enhancement Course - I: Practical: Introduction to Office Suite and Web Search	C01[K1]: operate the computer to create and store the files in windows environment C02[K2]: explain the usage of word, excel, power point presentation and mail merge C03[K3]: utilize the technology to send and receive mail C04[K4]: examine the importance of browsers, MS office and search engines C05[K5]: choose the appropriate MS office functions for applications
SEMESTER- II			



S.No.	Course Code	Course Name	Course Outcomes
4.	21UPHC21	Core Course - III: Heat and Thermodynamics	CO1[K1]: define the basic principles from real gas behaviour, transmission of heat, thermodynamics, and entropy CO2[K2]: explain the concepts of kinetic theory of gases, thermometry, calorimetry, modes of heat transfer, thermodynamics, and entropy CO3[K3]: apply the concepts of thermal physics to solve problems CO4[K4]: compare the transport phenomenon of gases, specific heat capacity of matter, modes of heat transfer and entropy CO5[K4]: examine the parameters related to heat and thermodynamics
5.	21UPHC2P	Core Course - IV: Practical: Thermal Physics	CO1[K1]: identify the concepts of thermal physics underlying in the experiments CO2[K2]: demonstrate the concepts of thermal physics underlying in the experiments CO3[K3]: calculate the physical parameters of a matter from the experimental data CO4[K4]: analyze the experimental results CO5[K5]: evaluate the physical parameters of a matter



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6.	21UPHS21	Skill Enhancement Course - II: Sound and Ultrasonics	CO1[K1]: describe the velocity of sound, Doppler effect, acoustics of building, production of ultrasonics and its applications CO2[K2]: explain the concepts of sound and ultrasonics CO3[K3]: present concepts of sound, Doppler effect, acoustics of building, production and applications of ultrasonics CO4[K4]: analyze the concepts of sound and ultrasonics used in instruments and devices CO5[K4]: distinguish applications of sound and ultrasonics
SEMESTER- III			
7.	21UPHC31	Core Course - V: Electricity and Electromagnetism	CO1[K1]: describe the electric field, potential, electric current, magnetic effects of currents, electromagnetic induction, AC current and working of AC bridges CO2[K2]: explain the concepts of electric field, electric potential, inductance, magnetic effects of currents, electromagnetic induction, and alternating currents CO3[K3]: apply the concepts of electricity and electromagnetism to solve problems CO4[K4]: analyze the applications of Gauss's law, magnetic effect of electric currents, electromagnetic induction, AC currents and AC bridges CO5[K4]: examine the parameters related to electricity and electromagnetism



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8.	21UPHC3P	Core Course - VI: Practical: Electricity and Electromagnetism	C01[K1]: identify the basic concepts of electricity and electromagnetism underlying in the experiments C02[K2]: demonstrate the concepts of electricity and electromagnetism by connecting electrical circuits C03[K3]: calculate the electrical and magnetic parameters from the experimental data C04[K4]: analyze the results of the experiments C05[K5]: evaluate the physical parameters
9.	21UPHN31	Non Major Elective Course - I: Physics of Home Appliances	C01[K1]: reproduce the basic principles of electricity, DC motors, UPS, solar energy devices and electrical home appliances C02[K2]: explain the concepts of electricity, DC motors, transformers, solar energy utilization and electrical devices C03[K3]: present the functions of various devices used in everyday life C04[K4]: analyze the concepts of physics in everyday life C05[K4]: examine the concepts of physics in everyday life



S.No.	Course Code	Course Name	Course Outcomes
10.	21UPHS31	Skill Enhancement Course - III: Electrical Wiring and Home Appliances	CO1[K1]: identify the basic concepts of electricity, electrical wiring and home appliances CO2[K2]: explain the usage of AC and DC currents, motors, lighting accessories, earthing, fuses and electric devices CO3[K3]: apply concepts of electricity, electrical wiring and home appliances to solve problems CO4[K4]: analyze the functions of AC and DC currents, AC and DC machines, switches, types of wires, fuses and home appliances CO5[K5]: justify the simple house wiring circuits
SEMESTER- IV			
11.	21UPHC41	Core Course - VII: Optics and Spectroscopy	CO1[K1]: identify the concepts of geometrical optics, physical optics and spectroscopy CO2[K2]: describe the concepts of geometrical optics, physical optics and spectroscopy CO3[K3]: apply the concepts of geometrical optics, physical optics and spectroscopy to solve problems CO4[K4]: distinguish optical phenomena due to refraction, interference, diffraction, polarization and light matter interaction CO5[K4]: examine the concepts of optics used in the optical devices/instruments



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12.	21UPHC4P	Core Course - VIII: Practical: Optics	CO1[K1]: identify the concepts of image formation, dispersion, interference, diffraction & polarization underlying in the experiments CO2[K2]: demonstrate the concepts of geometrical optics and physical optics underlying in the experiments CO3[K3]: calculate the physical parameters from the experimental data CO4[K4]: analyze the experimental results CO5[K5]: evaluate the physical parameters
13.	21UPHM41	Self-Paced Learning (Swayam Course): Nature and Properties of Materials	CO1[K1]: identify the background and the key words in Nature and Properties of Materials CO2[K2]: demonstrate independent and self-paced learning for clear understanding of the concept CO3[K3]: develop computer and communication skills to broaden their knowledge in the course CO4[K3]: use high quality reading resources, communication tools and technology to send assignments and to take up test CO5[K4]: analyse critically and apply technical skills to comprehend the ideas prescribed



S.No.	Course Code	Course Name	Course Outcomes
14.	21UPHM42	Self-Paced Learning (Swayam Course): Softskill Development	<p>C01[K1]: identify the background and the key words in softskill development</p> <p>C02[K2]: demonstrate independent and self-paced learning for clear understanding of the concept</p> <p>C03[K3]: develop computer and communication skills to broaden their knowledge in the course</p> <p>C04[K3]: use high quality reading resources, communication tools and technology to send assignments and to take up test</p> <p>C05[K4]: analyse critically and apply technical skills to comprehend the ideas prescribed</p>
15.	21UPHN41	Non Major Elective Course - II: Non-Conventional Energy Resources	<p>C01[K1]: outline the basic concepts in non-conventional energies.</p> <p>C02[K2]: specify the applications and environmental impacts of non-conventional energy resources</p> <p>C03[K3]: report the present status of non conventional energy resources</p> <p>C04[K4]: analyze the physics concepts involved in non-conventional energies</p> <p>C05[K4]: compare the merits and demerits of non-conventional energies</p>
16.	21UPHS41	Skill Enhancement Course - IV: Instrumentation Skill	<p>C01[K1]: list the various analog and digital devices and instruments</p> <p>C02[K2]: classify the various basic electrical instruments</p> <p>C03[K3]: operate the various analog and digital instruments</p> <p>C04[K4]: measure various physical parameters using various digital and analog instruments</p> <p>C05[K4]: analyze the various physical parameters of digital and analog instruments</p>

CRITERION - I



S.No.	Course Code	Course Name	Course Outcomes
SEMESTER- V			
17.	21UPHC51	Core Course - IX: Atomic Physics	C01[K1]: reproduce the characteristics of rays, various atom models, fine structure of spectral lines, X-rays and atomic spectra C02[K2]: describe the concepts of atomic physics C03[K3]: apply the concepts of atomic physics to solve problems C04[K4]: analyze the characteristics of rays, various atom models, fine structure of spectral lines, X-rays and laser emission lines C05[K5]: evaluate the different physical parameters related to atomic physics
18.	21UPHC52	Core Course - X: Analog Electronics	C01[K1]: identify the basic principles behind electronic devices and circuits C02[K2]: describe the basic principle and working of electronic circuits C03[K3]: apply basic principles to solve problems in electronics circuits C04[K4]: examine the electronic devices, electronic circuits and its applications C05[K5]: evaluate the working of electronic circuits



S.No.	Course Code	Course Name	Course Outcomes
19.	21UPHC53	Core Course - XI: Relativity and Quantum Mechanics	CO1[K1]: state basic terms in relativity and quantum mechanics CO2[K2]: explain about relativity, wave mechanical concepts, general formalism and applications of Schrödinger equations CO3[K3]: apply the concepts of relativity and quantum mechanics to solve problems CO4[K4]: analyze the validity conditions of relativity and quantum mechanics concepts CO5[K5]: deduce the solutions of various problems in relativity and quantum mechanics
20.	21UPHC5P	Core Course - XII: Practical: General Physics	CO1[K1]: identify the concepts of optics, electricity and electromagnetism and modern physics underlying in the experiments CO2[K2]: demonstrate the concepts of optics, electricity and electromagnetism and modern physics CO3[K3]: calculate the physical parameters from the experimental data CO4[K4]: analyze the experimental results CO5[K5]: evaluate the physical parameters



S.No.	Course Code	Course Name	Course Outcomes
21.	21UPH051	Major Elective Course - I: Classical and Statistical Mechanics	<p>C01[K1]: state the laws, principles and functions involved in classical and statistical mechanics</p> <p>C02[K2]: explain the concepts of classical and statistical mechanics</p> <p>C03[K3]: apply the Newtonian mechanics, Lagrangian formulations, Hamiltonian formulations, classical and quantum statistics to different systems</p> <p>C04[K4]: classify the different formulations in classical mechanics and different distribution laws in statistical mechanics</p> <p>C05[K5]: justify the different formulations/statistics in classical and statistical mechanics</p>
22.	21UPH052	Major Elective Course - I: Astrophysics	<p>C01[K1]: describe the birth of astronomy, astronomical tools, properties of sun, earth and galaxy</p> <p>C02[K2]: explain the history of astronomy, different types of telescopes and stars, history of sun & earth and galaxy models</p> <p>C03[K3]: calculate the different physical parameters of sun, stars, earth and galaxies</p> <p>C04[K4]: distinguish different types of astronomical tools, stars and galaxy models</p> <p>C05[K5]: justify the concepts behind with astrophysics</p>



S.No.	Course Code	Course Name	Course Outcomes
23.	21UPH053	Major Elective Course - I: Basis of Data Communications and Programming in C	<p>CO1[K1]: recognize basic terms in data communications and c programming</p> <p>CO2[K2]: explain the way of data communications and basic structure of programming in C</p> <p>CO3[K3]: compute various problems using programming in C</p> <p>CO4[K4]: analyze the behaviors of computer network, data communication and applications of C programming</p> <p>CO5[K5]: elaborate the data communications and the procedure of writing programs</p>
24.	21UPH054	Major Elective Course - II: Mathematical Physics	<p>CO1[K1]: outline the fundamental rules and laws in vectors, matrix, differential equations and partial differential equations</p> <p>CO2[K2]: explain the fundamental theorems in vectors, matrix differential equations, partial differential equations and its applications</p> <p>CO3[K3]: apply the formulae, theorems and laws to solve the problems</p> <p>CO4[K4]: classify the types of operators, matrices, differential and partial differential equations</p> <p>CO5[K5]: evaluate a physical system by using various mathematical methods, theorems and functions</p>



S.No.	Course Code	Course Name	Course Outcomes
25.	21UPHO55	Major Elective Course - II: Mathematical Methods	CO1[K1]: list various numerical methods available to solve problems CO2[K2]: explain the procedures to apply the various approximation methods CO3[K3]: compute the solution of given equation by using appropriate methods CO4[K4]: analyze the validity of various numerical or approximation methods CO5[K5]: deduce the exact solutions of given binomial, linear, differential and integration equations
26.	21UPHO56	Major Elective Course - II: Energy Physics	CO1[K1]: list out the various non-conventional energies available in our world CO2[K2]: explain the physics concepts behind construction and working of systems which are used to convert nonconventional energies into electrical energy CO3[K3]: present the applications of non-conventional energies CO4[K4]: analyze the environmental impacts and present status of solar, ocean, wind, biomass and geothermal energy CO5[K5]: justify the merits and demerits of non-conventional energies



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27.	21UPHS51	Skill Enhancement Course - V: Fibre Optics	<p>C01[K1]: list the types, characteristic physical parameters, different ways of connections, measurement methods and applications of optical fibre wave guide</p> <p>C02[K2]: explain theory of ray and mode transmission concepts, characteristics, different ways of connections, measurement methods and applications of optical fibre wave guide</p> <p>C03[K3]: apply the concepts of fibre optics to solve problems</p> <p>C04[K4]: identify the measurement methods to characterize the optical fibres</p> <p>C05[K4]: differentiate the characteristics, connecting methods and applications of different types of optical fibres</p>
28.	21UPHJ51	INTERNSHIP	<p>C01[K1]: identify the companies/industries/institutions for their career</p> <p>C02[K3]: operate the machines/equipments available in the chosen companies/industries/ institutions</p> <p>C03[K4]: inspect the performance of machines/equipments available in the chosen companies/industries/institutions</p> <p>C04[K5]: choose their career in a particular field</p> <p>C05[K6]: plan to become an entrepreneur</p>
SEMESTER- VI			



S.No.	Course Code	Course Name	Course Outcomes
29.	21UPHC61	Core Course - XIII: Solid State Physics	C01[K1]: reproduce the basic principles behind the solid state materials C02[K2]: explain the basic concepts of bonding in solids, crystal structures, electron theory of metals, magnetic, superconducting and dielectric materials C03[K3]: apply the concepts of solid state physics to solve problems C04[K4]: examine the importance of types of bonding, structure determination, electron theory of solids, magnetic, dielectric and superconducting materials C05[K5]: evaluate the different physical parameters of solid materials
30.	21UPHC62	Core Course - XIV: Nuclear Physics	C01[K1]: describe the concepts of nuclear physics C02[K2]: explain the important phenomena in nuclear physics C03[K3]: apply the concepts of nuclear physics to solve the problems C04[K4]: analyse the structure of atomic nuclei, various nuclear models, decay process, particle accelerators and radiation detectors C05[K5]: evaluate the properties of nuclei
31.	21UPHC63	Core Course - XV: Digital and Communication Electronics	C01[K1]: identify the concepts of digital and communication electronics C02[K2]: describe the concepts of digital and communication electronics C03[K3]: apply basic principles to solve problems in digital and communication electronics C04[K4]: examine the digital circuits, communication systems and its applications C05[K5]: evaluate the concepts of digital and communication electronics



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32.	21UPHJ61	Core Course - XVI: Project	C01[K2]: demonstrate the physical, chemical and mathematical concepts of their project work C02[K3]: present the physical, chemical and mathematical concepts of their project work C03[K4]: analyze the their project work qualitatively and quantitatively C04[K5]: justify the benefits of their project work to the society C05[K6]: develop new plans for further improvement of their project work
33.	21UPHC6P	Core Course - XVII: Practical: Electronics	C01[K1]: identify the concepts of analog and digital electronics underlying in the experiments C02[K2]: demonstrate the concepts of analog and digital electronics C03[K3]: calculate the physical parameters from the experimental data C04[K4]: analyze the experimental results C05[K5]: evaluate the physical parameters
34.	21UPHO61	Major Elective Course - III: Nano Physics	C01[K1]: reproduce the basic principles on synthesis, characterization and properties of nano-materials C02[K2]: explain the concepts of preparation, characterization and properties of nano-materials C03[K3]: report the physical and chemical parameters of nano-materials C04[K4]: examine the importance of nano-materials C05[K4]: analyze the scientific perspective of nano-materials



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35.	21UPHO62	Major Elective Course - III: Microprocessor Fundamentals	<p>C01[K1]: describe the basic principles of microprocessor architecture, instructions and interfacing devices</p> <p>C02[K2]: explain the concepts of assembly language programs, interrupts and interfacing of microprocessor (Intel 8085)</p> <p>C03[K3]: write simple programs using instruction set and interface a microprocessor to an I/O device</p> <p>C04[K4]: analyze architecture of 8085, assembly language program and apply it to other practical situations</p> <p>C05[K4]: examine the importance of an assembly language program and interfacing of 8085</p>
36.	21UPHO63	Elective Major Course - III: Medical Physics	<p>C01[K1]: state the human physiological systems, biopotential transducers, recorders and equipments used in medical field</p> <p>C02[K2]: explain the concepts of physics applied in medical instruments</p> <p>C03[K3]: apply the physics concepts in biomedical instrumentation</p> <p>C04[K4]: examine the results of biopotential recorders and various medical equipments</p> <p>C05[K4]: compare the different types of biopotential electrodes, transducers and recorders used in Biomedical instrumentation.</p>



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37.	21UPHS61	Skill Enhancement Course - VI: Solar Photovoltaics	CO1[K1]: state the basic principles of solar energy, photo-voltaic, and types of solar cells and design of PV systems CO2[K2]: explain the concepts of solar energy, photo-voltaic, and types of solar cells and design of PV systems CO3[K3]: present the concepts of solar energy, photo-voltaic, and types of solar cells and design of PV systems CO4[K4]: examine the importance of solar energy and solar cells. CO5[K4]: analyse the scientific perspective of solar cells

Coursed offered to other Departments:

S.No	Course Code	Course Name	Course Outcomes
1.	21UMAA11/21UCHA31	Allied Course - I/III: Physics - I	CO1[K1]: outline the basic concepts of properties of matter, heat transmission, geometrical and physical optics CO2[K2]: explain the basic concepts of properties of matter, heat transmission, geometrical and physical optics CO3[K3]: choose appropriate formulae to solve problems CO4[K4]: analyze the physical and optical parameters of materials CO5[K4]: examine the physical and optical parameters of materials



2.	21UMAA1P/21UCHA3P	Allied Course - I/III: Practical: Physics - I	<p>CO1[K1]: identify the concepts of physics underlying in the experiments</p> <p>CO2[K2]: demonstrate the concepts of physics underlying in the experiments</p> <p>CO3[K3]: calculate the physical parameters of a matter/electrical circuits from the experimental data</p> <p>CO4[K4]: analyze the experimental results</p> <p>CO5[K5]: evaluate the physical parameters of a matter/electrical circuits</p>
3.	21UMAA21/21UCHA41	Allied Course - II/IV: Physics - II	<p>CO1[K1]: outline the basic concepts of relativity, atomic and crystal physics, analog and digital electronics</p> <p>CO2[K2]: explain the basic concepts of relativity, atomic and crystal physics, analog and digital electronics</p> <p>CO3[K3]: choose appropriate formulae to solve problems</p> <p>CO4[K4]: analyze the applicability of special theory of relativity, physical parameters of atoms, crystals, and behavior of electronic circuits</p> <p>CO5[K4]: inspect the applicability of special theory of relativity, physical parameters of atoms, crystals, and behavior of electronic circuits</p>



4.	21UMAA2P/21UCHA4P	Allied Course - II/IV: Practical: Physics - II	CO1[K1]: identify the concepts of physics underlying in the experiments CO2[K2]: demonstrate the concepts of physics underlying in the experiments CO3[K3]: calculate the physical parameters of a matter/electronic circuits from the experimental data CO4[K4]: analyze the experimental results CO5[K5]: evaluate the physical parameters of a matter/electronic circuits
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