Govt. Degree College Nowshera
Department of Physics

BACHELOR DEGREE PROGRAMME IN PHYSICS (CBCS):

Semester	Course No.	Title	Credits	Name of Course
I	**UPHTC-101**	**Mechanics, Oscillation and Relativity**	4	CORE
	UPHPC-102	**Lab Course**	2	CORE
II	**UPHTC-201**	**Vector Calculus, Electrostatics and Electromagnetic Waves**	4	CORE
	UPHPC-202	**Lab Course**	2	CORE SKILL ENHANCEMENT
III	**UPHTC-301**	**Electronics, Thermodynamics and Statistical Mechanics**	4	CORE
	UPHPC302	**Lab Course**	2	CORE
	UPHSE303	**Physics Workshop Skill**	4	SKILL ENHANCEMENT
IV	**UPHTC-401**	**Waves and Optics**	4	CORE
	UPHPC-402	**Lab Course**	2	CORE
	UPHSE-403	**Renewable Energy and Energy Harvesting**	4	SKILL ENHANCEMENT
V	**UPYTE-501**	**Modern Physics**	4	CORE
	UPYTE-502	**Lab Course**	2	CORE
	UPYTS-503	**Basic Instrumentation Skills**	4	SKILL ENHANCEMENT
VI	**UPYTE-601**	**Solid State Physics, Quantum Optics and Electronics.**	4	CORE
	UPYTE-602	**Lab Course**	2	CORE
	UPYTS-603	**Weather Forecasting**	4	SKILL ENHANCEMENT

PROGRAMME OUTCOMES: B. Sc. PHYSICS

Department of Physics	**After successful completion of three-year degree program in physics a student should be able to**
Programme Outcomes	**PO-1**. Demonstrate, solve and an understanding of major concepts in all disciplines of Physics. **PO-2.** Solve the problem and also think methodically, independently and draw a logical conclusion. **PO-3**. Employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of Physics experiments. **PO-4**. Create an awareness of the impact of Physics on the society, and development outside the scientific community. **PO-5**. discover the capability to use ICT, Electrical devices and other related resources for life-long learning **PO-6**. To inculcate the scientific temperament in the students and outside the scientific community. **PO-7**. To motivate the students to pursue PG courses in reputed institutions **PO-8**: Students will be capable of oral and written scientific communication and will prove that they can think critically and work independently.
Programme Specific Outcomes	**PSO-1** To understand the basic laws and explore the fundamental concepts of physics **PSO-2** To understand the concepts and significance of the various physical phenomena. **PSO-3** To carry out experiments to understand the laws and concepts of Physics. **PSO-4** To apply the theories learnt and the skills acquired to solve real time problems. **PSO-5** To acquire a wide range of problem-solving skills, both analytical and technical and to apply them. **PSO-6** To enhance the student's academic abilities, personal qualities, and transferable skills this will give them an opportunity to develop as responsible citizens. **PSO-7** To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community. **PSO-8** To motivate the students to pursue PG courses in reputed institutions. **PSO-9** This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements. **PSO-10** Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics
Course Outcomes B. Sc Physics	
Course	**Outcomes After completion of these courses students should be able to**

UPHTC-101: MECHANICS, OSCILLATION AND RELATIVITY (Credit:4)	**CO-1**. Know the Cartesian, spherical polar and cylindrical co-ordinate systems. **CO-2**. Understand Newton's Laws of motion and their applications such as projectile and rocket motion **CO-3**: Gain the knowledge of motion in central force field **CO-4**. Classify elastic and inelastic scattering **CO-5**: Know the difference between Laboratory and centre of mass system **CO-6**: To understand the Special Theory of Relativity. **CO-7**: Discuss the Michelson- Morley Experiment.
UPHPC-102: PHYSICS (Lab Course) (Credit:2)	**CO-1**: A working knowledge of fundamental physics and basic mechanics principles. **CO-2**: The ability to identify, formulates, and solve physics problems. **CO-3**: The ability to formulate, conduct, analyses and interprets experiments in physics. **CO-4**: The ability to use modern physics techniques and tools, including mathematical techniques, graphs and laboratory instrumentation. **CO-5**: Students would perform basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements.
UPHTC-201: VECTOR CALCULUS, ELECTROSTATICS AND ELECTROMAGNETIC WAVES (Credit:4)	**CO-1**: Understand basics of vector calculus. **CO-2**: Understand divergence, gradient and curl and their physical interpretation. **CO-3**: Understand divergence theorem, Green's theorem, and Stoke's theorem and appreciate its applications. **CO-4**: Understand the basic concepts of electric and magnetic fields. **CO-5**: Understand the concept of conductors, dielectrics, inductance and capacitance. **CO-6**: Gain knowledge on the nature of magnetic materials. **CO-7**: Understand the concept of static and time varying fields. **CO-8**: Gain knowledge on electromagnetic induction and its applications **CO-9**: Gain knowledge on EM waves, propagation and their properties. **CO-10**: Ability to use Maxwell's equations in calculations featuring both free and stationary electromagnetic waves.
UPHPC-202: PHYSICS (Lab Course) (Credit:2)	**CO-1**: Understand physical characteristics of SHM and obtaining solution of the oscillator using experiment. **CO-2**: Students would gain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc.
UPHTC-301: ELECTRONICS THERMODYNAMICS AND STATISTICAL MECHANICS (Credit:4)	**CO-1**: Know the special purpose Diode. **CO-2**: To study the Transistor Amplifier. **CO-3**: To understand the FET, JFET and MOSFET. . **CO-4**: To study the Regulated Power supply. **CO-5**: To understand the Sequential Logic Circuits. **CO-6**: To study kinetic theory of Gases. **CO-7**: Faraday's Laws, Entropy and other thermal properties of matter. **CO-8**: Know the elementary concept of statistics. **CO-9**: Understand statistical distribution of system of particles. **CO-10**: To study Quantum statistics.
UPHPC-302: PHYSICS	**CO-1**: Understand the applications of diode, npn transistor, and OP-AMP and

(Lab Course) (Credit:2)	logic gates. **CO-2**: Understand half adder and full adder. **CO-3**: Understand tunnel diode characteristics. **CO-4**: Students would gain practical knowledge about heat and radiation, thermodynamics, thermo emf etc. and perform various experiment
UPHSE-303: Physics Workshop Skill (Credit:4)	**CO-1: To understand the basics of physics instruments** **CO-2: To study about elementary tools used in the physics lab.**
UPHTC-401: WAVES AND OPTICS (Credit:4)	**CO-1**: understand the phenomenon of interference and its applications **CO-2**: describe the working of optical instruments like microscopes and telescopes **CO-3**: solve problems related to polarization and interference of light **CO-4**: explain the principles of various lasers **CO-5**: recognize the applications of laser in day to day life **CO-6**: find wavelength of monochromatic light by forming Newton's rings. **CO-7**: The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering.
UPHPC-402: PHYSICS (Lab Course) (Credit:2)	The practical knowledge of wave motion doing experiments: Tuning fork, electric vibrations. They would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: Prism, grating, spectrometers
UPHSE-403: Renewable Energy and Energy Harvesting (Credits: 4)	CO-1: To study about various renewable energy sources. CO-2: To study about the various process/methods of energy Harvesting. CO-3: To study about renewable energy sources. CO-4: To study about various methods of Energy Harvesting.
UPYTE-501: MODERN PHYSICS (Credit:4)	**CO-1**. Understand De-Broglie hypothesis and Uncertainty principle **CO-2**. Derive Schrodinger's time dependent and independent equations **CO-3**. Solve the problems using Schrödinger's steady state equation **CO-4**. Know the properties of nucleus likes binding energy, magnetic dipole moment and electric quadruple moment **CO-5**. To understand the concept of radioactivity and decays law **CO-6**. To study achievement of Nuclear Models of Physics and its limitations **CO-7**. To give an extended knowledge about nuclear reactions such as nuclear fission and fusion **CO-8**. To understand the basic concept of Particle Physics **CO-9**. Understand different operators in Quantum Mechanics
UPYTE-502: PHYSICS (Lab Course) (Credit:2)	In this course students would be able to understand Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of H-spectrum, Single and double slit diffraction, Photo electric effect and determination of e/m
UPYTS-503: Basic Instrumentation Skills (Credit:4)	**CO-1**: To study about the use of basics equipments in the Physics Lab. **CO-2**: To Study about the elementary knowledge of electrical circuits. **CO-3**: To study about the elementary knowledge about welding process. **CO-4**: To study about the soldering and other elementary process.
UPYTE-601: SOLID STATE PHYSICS,	**CO-1**. Know the principles of structures determination by diffraction **CO-2**. To understand the principles and techniques of X-rays diffraction

QUANTUM OPTICS AND ELECTRONICS (Credit:4)	**CO-3**. Understanding the Point Defect, Line Defect with example. **CO-4**. Know the fundamental principles of semiconductors and be able to estimate the charge carrier mobility and density **CO-5**. To give an extended knowledge about magnetic properties like Department of Physics diamagnetic, paramagnetic, ferromagnetic, ferrites and superconductors **CO-6**. Know the history of LASERS and its basic concepts. **CO-7**. Understand the basic principle and working of different types of lasers. **CO-8**: Know the applications of lasers in various fields. **CO-9**: Understand the characteristics of LASERS. **CO-10**: Learn safety precaution sand measures while handling the lasers. **CO-11**. To study the Operational Amplifier and their types.
UPYPE-602: PHYSICS (Lab Course) (Credit:2)	The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid-state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics.
UPYTS-603: Weather Forecasting (Credits: 4)	**CO**-1: To study about different weather conditions. **CO**-2: To study about various methods of weather forecasting. **CO-3**: To study about the different methods for the prediction of weather. **CO-4**: To study about the latest technology for weather forecasting.

Head
Department of Physics