WELCOME

DEPARTMENT OF PHYSICS

SAGARDIGHI K K S MAHAVIDHYALAYA

PROGRAMME OUTCOME(PO) & COURSE OUTCOME (CO)

DEPARTMENT OF PHYSICS

UG 4 YEAR PHYSICS (HONOURS/ HONOURS WITH RESEARCH)

(Under NEP 2020)

W.E.F. the Academic Session 2023-24

Programme Outcome (PO)-Course Outcome (CO)

Course Structure Physics (NEP-2020)-KU

SEMESTER-I							
Course Code	Course Title	Nature of Course	Credit of Course	Class hours / week	Evaluation		Total
					Internal	Semester End	
PHY-M-T -1 PHY-M-P-1	Mathematical physics- I (4+2)	Major	6	6	15	60	75
PHY-MI-T-1 PHY-MI-P-1	Mathematical Physics -I (3+1)	Minor	4	4	10	40	50
PHY-MU-T-1	Physics in everyday life	Multidisciplinary Course	3	3	10	35	45
PHY-SEC-T-1	Electrical circuit and network skills	Skill Enhancement Course	3	3	10	35	45
		Value Added Course	4	4	10	40	50
05			20	20	55	210	265

- Value Added Course will be common to all major

SEMESTER-II							
Course Code	Course Title	Nature of Course	Credit of Course	Class hours / week	Evaluation		Total
					Internal	Semester End	
PHY-M-T-2 PHY-M- P-2	Mechanics (4+2)	Major	6	6	15	60	75
PHY-MI-T-2 PHY-MI-P-2	Mechanics (3+1)	Minor	4	4	10	40	50
PHY-MU-T-2	Weather forecasting	Multidisciplinary Course	3	3	10	35	45
		Ability Enhancement Course	4	4	10	40	50
PHY-SEC-T-2	Basic Instrumentation Skills	Skill Enhancement Course	3	3	10	35	45
		Summer Internship	4	4			
05			20	20			265

Ability Enhancement Course will be common to all major

COURSE OUTCOME (CO)

SEM	COURSE /COURSE CODE	CREDIT	CONTENT OF KU SYLLABUS	S. NO	COURSE OUTCOME (CO)
1ST	**PHY-M-T -1/PHY-M-P-1** **Mathematical physics-I**	4T+2P =6	❖ Calculus ❖ Vector Calculus ❖ Vector Integration ❖ Orthogonal Curvilinear Coordinates ❖ Matrices ❖ Introduction to probability ❖ Dirac Delta function and its properties ❖ Practical	01	**CO 1**. Various properties of function and series expansions of function are depicted here in detail. Differential equations up to second order as well as partial derivatives and their properties are mentioned in this section.
	PHY-MI-T -1/PHY-MI-P-1 **Mathematical Physics -I**	3T+1P =4		02	**CO 2**. Different properties of vectors and their operations are mentioned. Vector differential operator and its role in various cases are represented here.
				03	**CO 3.** Integration of vectors and related basic theorems are discussed in detail.
				04	**CO 4.** Vector operations and vector differential operator are studied in different coordinates systems.
				05	**CO 5**. Properties of Dirac Delta function and expressions of special functions as delta function are analyzed here
				06	**CO 6**. Computer Programme are developed to solve different numerical problems
	PHY-SEC-T-1	3	❖ **Basic Electricity Principles**	07	**CO 01:**Demonstrate knowledge of fundamental electric principal such as voltage, Current,

	Electrical circuit and network skills		❖ **Understanding Electrical Circuits**		Resistance, and Power. Ohm's law, Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with digital multimeter
			❖ **Generators and Transformers**	08	**CO 02:**Student will learn about Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuitelements. Single-phase and three-phase alternating current sources (principle of generation, output wave form, advantage of using three- phase).
			❖ **Electric Motors**	09	**CO 03:**Student will learn about DC Power sources (basic idea). AC and DC generators (basicprinciple of action). Inductance, capacitance, and impedance.
			❖ **Solid-State Devices**	10	**CO 04:**Student will learn about Single-phase, three-phase & DC motors. Basic design. Speed & power of acmotor.
			❖ **Electrical Protection**	11	**CO 05:**Student will learn about Resistors, inductors and capacitors. Diode and rectifiers (half wave and full wave rectifier with L, C, L-C filter arrangement, regulation). Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources.
			❖ **Electrical Wiring**	12	**CO 06:**Student will learn about Relays, Fuses and disconnect switches,

					Working principle of Circuit breakers, Miniature circuit breaker and its types.
				13	**CO 07**: Student will learn about Conduit wiring (basic idea of house hold wiring). Basics of wiring: Star and Delta Connections. Preparation of extension board, Wiring Materials (Basic information about the wiring components).
2 N D	**PHY-M-T -2/PHY-M-P-2** **Mechanics**	4T+2P =6	❖ Fundamentals of Dynamics	14	**CO 1**.Fundamental properties of reference frames, Galilean transformations and dynamics of a system of particles are described.
			❖ Work and Energy	15	**CO 2**.Basic descriptions of work, kinetic energy, potential energy, energy conservation law, conservative and non-conservative forces and work done by them are mentioned.
				16	**CO 3**.A detailed study of elastic and inelastic collisions between particles in different reference frames.
			❖ Collisions	17	**CO 4**.This topic helps learner to get a brief idea of angular momentum and its conservation principle, torque and moment of inertia. Students also learn how to calculate moment of inertia for different shapes and kinetic energy of a rotational body.
			❖ Rotational Dynamics	18	**CO 5**.Definition of elastic constants and relations between them are studied in detail with the calculation of twisting torque for a cylinder or wire.
			❖ Elasticity	19	**CO 6.**Kinematics of moving fluids.

			❖ Fluid Motion	20	**CO 7**.Fundamentals of gravitation and a detailed study of motion of a particle under central force field are described.
			❖ Gravitation and Central Force Motion ❖ Oscillations	21	**CO 8**.This topic helps students to solve the differential equation of simple harmonic oscillator for different cases like with and without damping force and with externally applied sinusoidal force. They also get a brief idea of resonance, sharpness of resonance and quality factor.
			❖ Non-Inertial Systems	22	**CO 9**.Laws of Physics in rotating coordinate systems with development of Coriolis force and its applications are elaborately described.
			❖ Special Theory of Relativity	23	**CO 10.** A brief description of postulates of Special Theory of Relativity, Lorentz transformation, Lorentz contraction, time dilation, mass-energy equivalence, relativistic Doppler effect and four vector are introduced.
			❖ Practical	24	**CO 11**.Students learn some laboratory based experiments related to Mechanics.*Ex*–determine the moment of inertia,g by using bar or Kater's pendulum etc
	PHY-MI-T - 2/PHY-MI-P-2 **Mechanics**	3T+1P =4	❖ **Laws of Motion:**	25	**CO 1**: Utilize Newton's First Law to understand the concept of equilibrium and inertia.
			❖ **Momentum and Energy**	26	**CO 02:**Apply Newton's Second Law to calculate forces, mass, and acceleration in various contexts.

			❖ **Rotational Motion** ❖ **Non-Inertial Systems** ❖ **Gravitation** ❖ **Collisions** ❖ **Oscillations** ❖ **Elasticity**	27	**CO 03**: Interpret Newton's Third Law in terms of action-reaction force pairs and their implications for motion.
				28	**CO 04:** Students will learn about Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications.
				29	**CO 05:** Understand kinetic and potential energy, and apply the work-energy theorem.
				30	**CO 06:** Calculate power and efficiency in mechanical systems.
				31	**CO 07:** Understand angular displacement, velocity, and acceleration.
				32	**CO 08:** Apply the principles of SHM to springs, pendulums, and other oscillating systems.
				33	**CO 09:** Students will learn about Kinematics of Moving Fluids: Poiseuille's Equation for Flow of a Liquid through a Capillary Tube. Euler's Equation. Bernoulli's Theorem.
				34	CO 10: Students will learn about Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms

			❖ **Fluid Motion**		of elastic constants - Work done in stretching
			❖ **Special Theory of Relativity**	35	**CO 11:** Students will learn about Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications
			❖ **Practical**	36	**CO 12:** Students will learn and develop their practical knowledge of Mechanics
	PHY-SEC-T-2 **Basic Instrumentation Skills**	3	❖ **Basic of Measurement**	37	**CO 01:** Students will learn about Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.
			❖ **Electronic Voltmeter:**	38	**CO 02:**Students will learn about Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity
				39	**CO 03:**Students will learn about Type of AC millivoltmeters: Amplifier-rectifier, and rectifier-amplifier. Blockdiagram ac millivoltmeter, specifications and theirsignificance.
			❖ **Cathode Ray Oscilloscope**	40	**CO 04:**Students will learn about Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only- no mathematical treatment), brief discussion on screenphosphor, visual persistence & chemical

					composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.
			❖ **Signal Generators and Analysis Instruments**	41	**CO 05:**Students will learn about Block diagram, explanation and specificationsof low frequency signal generators. pulse generator, and function generator.
				42	**CO 06:**Students will learn about Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge
			❖ **Impedance Bridges & Q-Meters**	43	**CO 07:**Students will learn about Principle and working of digital meters. Comparison of analog& digitalinstruments. Characteristics of a digital meter.
			❖ **Digital Instruments** ❖ **Digital Multi meter**	44	**CO 08:**Students will learn about block diagram and working of a digital multimeter. Working principle oftime interval, frequency and period measurement using universal counter/ frequency counter, time-base stability, accuracyand resolution.
			❖ **Practical**	45	**CO 09:**Students will learn about Use of CRO for the measurement of voltage
				46	**CO 10:**Students will learn and develop their practical knowledge of Basic InstrumentationSkills