



গড়গাঁও মহাবিদ্যালয়

GARGAON COLLEGE



Course Distribution
Department of Physics
2023-24

Course distribution of Odd Semester,

Department of Physics, Gargaon College

2023-2024

Faculty Name	Semester		Paper Code	Unit wise division
Mr. Diganta Konwar	I	H	C-1: Mechanics and Properties of Matter	Unit-1: Kinematics of Moving Fluids, Poiseuille's Equation for Flow of a Liquid through a Capillary Tube. Unit-3: Simple Harmonic Motion (SHM) and Oscillations, Differential Equation of SHM and its solution, Kinetic Energy, Potential Energy, Total energy and their time-average values, Damped oscillation, Forced oscillations, Resonance, Power Dissipation and Quality Factor.
		Minor	M-1 : Mechanics	Unit-3: Simple Harmonic Motion (SHM) and Oscillations, Differential Equation of SHM and its solution, Kinetic Energy, Potential Energy, Total energy and their time-average values, Damped oscillation, Forced oscillations, Resonance, Power Dissipation and Quality Factor.
		SEC	SEC-1: Electrical Circuits and Network Skills	Unit-8: Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays. Splices: wire nuts, crimps, terminal blocks, split bolts, and solder. Preparation of the extension board.
		GEC	GEC-1: Evolution of Science	Invention of wheel and beginning of science, Science for progress. Science in ancient world Medieval science Renaissance and industrial revolution: Rise of western science

	III	H	C7: Digital System and Application C6-Lab C7-Lab	Introduction to CRO, Integrated Circuit, Digital Circuit, Boolean Algebra, Data Processing Circuits, Arithmetic Circuit, Sequential Circuit, Timers, Shift registers, Counters(4 bits)
		GE	DSC-3A: Thermal Physics and Statistical Mechanics	Kinetic Theory of Gases.
	V	H	C12: Solid State Physics DSE1: Classical Dynamics	Dielectric Properties of Materials, Ferroelectric Properties of Matters, Elementary band theory, Superconductivity. Classical Mechanics of Point Particles, Small Amplitude Oscillations
Mr. Guna Kanta Sonowal	I	H	C-1 : Mechanics and Properties of Matter	Unit 2: Relation between Elastic constants, Twisting torque on a Cylinder or Wire. Unit 4: Non-inertial Frames and Fictitious Forces, Uniformly Rotating Frame, Laws of Physics in rotating coordinate systems, Centrifugal Force, Coriolis Force and its applications, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
		Minor	Minor-1 : Mechanics and Properties of Matter	Relation between Elastic constants, Twisting torque on a Cylinder or Wire. Non-inertial Frames and Fictitious Forces, Uniformly Rotating Frame, Laws of Physics in rotating coordinate systems, Centrifugal Force, Coriolis Force and its applications, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
		SEC	SEC-1: Electrical circuit and networking	Unit-1: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC, Electricity. Familiarization with multimeter, voltmeter and ammeter. Unit-2: Main electric circuit elements and

				their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements.
		GEC	GEC-1 : Evolution of Science	Einstein and Special Theory of Relativity: The paradigm shift. Quantum Theory, Quantum generation, The Second creation: development of concept of field quantisation, ups and downs. Nuclear era: space science and technology.
	III	H	C6: Thermal Physics	Thermodynamic Potential, Maxwell's Thermodynamic Relations, Kinetic Theory of Gasses, Distribution of velocities, Molecular Collisions, Real Gases,
		GE	DSC-3A: Thermal Physics and Statistical Mechanics	Statistical Mechanics.
	V	H	C11: Quantum Mechanics & Applications C9-Lab	Time dependent Schrodinger Equation, Time independent Schrodinger Equation, General discussion of bound states in an arbitrary potential, Quantum theory of hydrogen like atoms, Atoms in Electric and Magnetic fields, Atom in external Magnetic fields, Many electron atoms.
Mr. Jayanta Sonowal	I	H	C-1 : Mechanics and Properties of Matter	1.1: Frames of Reference, Inertial Frames, Galilean Transformations, Galilean Invariance; Dynamics of a System of Particles, Centre of Mass, Principle of Conservation of Linear Momentum. 1.2: The Work-Energy Theorem, Conservative and Non-conservative Forces, Conservation of Mechanical Energy, Work done by non-conservative forces, Force as gradient of potential energy, Energy Diagram, Stable and Unstable Equilibrium.
		Minor	Minor-1 : Mechanics and Properties of Matter	1.1: Frames of Reference, Inertial Frames, Galilean Transformations, Galilean Invariance; Dynamics of a System of Particles, Centre of Mass, Principle of Conservation of Linear Momentum.

		SEC	SEC-1: Electrical circuit and networking	DC Power Sources, AC/ DC generators, Inductance, Capacitance and Impedance. Operation of transformers, Single phase, three phase & DC Motors. Basic design. Interfacing DC or AC Sources to control heater and motors, speed and power of ac motor.
		GEC	GEC-1 : Evolution of Science	Nineteenth century and beginning of modern science:
	III	H	C5: Mathematical Physics-II C7: Digital System and Application C5-Lab C7-Lab	Theory of Errors, Partial Differential Equations. Computer organization, Intel 8085 Microprocessor Architecture, Introduction to Assembly Language.
		GE	DSC-3A: Thermal Physics and Statistical Mechanics	Thermodynamic Potential.
	V	H	DSE2: Astronomy & Astrophysics	Astronomical Scales, Astronomical Technique, The Sun, The milky way, Galaxies, Large scale structure & expanding universe.
Dr. Gitashri Arandhara	I	H	C-1 : Mechanics and Properties of Matter	Principle of Conservation of Angular Momentum, Rotation about a fixed axis, Moment of Inertia, Calculation of Moment of Inertia for rectangular, cylindrical and spherical bodies, Kinetic Energy of Rotation, Motion involving both translation and rotation.
		Minor	Minor-1 : Mechanics and Properties of Matter	Principle of Conservation of Angular Momentum, Rotation about a fixed axis, Moment of Inertia, Calculation of Moment of Inertia for rectangular, cylindrical and spherical bodies, Kinetic Energy of Rotation, Motion involving both translation and rotation.
		SEC	SEC-1: Electrical circuit and networking	Unit 2: Understanding Electrical Circuit Unit 3: Electrical Drawing and Symbols Demonstration and Laboratory
		GEC	GEC-1 : Evolution of Science	Unit-1: Contributions of Aristotle, Galileo Galilei, Robert Hooke, Darwin, Kepler etc. Contributions of Sir Isaac Newton: Laws of motion, Universal law of Gravitation Unit-4: Electronic age and birth of

				computers. Laser and optical evolution. Contemporary science and India's contribution.
	III	H	C6: Thermal Physics	Zeroth and First Law of Thermodynamics, Second law of Thermodynamics, Entropy.
		GE	DSC-3A: Thermal Physics and Statistical Mechanics	Theory of radiation
	V	H	C12: Solid State Physics C12-Lab	Crystal Structure, Elementary Lattice Dynamics, Magnetic properties of matter
Dr. Bidyut Bikash Hazarika	I	H	C-1 : Mechanics and Properties of Matter	Michelson-Morley Experiment and its outcome, Postulates of Special Theory of Relativity, Lorentz Transformations, Simultaneity and order of events, Lorentz contraction, Time dilation. Relativistic Transformation of Velocity, Frequency and Wave-number, Relativistic addition of Velocities, Variation of Mass with Velocity, Massless Particles, Mass-energy Equivalence. Relativistic Kinematics, Transformation of Energy and Momentum, Relativistic Doppler effect.
		Minor	Minor-1 : Mechanics and Properties of Matter	Michelson-Morley Experiment and its outcome, Postulates of Special Theory of Relativity, Lorentz Transformations, Simultaneity and order of events, Lorentz contraction, Time dilation. Relativistic addition of Velocities, Variation of Mass with Velocity, Mass-energy Equivalence.
		SEC	SEC-1: Electrical circuit and networking	Resistors, inductors and capacitors, Diode and rectifiers, Components in series or in shunt, Response of Inductors and capacitors with AC or DC sources. Relays, fuses and disconnect switches, Circuit breakers, Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to control elements (relay protection device)
		GEC	GEC-1 : Evolution of Science	Developments of electricity and magnetism, Maxwell's contributions, Contributions of Thomas A. Addison

	III	H	C5: Mathematical Physics-II	Fourier Series, Frobenius Method and Special Function, Some Special Integral
		GE	DSC-3A: Thermal Physics and Statistical Mechanics	Law of thermodynamics
	V	H	DSE1: Classical Dynamics C12-Lab	Special Theory of Relativity, Fluid Dynamics.



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Department of Physics
Gargaon College

Course distribution of Even Semester

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2023-2024

Faculty Name	Semester		Paper Code	Unit wise division
Mr. Diganta Konwar	II	H	C-2: Wave and optics	1. Linearity and Superposition Principle. Superposition of two collinear oscillations having equal frequencies and different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with equal phase differences and equal frequency differences. 2. Graphical and Analytical Methods. Lissajous Figures with equal and unequal frequency and their use.
		Minor	Minor-2: Waves and Optics	Unit-1: 1.1 : Linearity and Superposition Principle, Superposition of two collinear oscillations having (i) equal frequencies and (ii) different frequencies(Beats), Superposition of N collinear Harmonic Oscillations with (i) equal phase differences and (2) equal frequency differences 1.2: Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods, Lissajous Figures with equal and unequal frequency and their use.
		SEC	SEC-2: Basic Instrumentation Skills	Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base

				operation, synchronization. Front panel controls. Specifications of a CRO and their significance.
	IV	H	C10: Analog System and Application C10-Lab	Semiconductor diode, Two terminal devices and their applications, Bipolar junction transistors, Amplifiers, Coupled amplifier, Feedback in amplifiers.
		GE	DSC-4A: Wave and Optics	Superposition of two collinear harmonic oscillations, Superposition of two perpendicular harmonic oscillations, Wave motion-General.
	VI	H	DSE-3: Nuclear and Particle Physics C13-Lab	General properties of nuclei, Nuclear models, radioactive decay, Nuclear reactions. Particle Physics.
Mr. Guna Kanta Sonowal	II	H	C-2: Wave and optics	Unit-3: Standing (Stationary) Waves in a String: Fixed and Free Ends, Analytical Treatment, Phase and Group Velocities, Changes with respect to Position and Time, Energy of Vibrating String, Transfer of Energy, Normal Modes of Stretched Strings, Plucked and Struck Strings, Melde's Experiment, Longitudinal Standing Waves and Normal Modes, Open and Closed Pipes, Superposition of N Harmonic Waves.
		Minor	Minor-2: Waves and Optics	Unit-3: Standing (Stationary) Waves in a String: Fixed and Free Ends, Analytical Treatment, Phase and Group Velocities, Changes with respect to Position and Time, Energy of Vibrating String, Transfer of Energy, Normal Modes of Stretched Strings, Plucked and Struck Strings, Melde's Experiment, Longitudinal Standing Waves and Normal Modes, Open and Closed Pipes, Superposition of N Harmonic Waves.
		SEC	SEC-2: Basic	Instruments accuracy, precision, sensitivity, resolution

			Instrumentation Skills	range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance
		GEC	GEC-2: Materials Today	Materials: Drivers of human civilization Development of materials: Stone age, Copper age, Bronze age, Iron age Explanation with examples to mark this development
	IV	H	C8: Mathematical physics-III C9-Lab	Complex Analysis.
		GE	DSC-4A: Wave and Optics DSC-4A-Lab	Sound
	VI	H	C-13 : Electromagnetic Theory C14: Statistical Mechanics	Polarization of electromagnetic waves. Classical statistics, Classical theory of radiation, Quantum theory of radiation.
Mr. Jayanta Sonowal	II	H	C-2: Wave and optics	5.1: Division of amplitude and wavefront, Young's double slit experiment, Lloyd's Mirror and Fresnel's Biprism, Phase change on reflection: Stokes' treatment, Interference in Thin Films: parallel and wedge-shaped films. Newton's Rings: Measurement of wavelength and refractive index. 5.2: Michelson Interferometer- (i) Idea of form of fringes (No theory required), (ii) Determination of Wavelength, (iii) Wavelength Difference, (iv) Refractive Index and (v) Visibility of Fringes. Fabry-Perot interferometer.
		Minor	Minor-2: Waves and Optics	5.1: Division of amplitude and wavefront, Young's double slit experiment, Lloyd's Mirror and Fresnel's Bi-prism, Phase change on reflection: Stokes' treatment, Interference in Thin Films: parallel

				and wedge-shaped films. Newton's Rings: Measurement of wavelength and refractive index.
		SEC	SEC-2: Basic Instrumentation Skills	Principle and working of digital meters. Comparison of analog and digital instruments. Characteristics of digital meter. Working principle of digital voltmeter. Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.
		GEC	GEC-2: Materials Today	Overview of the different states of matter: Solid, Liquid, Gas, Plasma
	IV	H	C9: Elements of Modern physics C9: Elements of Modern physics C8-Lab	Atomic Nucleus, Radioactivity, Fission and Fusion, Lasers. Sinusoidal oscillations, Operational amplifiers, Applications of Op-Amps, Conversion.
		GE	C9: Elements of Modern physics C9: Elements of Modern physics C8-Lab	Atomic Nucleus, Radioactivity, Fission and Fusion, Lasers. Sinusoidal oscillations, Operational amplifiers, Applications of Op-Amps, Conversion.
	VI	H	DSE-4: Nano material and Application DSE-4-Lab	Synthesis of nanostructure materials, Characterization, Optical properties, Electron transport, applications.
Dr. Gitashri Arandhara	II	H	C-2: Wave and optics	2.1 : Plane and Spherical Waves, Longitudinal and Transverse Waves, Plane Progressive (Travelling) Waves, Wave Equation, Particle and Wave Velocities, Differential Equation of a Wave, Pressure of a Longitudinal Wave, Energy Transport, Intensity of Wave. 2.2: Velocity of Transverse Vibrations of Stretched Strings, Velocity of Longitudinal Waves in a Fluid in a Pipe, Newton's Formula for Velocity of Sound, Laplace's Correction. Electromagnetic nature of light, definition and properties of wave front, Huygens principle, Temporal and Spatial coherence.

		Minor	Minor-2: Waves and Optics	2.1 : Plane and Spherical Waves, Longitudinal and Transverse Waves, Plane Progressive (Travelling) Waves, Wave Equation, Particle and Wave Velocities, Differential Equation of a Wave, Pressure of a Longitudinal Wave, Energy Transport, Intensity of Wave. 2.2: Velocity of Transverse Vibrations of Stretched Strings, Velocity of Longitudinal Waves in a Fluid in a Pipe, Newton's Formula for Velocity of Sound, Laplace's Correction.
		GEC	GEC-2 : MATERIALS TODAY	Breakthroughs in Materials Development Overview of Advanced Materials: Semiconductors, Biomaterials, Smart Materials (Materials of the Future), Nano-structured Materials
	IV	H	C9: Elements of Modern physics	Planck's quantum theory, Radiation, Position measurement, Schrödinger equation, Two slit interference experiments with photons, One dimensional rigid box.
		GE	DSC-4A: Wave and Optics	Michelson's interferometer, Polarization.
	VI	H	C13: Electromagnetic Theory DSE-3: Nuclear and Particle Physics DSE-4: Nano material and Application DSE-4-Lab	Maxwell equation. Interaction of nuclear radiation with matter, Detector for nuclear radiation, Particle accelerators. Nanoscale system.
Dr. Bidyut Bikash Hazarika	II	H	C-2: Wave and optics	6.1 : Kirchoff's Integral Theorem, Fresnel-Kirchoff's Integral formula (Qualitative discussion only) 6.2 : Fraunhofer Diffraction: Single slit, Circular aperture. Resolving Power of a telescope, Double slit, Multiple slits. Diffraction grating, Resolving power of grating. 6.3 : Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period

				Zones for Plane Wave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Fresnel diffraction pattern of a straight edge, a slit and a wire.
		Minor	Minor-2: Waves and Optics	Electromagnetic nature of light, definition and properties of wave front, Huygens principle, Temporal and Spatial coherence 5.2: Michelson Interferometer- (i) Idea of form of fringes (No theory required), (ii) Determination of Wavelength, (iii) Wavelength Difference, (iv) Refractive Index and (v) Visibility of Fringes. Fabry-Perot interferometer.
		GEC	GEC-2 : MATERIALS TODAY	Metals & Alloys, Non-Metals, Ceramics, Polymers, Composites etc. with examples and applications Uses, Performance, Composition & Structure; Physical and Chemical properties; Processing & Synthesis of various classes of materials
	IV	H	C8: Mathematical physics-III C9-Lab C10-Lab	Integral Transforms, Laplace transform.
		GE	DSC-4A: Wave and Optics DSC-4A-Lab	Diffraction
	VI	H	C13: Electromagnetic theory C13-Lab C14: Statistical Mechanics	EM Wave propagation in unbounded media, EM wave in bounded media, Optical fibers. Bose-Einstein statistics, Fermi-Dirac statistics.



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