

Dr.S.D. Devsey Arts College and Commerce & Science College Wada, Dist. Palghar

i. Teaching Plan Year (2023-2024) Semester: VI

a. Department of Physics

ii. Semester Duration: Nov 2023 to May 2024

iii. Duration of Teaching: Nov 2023 to April 24

Class: T.Y.B.Sc

Subject: Electronics

Course: USPH602

Sr. no.	Topics	Number of hours planned	Lectures per week 4	Learning Inputs
1	Unit I	15		
	Field effect transistors: JFET: Basic ideas, Drain curve, The transconductance Curve, Biasing in the ohmic region and the active region	3	Nov 2023 to Jan 2024	Fundamentals of Electronics, conduction of electric current in P-N junction diode stages
	Transconductance, JFET common source amplifier, JFET analogue switch,	2		Types of transistors its working, Biasing.
	Multiplexer, voltage-controlled resistor, current sourcing.	3		Rectifier its Types
	MOSFET: Depletion and enhancement mode, MOSFET operation and characteristics, digital switching.	2		
	SCR- construction, static characteristics, Analysis of the operation of SCR,	2		
	Gate triggering characteristics, Variable half wave rectifier and Variable full wave rectifier, Current ratings of SCR.	1		
	UJT: construction, Operation characteristics and application as a relaxation oscillator.	2		
	Unit-II	15		
	Differential Amplifier using transistor: The Differential Amplifier, DC and AC analysis of a differential amplifier,	4	30 Jan to Feb 2024	Operational amplifier 741 comparison with Transistor.
	Input characteristics -effect of input bias, offset current and input offset voltage on output, common mode gain, CMRR.	3		
	Op Amp Applications: Log amplifier,	8		
	Instrumentation amplifiers, Voltage controlled current sources (grounded load), First order Active filters, Astable using OP AMP, Comparators with Hysteresis, Window Comparator.	15		
	Unit-III		First week of Mar to end of Mar 2024	
	Transistor Multivibrators: Astable, Monostable and bistable Multivibrators, Schmitt trigger.	6		As per content, pulse modulation, power supply,

	555 Timer: Review Block diagram, Monostable and Astable operation Voltage Controlled Oscillators, Pulse Width modulator, Pulse position Modulator, Triggered linear ramp generator.	4		controller, oscillator
	Regulated DC power supply: characteristics, series voltage regulator, short circuit protection (Current limit and fold back) Monolithic linear IC voltage Regulators. (LM 78XX, LM 79XX, LM317, LM337).	5		
	Unit-IV	15	1 April to first week of April 2024	Types of Gates, and AND,OR,NOT,N AND,EXOR,its truth Tables etc.
	Logic families: Standard TTL NOR, Open collector gates, Three states TTL devices, MOS inverters, CMOS NAND and NOR gates, CMOS characteristics.	8		
	Digital Communication Techniques: Digital Transmission of Data, Benefits of Digital Communication, Disadvantage of Digital Communication, Parallel and serial transmission, pulse Modulation, Comparing pulse - modulation Methods (PAM, PWM,PPM), pulse-Code Modulation.	7		


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DEPARTMENT OF PHYSICS




PRINCIPAL
Shikshak Sanchalit Shikshan Sanstha's
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Wada, Dist. Palghar

Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist: Palghar

Teaching Plan 2023-2024 Semester: VI

Department of Physics

Semester Duration: Nov 2023 to May 2024

Duration of Teaching: Nov 2023 to April 2024

Class: T.Y.B.Sc Subject: Classical Mechanics Course:USPH601

Sr.no.	Topics	Number of hours planned	Lectures per week-4	Learning inputs
1	Central force	15		
	1.Motion under a central force, central force inversely proportional to the square distance	2	Last week of Nov2023 to Jan 2024	Newtons laws, Gravitation Kepler's-laws, moment-of-Inertia, Rotational motion
	Elliptic Orbits, The Kepler problem	2		
	2.moving origin of coordinates, Numerical	3		
	Rotating coordinate systems, Numerical	2		
	Law of motion on the rotating earth	2		
	The Foucault problems, Coriolis theorems	2		
2	Unit II: Lagrange's equation	15		
	1.D'Alembert's principle, constraints, Examples of holonomic constraints, examples of non holonomic constraints, degrees of freedom and generalized coordinates,	4	Jan to Last week of Feb 2024	Constraints, inertial frame-of-Reference, non-inertial frame of reference, general coordinate system
	Virtual displacement, virtual work, D'Alembert's principle, illustrative problems.	3		
	2. Lagrange's equation (using D'Alembert's principle), properties of Lagrange's equations,	4		
	Illustrative problem, canonical momentum, cyclic or ignorable coordinates	2		
	Number of numerical	2		
3	Unit III : Fluid Motion and Rigid body rotation	15		
	1. Kinematics of moving fluids, Equation of motion for an ideal fluid, conservation laws for fluid motion, steady flow.	4	First week of 1Mar to end of March 2024	Viscosity, Bernoulli's theorem, Degree of freedom, rotation of rigid bodies, spinning top.
	2. Rigid dynamics: introduction, degrees of freedom, rotation about an axis: orthogonal matrix,	4		
	Euler's theorem, Eulerian angles, inertia tensor, angular momentum of rigid body, symmetric top (without notation)	4		
	Euler's equation of motion of rigid body, free motion of rigid body, motion of Symmetric top (without notation)	2		
		1		
4	Unit IV : Non Linear Mechanics	15		
	1. Non linear mechanics: Qualitative approach to chaos,	5	1 April to last week of April 2024	Undamped and damped harmonic and forced oscillations

	The anharmonic oscillator, Numerical solution of Duffing's equation.	5		Third stage of matter
	2. Transition to chaos: Bifurcations and strange attractors, Aspects of chaotic behaviour (logistic map).	5		


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Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist.: Palghar

Teaching Plan 2023-2024

Department of Physics

Class: T.Y.B.Sc

Subject: Solid State Physics

Course:USPH502

Duration of Semester: Jun 2023 to Nov 2024

Teaching Duration: Jun 2023 to Oct 2024

Sr.no.	Topics	Number of hours planned	Lectures per week	Inputs and Learning outcomes
1	Unit 1: Crystal Physics General introduction of reflection, refraction, Dispersion, interference, polarisation, Types of prisms, overall revision of theories. Lattice point and space lattice, The basis and crystal structure, Unit cells and lattice parameters, primitive cells Crystal systems, crystal symmetry, Bravais space lattices, metallic crystal structures Relation between density of crystal material and lattice constant in a cubic lattice Directions, planes miller indices, important planes in scc structure Separation between lattice planes in a cubic structure, reciprocal lattice X-ray diffraction, classical free electron theory of metals, collision time, relaxation time and mean free path	15	Second week of Jun 2022 to second week of July 2023	General fundamentals of light is discussed with student. Student are able to understand the concepts which were strike.
2	Unit II: Electrical properties of metal Quantum theory of free electrons, Fermi Dirac statistics and electronic distribution in solids Density of energy states and Fermi energy, Fermi Distribution Function, Heat capacity of electron gas Mean energy of electron gas at 0 kelvin, electrical conductivity from Quantum mechanical consideration	15	July 2023 to second week of Aug 2023	Inter relation between conduction convection, effect Transition in temperatures Heat capacities were discussed. Students recalled from concept of resistance, density. Ionic gas its role in conductivity understood. Students are able to understand Application of electrical conductivity, specific -resistance, conductance their applications in units
2	Unit II: Band theory of solids, The Kronig penny model, Brillouin zones,			Energy, wavefunctions, conduction and Valence band theories were discussed, good outcomes obtained with concept of wave function Schrödinger equations and Einstein energy relations.
	Number of Wave function in band, Motion of		Last week	

	electron in one dimensional periodic potential,		of Aug	
	Distinction between metals, insulator and intrinsic semiconductor		2023 to	
3	Unit III:Conduction in semiconductors Electrons in holes in intrinsic semiconductor,conductivity,carrier concentrations	15	sept 2023	Basics of conductor's insulator and semiconductors were revised and formation of PN junction Diode rectifier its application are discussed
	Fermi levels in intrinsic semiconductors,Diffusion, carrier life time			
	The continuity equation, Hall effect			Verified with Experimental outcomes of V-I characteristic
	Semiconductor diode characteristics: Qualitative theory of p-n junction,			
	P-n junction as a diode, Band structure of open circuit p-n junction			
4	Unit IV: Diode, Magnetism and super conductivity	15		
	1.The current component in a pn junction diode, Quantitative theory of pn junction diode current			Polarisation of magnetic lines, Atomic Theory of, coulombs law, orientation of magnetic lines, flux its Alignments are discussed.
	The V-I Characteristics, The temperature dependence of p-n characteristic, Diode resistance			Penetration of magnetic lines under the action of magnetic field are discussed.
	2. Magnetic properties of matter; The diamagnetism and Para magnetism, The origin of permanent magnetic dipole Diamagnetism and Lamour precession, The static paramagnetic susceptibility.		Last week of Sep 2023 to-first -week of Oct 2023	
	Superconductivity: Mechanism of superconductors, Effect of magnetic field			
	Critical currents, The Meissner effect, The penetration Depth			
	Type I and II superconductors			


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**Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist.:
Palghar Teaching Plan 2023-2024**

Semester V Department of Physics

Class: T.Y.B.Sc

Subject: ELECTRODYNAMICS

Course: USPH504

Duration of Semester: Jun 2023 to Nov 2023

Teaching Duration: Jun 2023 to Oct 2023

Sr.no.	Topics	Number of hours planned	Lectures per week 4	Inputs and Learning outcomes
1	Unit 1: Electrostatics: Introduction, revision from coulombs law, fundamentals, revision of formulae, general idea about syllabus and topics in syllabus	2	End of second week Jun2023 to 11Jully 2023	Fundamentals from coulombs law, concept of Flux, Revision of Divergence, curl.
	Field lines, Flux and Gauss law, The divergence of E	2		
	Application of gauss law	2		Properties of lines of force and tubes of force
	Curl of E, Introduction to potential, comments on potential	3		
	Poisson's equation and Laplace Equation	2		
	The potential of a localized charge distribution, Review of conductors	2		
	First Uniqueness theorem, the classic image problem-infinite conducting plane	2		
2	Unit II: polarisation and Magneto statics	15	Second of July2023 to 14 Aug 2023	Fundamentals of magnetic materials, Bohr's theory, its postulates
	Dielectrics, induced Dipoles, Alignment of polar molecules, polarisation	3		
	Bound charges, and their physical interpretation	2		
	Gauss law in presence of Dielectrics,,A Deceptive parallel,succceptibility,permitivity,Dielectricco nstant, Energy in Dielectric systems	4		
	Straight line currents of B and curl of Application of Ampere law in case of long straight wire and long solenoid,	3		
	Comparison of Magneto statics and	3		

	electrostatics			
3	Unit III:Magnetism and Varying Field	15	Third week of Aug2023 to first week of Sep 2023	Distinguish between Para magnetism, magnetic susceptibility, charge distribution, electrodynamic s before Maxwell.
	1.Diamagnets para magnets, ferro-magnets, Magnetisation	2		
	Bound currents and their physical interpretation	2		
	Amperes law in magnetised materials, A deceptive parallel, magnetic susceptibility and permeability	3		
	2.Energy in Magnetic fields, Electrodynamics Before Maxwell, Maxwell correction to Amperes law,	3		
	Maxwell's Equations, Magnetic charge, Maxwell's Equation in matter,Boundary conditions	5		
4	Unit IV :Electromagnetic waves	15	Second week of sept 2023 to first week of Oct 2023	Types of waves, momentum of waves, concept of transmission
	1.The continuity equation,	2		
	Poynting theorem Newtons third law in Electrodynamic.	3		
	2.The wave equation Foe E and B	2		
	Monochromatic plane waves, Energy and momentum in electromagnetic waves	3		
	Propagation in linear media	2		
	Reflection and transmission of EM waves At normal incidence	3		


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Teaching Plan Year (2023–2024) Semester: I

Department: Physics **Duration of Teaching:** June 2023 to December 2024

Class: F.Y.B.Sc. **Subject:** Physics Practicals

Course: USPHP1

Hours = 30

Sr. No.	Topics	Number of Hours Planned	Lectures per Week (3)	Duration
Unit I	GROUP-A	8		
1	Torsional Oscillation	2	2	August to Second Week of September
2	Bifilar Pendulum	2	2	
3	Flywheel Experiment	2	2	
4	Young's Modulus by Vibration Method	2	2	
	GROUP-B	8		
1	AC Mains Frequency using Sonometer	2	2	Second Week of September to October
2	Thermistor Characteristics	2	2	
3	Capacitance in AC Circuit	2	2	
4	Inductance in AC Circuit	2	2	
	GROUP-C (Skill Experiments)	14		
1	Vernier Callipers, Screw Gauge & Travelling Microscope	3	3	Last Week of July to Second Week of August
2	Graph Plotting	3	3	
3	Spectrometer – Schuster's Method	3	3	
4	Resistance & Capacitance using Colour Code	3	3	
5	Digital Multimeter	2	3	


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DSDD Arts College and Commerce & Science College, Wada, Dist. Palghar

Teaching Plan

Name of Teacher: Dr. Kailas Prabhakar Joshi

Department: Physics

Academic Year: 2023–2024

Class and Semester: F.Y.B.Sc. Semester II

Subject & Paper: Physics Practicals

Course Code: USPHP2

Duration of Teaching: December 2023 to March 2024

Hours = 30

Sr. No.	Topics	Number of Hours Planned	Lectures per Week (3)	Duration
	Unit I	30		
	GROUP-A	8		
1	Study of LASER Beam Divergence	3	2	Second Week of December to January
2	Spectrometer: To determine angle of Prism	3	2	
3	Spectrometer: To determine refractive index of prism material	3	2	
4	Combination of Lenses: To determine equivalent focal length of a lens system	3	2	
	GROUP-B	8		
1	Study of Logic Gates & Verification of De Morgan's Theorems	3	2	Month of February
2	To study EX-OR Gate and verify its truth table	2	2	
3	To study Half Adder and Full Adder and verify their truth tables	4	2	
4	To study load regulation of a Bridge Rectifier	3	2	
	GROUP-C: Skill Experiments	14		
1	Radius of Ball Bearings (Single Pan Balance)	1	3	Second Week of February to First Week of March
2	Use of Oscilloscope: Waveforms at output of Half-wave and Bridge Rectifiers with and without Capacitor Filter; Ripple	2	3	

3	Testing of Components (Resistor, Diode, Transistor, Capacitor)	1	3	
4	Study of I-V Characteristics of Solar Cell	2	3	


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Teaching Plan (2023-24) Semester: IV Department of Physics

Duration: Nov 2023 to May 2024

Class: S.Y.B. Sc Subject: Optical and Applied Physics-II Course: USPH401

Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
1	Diffraction	15	Nov-Dec2023	Revision of Fundamentals Fundamentals of light, interference, Diffraction, polarisation, Huygens and Newton's Theory Single and Double slit Experiment
	1.Fresnel Diffraction			
	Fresnel assumption, Rectilinear propagation of light, Diffraction pattern due to Straight Edge, position of maxima and minima of intensity	2		
	Intensity t a point inside the geometrical shadow	3		
	Diffraction due to narrow slit	2		
	Diffraction due to Narrow wire	2		
	2.Fraunhofer Diffraction			
	Introduction, Fraunhofer Diffraction at a single slit	3		
	Intensity distribution in diffraction pattern due to a single slit	1		
	Fraunhofer Diffraction at a double slit	1		
	Distinction between single slit and double slit Diffraction pattern and missing orders	2		
	Plane Diffraction Grating, Theory of plane Diffraction Grating	2		
	Width of principal maxima	1		
2	Unit II: Polarisation	15	Dec 2023 to Jan2024	Concept of Lens, types of polaroid's, practical examples. Types of crystal, crystal Growth, Refractive index, Braggs law, law of Malus, bending of light waves, shaping of waves
	Types of polarisations, plane polarised light	1		
	Revision- Circularly polarised light, Elliptical polarised light, partially polarised light	1		
	Fundamental -Production of plane polarised light, polarisation by reflection from dielectric surface	2		
	Revision -Polarisation by refraction pile of plates, polarisation by scattering	2		
	Introduction , Malus' Law, Production of Polarized light: The wire grid polarizer and a Polaroid, Polarization by Reflection, Polarization by Double Refraction Interference of Polarized light: Quarter	10		

	wave plates and half wave plates (Qualitative) Ordinary and Extra Ordinary Rays, Positive and Negative crystals			
3	Unit III Interferometers and Resolving Power . Michelson's Interferometer: Principle, construction, working, circular fringes, localized fringes, White light fringes, Visibility of fringes. Applications of Michelson Interferometer: a) Measurement of wavelength b) Determination of the difference in the wavelength of two waves c) Thickness of a thin transparent sheet d) Determination of the refractive index of gases	15	Jan to 2024 last week of march 2024	Fundamentals of Measurements of length ,concept of fringes and its types ,criterias ,Types of Prisms
	Resolving Power: Introduction, Rayleigh's criterion, Resolving power of optical instruments, Criterion for resolution according to Lord Rayleigh,	6		
	Resolving power of a telescope, Resolving power of a prism,.	5		
	Resolving power of a plane transmission grating	5		


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Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
.	UNIT – I Compound pendulum : Expression for period, maximum and minimum time period, centres of suspension and oscillations , reversible compound pendulum. Kater's reversible pendulum , compound pendulum and simple pendulum- a relative study. II Center of Mass , .Motion of the Center of Mass , Linear momentum of a Particle Linear momentum of a System of Particles , Linear momentum wrt CM coordinate (i.e shift of origin from Lab to CM), Conservation of Linear Momentum , Some Applications of the Momentum Principle , System of Variable Mass Torque Acting on a Particle , Angular Momentum of a Particle , Angular Momentum of System of Particles , Total angular momentum wrt CM coordinate. Conservation of Angular Momentum iii Oscillations , The Simple Harmonic Oscillator , Relation between Simple Harmonic Motion and Uniform Circular Motion , Two Body Oscillations, Damped Harmonic Motion , Forced Oscillations and Resonance.	15	4	Fundamentals of XII physics, revision of syllabus of moment of inertia, rotational motion, practical's knowledge-based questions revised, topics of syllabus

	UNIT –II (Review of zeroth and first law of thermodynamics) I Conversion of heat into work, heat engine, Carnot's cycle: its efficiency. II Second law of thermodynamics, Statements, Equivalence of Kelvin and Plank statement, Carnot's theorem, Reversible and irreversible process, Absolute scale of temperature. iii Clausius theorem, Entropy, Entropy of a cyclic process, Reversible process, Entropy change, Reversible heat transfer, Principle of increase in entropy, generalized form of first and second law, entropy change of an ideal gas, entropy of steam, entropy and unavailable energy, entropy and disorder, absolute entropy.	15	4	Fundamentals with laws of thermodynamics, effect of Heat, engines cycles. Conversion of heat into work, heat engine, Carnot's cycle: its efficiency. Second law of thermodynamics, Statements, Equivalence of Kelvin and Plank statement, Carnot's theorem,
	UNIT –III i Third law of thermodynamics, Nernst heat theorem, Consequences of the third law, Maxwell's thermodynamic relations, Clausius – Clapeyron equation, Thermal Expansion. ii Steam engine, Rankine cycle, Otto engine, Efficiency of Otto cycle, Diesel cycle, Efficiency of Diesel cycle, Otto and diesel comparison iii Low temp Physics: Different methods of liquefaction of gases, methods of freezing, Cooling by evaporation, cooling by adiabatic expansion Joule - Thompson effect, JT effect of Vander Waal's gas, Liquefaction of helium, properties and uses of liquid Helium	15	4	Third law of thermodynamics, Joule - Thompson effect, JT effect of Vander Waal's gas, Liquefaction of helium, properties and uses of liquid Helium, Maxwell's thermodynamic


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Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist: Palghar

Teaching Plan (2023-24) Semester: III Department of Physics

Duration: Jun 2023 to Nov 2024

Class: S.Y.B.Sc Subject: Physics paper -III Course: USPH-303

Sr.no.	Topics	Number of Hrs planned	Lectures / week-4	Learning Inputs
1	1. Acoustics of Buildings: Reverberation, Explanation of Sabine's formula, & Importance of Sabine's Formula, Absorption Coefficient, Acoustics of Buildings, Factors Affecting Acoustics of Buildings, Sound Distribution in an Auditorium.	15	4	Fundamental of Acoustics, factors of acoustics discussed with different examples.
	2. Laser: Introduction, transition between Atomic energy states, Principle of Laser, Properties of Laser: Coherence Properties of LASER, Spatial Coherence Length, Directionality, Intensity, Helium-Neon Laser, Application of Laser, Holography	15	4	Concept of light its importance, Application and its engineering and medical applications were discussed
2	Unit II: Crystal Physics 1) Lattice points and space lattice, The basis and crystal structure, Unit Cells and lattice parameters, Primitive Cells, Crystal Systems, Crystal Symmetry, Bravais space lattices 2) Metallic crystal structures, relation between the density of crystal material and lattice constant in a cubic lattice, Directions, Planes, Miller Indices, Important planes in simple cubic structure, separation between lattice planes in a cubic crystal.	15	4	Types of crystals, solid state bonds, miller indices, structures were highlighted
	Unit III: Properties of Material 15 Lectures 1) Electrical properties: Review of energy band diagram for materials – conductors, semiconductors and insulators,		4	Band gap, Brewster's law, reflection, magnetic materials, susceptibility's, periodic elements were discussed, properties of materials, various types of
3				

	Electrical conductivity in metals, semiconductors and insulators (dielectrics), effect of temperature on conductivity. 2) Optical properties: Reflection, refraction, absorption and transmission of electromagnetic radiation in solids. 3) Magnetic properties: Origin of magnetism in solids (basic idea), Types of magnetic order (Para magnetism, Diamagnetism, antiferromagnetic, ferromagnetism, ferrimagnetism), magnetic hysteresis. 4) Applications: Dielectric materials: Piezoelectric, ferroelectric			characterizations like X ray,TGA,DSC,DTA,BAND GAP,V.B.THEORY
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i. Teaching Plan Year (2023-2024) Semester: VI

a. Department of Physics

ii. Semester Duration: Nov 2023 to May 2024

iii. Duration of Teaching: Nov 2023 to April 24

Class: T.Y.B.Sc

Subject: Electronics

Course: USPH602

Sr. no.	Topics	Number of hours planned	Lectures per week 4	Learning Inputs
1	Unit I	15		
	Field effect transistors: JFET: Basic ideas, Drain curve, The transconductance Curve, Biasing in the ohmic region and the active region	3	Nov 2023 to Jan 2024	Fundamentals of Electronics, conduction of electric current in P-N junction diode stages
	Transconductance, JFET common source amplifier, JFET analogue switch,	2		Types of transistors its working, Biasing.
	Multiplexer, voltage-controlled resistor, current sourcing.	3		Rectifier its Types
	MOSFET: Depletion and enhancement mode, MOSFET operation and characteristics, digital switching.	2		
	SCR- construction, static characteristics, Analysis of the operation of SCR,	2		
	Gate triggering characteristics, Variable half wave rectifier and Variable full wave rectifier, Current ratings of SCR.	1		
	UJT: construction, Operation characteristics and application as a relaxation oscillator.	2		
	Unit-II	15		
	Differential Amplifier using transistor: The Differential Amplifier, DC and AC analysis of a differential amplifier,	4	30 Jan to Feb 2024	Operational amplifier 741 comparison with Transistor.
	Input characteristics -effect of input bias, offset current and input offset voltage on output, common mode gain, CMRR.	3		
	Op Amp Applications: Log amplifier, Instrumentation amplifiers, Voltage controlled current sources (grounded load), First order Active filters, Astable using OP AMP, Comparators with Hysteresis, Window Comparator.	8		
		15		
	Unit-III		First week of Mar to end of Mar 2024	
	Transistor Multivibrators: Astable, Monostable and bistable Multivibrators, Schmitt trigger.	6		As per content, pulse modulation, power supply,

	555 Timer: Review Block diagram, Monostable and Astable operation Voltage Controlled Oscillators, Pulse Width modulator, Pulse position Modulator, Triggered linear ramp generator.	4		controller, oscillator
	Regulated DC power supply: characteristics, series voltage regulator, short circuit protection (Current limit and fold back) Monolithic linear IC voltage Regulators. (LM 78XX, LM 79XX, LM317, LM337).	5		
	Unit-IV	15	1 April to first week of April 2024	Types of Gates, and AND,OR,NOT,N AND,EXOR,its truth Tables etc.
	Logic families: Standard TTL NOR, Open collector gates, Three states TTL devices, MOS inverters, CMOS NAND and NOR gates, CMOS characteristics.	8		
	Digital Communication Techniques: Digital Transmission of Data, Benefits of Digital Communication, Disadvantage of Digital Communication, Parallel and serial transmission, pulse Modulation, Comparing pulse - modulation Methods (PAM, PWM,PPM), pulse-Code Modulation.	7		


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Teaching Plan 2023-2024 Semester: VI

Department of Physics

Semester Duration: Nov 2023 to May 2024

Duration of Teaching: Nov 2023 to April 2024

Class: T.Y.B.Sc Subject: Classical Mechanics Course: USPH601

Sr.no.	Topics	Number of hours planned	Lectures per week-4	Learning inputs
1	Central force	15		
	1.Motion under a central force, central force inversely proportional to the square distance	2	Last week of Nov2023 to Jan 2024	Newtons laws, Gravitation Kepler's-laws, moment-of-Inertia, Rotational motion
	Elliptic Orbits, The Kepler problem	2		
	2.moving origin of coordinates, Numerical	3		
	Rotating coordinate systems, Numerical	2		
	Law of motion on the rotating earth	2		
	The Foucault problems, Coriolis theorems	2		
2	Unit II: Lagrange's equation	15		
	1.D'Alembert's principle, constraints, Examples of holonomic constraints, examples of non holonomic constraints, degrees of freedom and generalized coordinates,	4	Jan to Last week of Feb 2024	Constraints, inertial frame-of-Reference, non-inertial frame of reference, general coordinate system
	Virtual displacement, virtual work, D'Alembert's principle, illustrative problems.	3		
	2. Lagrange's equation (using D'Alembert's principle), properties of Lagrange's equations,	4		
	Illustrative problem, canonical momentum, cyclic or ignorable coordinates	2		
	Number of numerical	2		
3	Unit III : Fluid Motion and Rigid body rotation	15		
	1. Kinematics of moving fluids, Equation of motion for an ideal fluid, conservation laws for fluid motion, steady flow.	4	First week of 1Mar to end of March 2024	Viscosity, Bernoulli's theorem, Degree of freedom, rotation of rigid bodies, spinning top.
	2. Rigid dynamics: introduction, degrees of freedom, rotation about an axis: orthogonal matrix,	4		
	Euler's theorem, Eulerian angles, inertia tensor, angular momentum of rigid body, symmetric top (without notation)	4		
	Euler's equation of motion of rigid body, free motion of rigid body, motion of Symmetric top (without notation)	2		
		1		
4	Unit IV : Non Linear Mechanics	15		
	1. Non linear mechanics: Qualitative approach to chaos,	5	1 April to last week of April 2024	Undamped and damped harmonic and forced oscillations

	The anharmonic oscillator, Numerical solution of Duffing's equation.	5		Third stage of matter
	2. Transition to chaos: Bifurcations and strange attractors, Aspects of chaotic behaviour (logistic map).	5		


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Shikshak Sanchalit Shikshan Sanstha's
Dr. Shantilal Dhanji Devsey Arts College
& Commerce & Science College,
Wada, Dist. Palghar

Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist.: Palghar

Teaching Plan 2023-2024

Department of Physics

Class: T.Y.B.Sc

Subject: Solid State Physics

Course:USPH502

Duration of Semester: Jun 2023 to Nov 2024

Teaching Duration: Jun 2023 to Oct 2024

Sr.no.	Topics	Number of hours planned	Lectures per week	Inputs and Learning outcomes
1	Unit 1: Crystal Physics General introduction of reflection, refraction, Dispersion,interference,polarisation, Types of prisms, overall revision of theories. Lattice point and space lattice,The basis and crystal structure, Unit cells and lattice parameters, primitive cells Crystal systems, crystal symmetry, Bravais space lattices, metallic crystal structures Relation between density of crystal material and lattice constant in a cubic lattice Directions, planes miller indices, important planes in scc structure Separation between lattice planes in a cubic structure, reciprocal lattice X-ray diffraction, classical free electron theory of metals, collision time, relaxation time and mean free path	15	Second week of Jun 2022 to second week of July2023	General fundamentals of light is discussed with student. Student are able to understood the concepts which were strike.
2	Unit II: Electrical properties of metal Quantum theory of free electrons, Fermi Dirac statistics and electronic distribution in solids Density of energy states and Fermi energy, Fermi Distribution Function, Heat capacity of electron gas Mean energy of electron gas at 0 kelvin, electrical conductivity from Quantum mechanical consideration	15	July2023 to second week of Aug 2023	Inter relation between conduction convection, effect Transition in temperatures Heat capacities were discussed. Students recalled from concept of resistance, density. Ionic gas its role in conductivity understood. Students are able to understand Application of electrical conductivity, specific -resistance, conductance their applications in units
2	Unit II:Band theory of solids, The Kronig penny model, Brillouin zones,			Energy, wavefunctions, conduction and Valence band theories were discussed, good outcomes obtained with concept of wave function Schrödinger equations and Einstein energy relations.
	Number of Wave function in band, Motion of		Last week	

	electron in one dimensional periodic potential,		of Aug	
	Distinction between metals, insulator and intrinsic semiconductor		2023 to	
3	Unit III:Conduction in semiconductors Electrons in holes in intrinsic semiconductor,conductivity,carrier concentrations	15	sept 2023	Basics of conductor's insulator and semiconductors were revised and formation of PN junction Diode rectifier its application are discussed
	Fermi levels in intrinsic semiconductors,Diffusion, carrier life time			
	The continuity equation, Hall effect			Verified with Experimental outcomes of V-I characteristic
	Semiconductor diode characteristics: Qualitative theory of p-n junction,			
	P-n junction as a diode, Band structure of open circuit p-n junction			
4	Unit IV: Diode, Magnetism and super conductivity	15		
	1.The current component in a pn junction diode, Quantitative theory of pn junction diode current			Polarisation of magnetic lines, Atomic Theory of, coulombs law, orientation of magnetic lines, flux its Alignments are discussed.
	The V-I Characteristics, The temperature dependence of p-n characteristic, Diode resistance			Penetration of magnetic lines under the action of magnetic field are discussed.
	2. Magnetic properties of matter; The diamagnetism and Para magnetism, The origin of permanent magnetic dipole Diamagnetism and Lamour precession, The static paramagnetic susceptibility.		Last week of Sep 2023 to-first -week of Oct 2023	
	Superconductivity: Mechanism of superconductors, Effect of magnetic field			
	Critical currents, The Meissner effect, The penetration Depth			
	Type I and II superconductors			


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**Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist.:
Palghar Teaching Plan 2023-2024**

Semester V Department of Physics

Class: T.Y.B.Sc

Subject: ELECTRODYNAMICS

Course: USPH504

Duration of Semester: Jun 2023 to Nov 2023

Teaching Duration: Jun 2023 to Oct 2023

Sr.no.	Topics	Number of hours planned	Lectures per week 4	Inputs and Learning outcomes
1	Unit 1: Electrostatics: Introduction, revision from coulombs law, fundamentals, revision of formulae, general idea about syllabus and topics in syllabus	2	End of second week Jun2023 to 11Jully 2023	Fundamentals from coulombs law, concept of Flux, Revision of Divergence, curl.
	Field lines, Flux and Gauss law, The divergence of E	2		
	Application of gauss law	2		Properties of lines of force and tubes of force
	Curl of E, Introduction to potential, comments on potential	3		
	Poisson's equation and Laplace Equation	2		
	The potential of a localized charge distribution, Review of conductors	2		
	First Uniqueness theorem, the classic image problem-infinite conducting plane	2		
2	Unit II: polarisation and Magneto statics	15	Second of July2023 to 14 Aug 2023	Fundamentals of magnetic materials, Bohr's theory, its postulates
	Dielectrics, induced Dipoles, Alignment of polar molecules, polarisation	3		
	Bound charges, and their physical interpretation	2		
	Gauss law in presence of Dielectrics,,A Deceptive parallel,succceptibility,permitivity,Dielectricco nstant, Energy in Dielectric systems	4		
	Straight line currents of B and curl of Application of Ampere law in case of long straight wire and long solenoid,	3		
	Comparison of Magneto statics and	3		

	electrostatics			
3	Unit III:Magnetism and Varying Field	15	Third week of Aug2023 to first week of Sep 2023	Distinguish between Para magnetism, magnetic susceptibility, charge distribution, electrodynamic s before Maxwell.
	1.Diamagnets para magnets, ferro-magnets, Magnetisation	2		
	Bound currents and their physical interpretation	2		
	Amperes law in magnetised materials, A deceptive parallel, magnetic susceptibility and permeability	3		
	2.Energy in Magnetic fields, Electrodynamics Before Maxwell, Maxwell correction to Amperes law,	3		
	Maxwell's Equations, Magnetic charge, Maxwell's Equation in matter,Boundary conditions	5		
4	Unit IV :Electromagnetic waves	15	Second week of sept 2023 to first week of Oct 2023	Types of waves, momentum of waves, concept of transmission
	1.The continuity equation,	2		
	Poynting theorem Newtons third law in Electrodynamic.	3		
	2.The wave equation Foe E and B	2		
	Monochromatic plane waves, Energy and momentum in electromagnetic waves	3		
	Propagation in linear media	2		
	Reflection and transmission of EM waves At normal incidence	3		


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