

Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist: Palghar
Teaching Plan 2021-22 Semester: I

Department of Physics

Duration: Jun 2021 to Nov 2021

Lectures Alloted-45

Class: F.Y.BSC

Subject: CLASSICAL PHYSICS

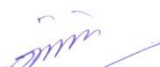
Course: USPH101

S r. n o.	Topics	Num ber of hours plann ed per Unit	Lectur es per week-3 / Unit to be Covere d.	Inputs and Expected Learning outcomes
	Unit: I	15	3	
1.	Newton's Laws: Newton's first, second and third laws of motion, interpretation and application, pseudo forces,	3	Month of July-2021	Fundamentals and Review should be Discussed $F=Ma$, concept of momentum, centripetal and centrifugal forces with examples of washing machine, pseudo forces discussed. Solved numericals.
	Inertial and non-inertial frames of reference. Worked out examples (with friction present)	2		Examples of Threading Two body problems laws of sliding rolling and kinetic friction are Discussed. Stable and movable bodies and its observations discussed
2.	Elasticity: Review of Elastic constants Y, K, n and o Equivalence of shear strain to compression and extension strains.	3		Stress strain, hooks law, poissons ratio, elastic limit and types are recalled and formulated
	Relation between elastic constants, Couple for twist in cylinder.	2		Practically performed with searles Experiment
3.	Fluid Dynamics: Equation of continuity, Bernoulli's equation, application of Bernoulli's equation, streamline and	3	Month of August 2021	The rate of Flow of different liquids its Viscous forces are discussed
	turbulent flow, lines of flow in airfoil, poiseuille's equation.	2		Velocity Gradient effect of forces Discussed
	Unit-II	15		Concept of Reflection Refraction snells law, velocity of light its speed in different medium discussed with given content
1.	Lens Maker's Formula (Review), Newton,s lens equation,	2		Refraction of light using lens its Equations are solved and Derived
	magnification-lateral, longitudinal and angular.	4		
2.	Equivalent focal length of two thin lenses, thick lens, cardinal points of thick lens, Ramsden and Huygens eyepiece.	3	4	Types of lenses ,optical lenses its applications are discussed
3.	Aberration: Spherical Aberration, Reduction of spherical Aberration,	3		Defect in lenses with content discussed

	Chromatic aberration and condition for achromatic aberration.			Distinguished content including numericals
4.	Interference: Interference in thin films, Fringes in Wedge shaped films, Newton's Rings (Reflective)	2	4	Topic discussed with polarisation, Huygens Compton concept.
	Unit-III	15	Month of September up to first week of October 20210	
1.	Behaviour of real gases and real gas equation, Van der Waal equation.	3		Fundamental of thermodynamics discussed
2.	Thermodynamic Systems, Zeroth law of Thermodynamics, Concept of Heat, The first law,	5		Topic discussed, conversion of Heat mechanical energy and work done discussed
	Non Adiabatic process and Heat as a path function, Internal energy, Heat Capacity and specific heat,	5		Graph of energy, Heat capacity plotted with numericals in tabular form are discussed
	Application of first law to simple processes, general relations from the first law,	2		Topic discussed
	Indicator diagrams, Work done during isothermal and adiabatic processes, Worked examples, problems.	3		Discussed ,solved numericals


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

Teaching Plan 2021-22 Semester: II

Department of Physics

Duration: Nov 2021 to April 2022

Class: F..Y.B.Sc

Subject: Mathematical physics

Course: USPH201

Sr. no.	Topics	Number of hours planned	Lectures per week-3	Learning Inputs
1	Vector Algebra	15	3	
	Vectors, scalars, Vector algebra, laws of vector Algebra	2	Nov 2021 to -Dec 2021	Dot and cross products with different examples were solved. Properties of different laws are discussed. Students are able to understand and solved many numericals
	Scalar fields, Vector fields, problem based on vector Algebra	2		
	Scalar or Dot products, cross or vector product	2		
	Commutative and Distributive laws, scalar triple product	1		
	Vector triple product, problems and applications based on vector and Triple product	2		
	Gradient, Divergence and Curl			
	The del operator Definition and physical significance of Gradient	2		One two and three dimensions, curl, divergence are derived, comparatively solved derivations students are able to solve derivation and numerical
	Divergence and curl	1		
	2. Distributive laws for Gradient	1		
	Divergence and curl, problems based on Gradient	2		
	Divergence and curl	2		
	Numerical on this Topic	1		
2	Unit II			
	1. Differential equations		Dec 2021 To Jan 2022	Fundamental of derivative and integration their rules Are discussed. these rules are applied to electronic circuits. order of equations and their importance taken using Feedback from students orally.
	Introduction, Ordinary Differential Equations	2		
	First order homogeneous and non homogeneous equations with variable coefficients	2		
	Exact differentials	1		
	General first order LDE, second order homogeneous equations with constant coefficients	2		
	Problems Depicting physical situations like LC and LR circuits	2		
	Simple harmonic motions spring mass systems	2		
	2. Transient response of circuits			Types of circuit are discussed compared with practical's performed in laboratory
	Series LR, CR, LCR circuits	2		
	Growth of decay of currents/charge	2		
	Unit III	15		

1. Super positions of collinear Harmonic oscillations	2	Jan 2022 to Feb 2022	Force and displacements, principle of superposition, concept of change in wavelength, velocity Frequency are discussed with content of unit, students given good response on it. This topic also discussed comparatively with fundamental of wave theory of light by Newton, Huygen, Fresnel, Heisenberg etc.
Linearly and superposition principle, superposition of two collinear oscillations having Equal frequencies and Different frequencies I.e. Beats	2		
2. Super positions of two perpendicular Harmonic oscillations	2		
Graphical and analytical Methods	1		
Lissajous Figures with equal and unequal Frequency and their uses	2		
3. wave motion			
Transverse wave on string, Travelling and standing waves on a string	3	Feb-to Last week-march 2022	
Group velocity, phase velocity, plane waves	2		
Spherical waves, wave intensity	1		


HEAD
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Teaching Plan Year (2021–2022) Semester: I

Department: Physics **Duration of Teaching:** June 2021 to December 2021

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	Moment of Inertia of Flywheel	2	2	
4	Young's Modulus by Vibration Method	2	2	
	GROUP-B	8		
1	Frequency of AC Mains	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	Measuring Instruments	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	


HEAD
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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: 2021–2022

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

Subject & Paper: Physics Practicals

Course Code: USPHP2

Duration of Teaching: December 2021 to March 2022

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	


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

Teaching Plan (2021-22) Semester: IV Department of Physics

Duration: Nov 2021 to May 2022

Class: S.Y.B. Sc Subject: Optical and Digital Electronics Course: USPH401

Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
1	Diffraction	15	Nov to Dec 2021	
	1.Fresnel Diffraction			
	Fresnel assumption, Rectilinear propagation of light, Diffraction pattern due to Straight Edge, position of maxima and minima of intensity	2		Fundamentals of light, interference, Diffraction, polarisation, Huygens and Newton's Theory
	Intensity at a point inside the geometrical shadow	3		
	Diffraction due to narrow slit	2		
	Diffraction due to Narrow wire	2		
	2.Fraunhofer Diffraction			Single and Double slit Experiment
	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		Concept of Lens, types of

	Types of polarisations, plane polarised light	1	4	polaroid's, practical examples. Types of crystal, crystal Growth, Refractive index, Braggs law, law of Malus, bending of light waves, shaping of waves
	Circularly polarised light, Elliptical polarised light, partially polarised light	1	Dec 2021 to Jan2022	
	Production of plane polarised light, polarisation by reflection from dielectric surface	2		
	Polarisation by refraction pile of plates, polarisation by scattering	2		
	Polarisation by Selective Absorption Polarisation by double refraction Polariser and analyser, malus law, Anisotropic crystal, calcite crystal, optic axis	2		
	Double refraction in calcite crystal, Huygens explanation of double refraction, ordinary and Extraordinary rays, positive and negative crystal	2	Dec 2021 to Jan2022	Practical input of Refraction
	Superposition of waves linearly polarised right angles, superposition of E-ray and O-ray, Retarders, Quarter wave plates	2		Production of various polarised light
	Half wave plate, production of linearly polarised light, production of epiphytically polarised light	2		
	Production of circularly polarised light, Analysis of polarised light, Application of polarised light	1		Applications in commercialism
3	Unit III			
	Digital Electronics	15	Jan to last week of march	Types oF Gates ,NAND ,NOR ,OR,NOT,etc

			2022	
	Fundamental revision	1		
	Binary number system, Arithmetic Building blocks, Types of registers, Digital IC signal levels, Binary to Decimal, decimal to binary, Hexadecimal number, Hexadecimal to Binary conversion, Binary to Hexadecimal conversion, Binary addition, Unsigned binary numbers, sign magnitude numbers, 1 and 2 complements, converting to and from 2's complement representation, 2's complement arithmetic, the Adder-subtractor	5		Microprocessor its types, adder and contents. Practical inputs and fundamentals of binary numbers
	R-S flip-flop, Gated flip-flop, Edge triggered RS flip-FLOP, Edge triggered D flip-flop, Edge triggered JK flip-flop, JK Master slave Flip-flop, Bounce Elimination switch	3		Types of flipflop, registers, counters, synchronisation, modification of flipflops
	Types of registers: SISO, SIPO, PISO, PIPO	2		
	Asynchronous counter-3bit, synchronous counter only mod8,	3		
	Decode counters Mod5 and Mod10	2		


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

Teaching Plan (2020-21) Semester: III Department of Physics

Duration: Jun 2020 to Nov 2021

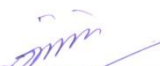
Class: S.Y.B.Sc Subject: Physics paper -III Course:USPH-303

Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
	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
	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		4	Band gap, Brewster's law, reflection ,magnetic materials, susceptibility's, periodic elements were discussed
	1) Electrical properties: Review of energy band diagram for materials – conductors, semiconductors and insulators, 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			,properties of materials, various types of characterizations like X ray,TGA,DSC,DTA,BAND GAP,V.B.THEORY


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

Teaching Plan (2020-22) Semester:IV Department of Physics

Duration: Nov 2021 to May 2022

Class: S.Y.B.Sc Subject: Applied Physics paper -III Course:USPH-403

Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
1	CHAPTER 1: GEOLOGY 1 Introduction to Geology its branches and relationship with other sciences. 2 Earth and solar system: Meteorites and other extra-terrestrial materials. 3 Age of Earth and various methods of determination. Planetary evolution of the Earth and its internal structure: Elastic waves and variation of physical and chemical properties in the interior of Earth. 4 Major tectonic features of the ocean oceanic and continental crust. 5 Continental drift – geological and geophysical evidence: mechanisms, objections and present status. 6 Geodynamics of the Indian plate.	8	4	Introduction to Geology its branches and relationship with other sciences. Age of Earth, Geodynamics of the Indian plate. Planetary evolution of the Earth
2	CHAPTER 2: GEOPHYSICS 1 Introduction to Geophysics 2 Gravity and magnetic anomalies at Mid-ocean ridges: deep sea trenches, continental shield areas and mountain chains. 3 Geomagnetism, elements of Earth's magnetism: Internal, external fields and their causes, Palaeomagnetism, Polar wandering paths and reversals, Seafloor spreading and Plate tectonics. 4 Seismic belts of the Earth: Seismicity and plate movements. 5 Utility of the different geophysical techniques (discussed above) in exploration for academic as well as for harnessing resources. Geophysical potential fields: Principles of Gravity	7	4	Introduction to Geophysics, Geomagnetism, Seismic belts, Seismicity and plate movements. Magnetic methods.

	and Magnetic methods. 6 Instrumentation, field procedures used in geophysical studies.			
3	Unit: II - Microprocessors 1) Building Concept of microprocessor Introduction, Study of Memory, Input Device , Output Device , Input/output Device Central Processing Unit. 2) 8085 Microprocessor Introduction, Features of Inter 8085 , Pin Diagram of 8085 , 8085 CPU Architecture ,Arithmetic and Logical Group (ALU , Accumulator , Temporary Register , Flag Register (PSW)) , Register Group (Temporary Registers (W and Z) , General purpose registers , Special Purpose registers) , Interrupt Control , Serial I/O Control Group ,Instruction Register , Decoder and Control Group (Instruction Register , Instruction Decoder , Timing and Control) 3) Classification of Instruction Set (Data Transfer Group ,Arithmetic Group , Logical Group , Branching Group , Stack and Machine Control Group) , Notations used in Instructions and Opcode , Data Transfer Group ,Program Examples for Data Transfer Group , Arithmetic Operation Group , Branch Group , Logical Group , Addressing Modes , 8085 Programmers Model.	15	4	Building Concept of Microprocessor, 8085 Microprocessor, Instruction Register, 8085 Instruction Set. Introduction, Flowchart
	Unit: III-Radio communication 1) Basics of Communication: Block diagram of communication system, types of communication system: simplex, duplex, analog and digital communication, Electromagnetic spectrum, base band and broad band communication. Noise concept and types, signal to noise ratio, noise figure, noise temperature. 2) Amplitude Modulation: Need of modulation, concept of modulation, AM,waveform, mathematical expression of AM, concept of	15		Basics of Communication: Block diagram of communication system, Amplitude Modulation: Need of modulation, concept of modulation, AM

	sideband, demodulation principles. AM Receiver: TRF and super heterodyne receiver. 3) Frequency Modulation: Definition, mathematical representation, frequency, spectrum, bandwidth and modulation index. 4) Concept of ASK, PSK, FSK, PAM, PWM, PPM, PCM.			
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HEAD
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Dr.S.D.Devsey Arts College and Commerce &Science College Wada,Dist:Palghar

Teaching Plan (2020-21) Semester:IV Department of Physics

Duration: Jun 2020 to Nov 2021

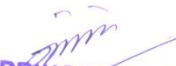
Class: S.Y.B.Sc Subject: Mechanics and Thermodynamics Course:USPH-301

Sr.no	Topics	Number of hours planned	Lectures per week-4	Learning Inputs
1	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

2	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,
3	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


HEAD
 DEPARTMENT OF PHYSICS




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

i. Teaching Plan Year (2021-2022) Semester: VI

a. Department of Physics

ii. Semester Duration: Nov 2021 to May 2022

iii. Duration of Teaching: Nov 2021 to April 2021

Class: T.Y.B.Sc

Subject: Electronics

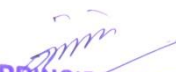
Course: USPH602

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 2021 to Jan 2022	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	30 Jan to Feb 2022	Operational amplifier 741 comparison with Transistor.
	Differential Amplifier using transistor: The Differential Amplifier, DC and AC analysis of a differential amplifier,	4		
	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	First week of Mar to end of Mar 2022	As per content, pulse modulation, power supply,
	Unit-III			
	Transistor Multivibrators: Astable, Monostable and bistable Multivibrators, Schmitt trigger.	6		

	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 2021	Types of Gates, and AND, OR, NOT, NAND, 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		


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

Teaching Plan 2021-2022 Semester: VI

Department of Physics

Semester Duration: Nov 2021 to May 2022

Duration of Teaching: Nov 2021 to April 2022

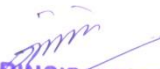
Class: T.Y.B.Sc Subject: Classical Mechanics Course: USPH601

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 Nov 2021 to Jan 2022	Newtons laws, Gravitation Kepler's-laws, moment-of-Inertia, Rotational motion
	Elliptic Orbits, The Kepler problem	2		
	2. motion origin of coordinates, Numerical	3		
	Rotating coordinate systems, Numerical	2		
	Law of motion on the rotating earth	2		
	The Foucault problems, armours theorems	2		
2	Unit II: Lagrange's equation	15		
	1. D'Alembert principle, constraints, Examples of holonomic constraints, examples of non holonomic constraints, degrees of freedom and generalized coordinates,	4	Jan to Last week of Feb 2022	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 1 Mar to end of March 2022	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 2022	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		


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

Teaching Plan 2021-2022

Department of Physics Class: T.Y.B.Sc

Subject: Solid State Physics

Course: USPH502

Duration of Semester: Jun 2021 to Nov 2022

Teaching Duration: Jun 2021 to Oct 2021

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 2021 to second week of July 2021	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 2021 to second week of Aug 2021	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 Aug2021	
	Distinction between metals, insulator and intrinsic semiconductor		to sept	
3	Unit III:Conduction in semiconductors Electrons in holes in intrinsic semiconductor,conductivity,carrier concentrations	15	2021	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			
	Semiconductor diode characteristics: Qualitative theory of p-n junction,			Verified with Experimental outcomes of V-I characteristic
	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 2021 to-first -week of Oct 2021	
	Superconductivity: Mechanism of superconductors, Effect of magnetic field			
	Critical currents, The Meissner effect, The penetration Depth			
	Type I and II superconductors			


HEAD
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**Dr. S.D. Devsey Arts College and Commerce & Science College Wada, Dist:
Palghar Teaching Plan 2021-2022**

Semester: V Department of Physics

Class: T.Y.B.Sc Subject: ELECTRODYNAMICS Course: USPH504

Duration of Semester: Jun 2021 to Nov 2022

Teaching Duration: Jun 2021 to Oct 2022

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 Jun2021 to 11Jully 2021	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 July2021 to 14 Aug 2021	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,succeptibility,permutivity,Dielectric constant, 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 electrostatics	3		
3	Unit III:Magnetism and Varying Field	15	Third week of Aug2021 to first week of Sep 2021	Distinguish between Para magnetism, magnetic susceptibility,
	1.Diamagnets para magnets, ferro-magnets,	2		

	Magnetisation			charge distribution, electrodynamic s before Maxwell.
	Bound currents and their physical interpretation	2		
	Ampere's law in magnetised materials, A deceptive parallel, magnetic susceptibility and permeability	3		
	2. Energy in Magnetic fields, Electrodynamics Before Maxwell, Maxwell correction to Ampere's 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 2021 to first week of Oct 2021	Types of waves, momentum of waves, concept of transmission
	1. The continuity equation,	2		
	Poynting theorem Newton's third law in Electrodynamics.	3		
	2. The wave equation for 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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