

Dr.S.D.Devsey Arts College and Commerce & Science College Wada, Dist: Palghar
Teaching Plan 2020-21 Semester: I
Department of Physics
Duration: Jun 2020 to Nov 2020 **Lectures Alloted-45**
Class: F.Y.BSC **Subject: CLASSICAL PHYSICS** **Course: USPH101**

Sr. no.	Topics	Number of hours planned per Unit	Lectures per week-3/ Unit to be Covered.	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, Inertial and non-inertial frames of reference. Worked out examples (with friction present) Elasticity: Review of Elastic constants Y, K, n and o Equivalence of shear strain to compression and extension strains. Relation between elastic constants, Couple for twist in cylinder. Fluid Dynamics: Equation of continuity, Bernoulli's equation, application of Bernoulli's equation, streamline and turbulent flow, lines of flow in airfoil, poiseuille's equation.	15	Month of July-2020	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. Examples of Threading Two body problems laws of sliding rolling and kinetic friction are Discussed. Stable and movable bodies and its observations discussed Stress strain, hooks law, poissons ratio, elastic limit and types are recalled and formulated Practically performed with searles Experiment The rate of Flow of different liquids its Viscous forces are discussed Velocity Gradient effect of forces Discussed
	Unit-II	15	Month of August 2020	Concept of Reflection Refraction snells law, velocity of light its speed in different medium discussed with given content Refraction of light using lens its Equations are solved and Derived Types of lenses, optical lenses its applications are discussed Defect in lenses with content discussed Distinguished content including numericals Topic discussed with polarisation, Huygens Compton concept.
2	Lens Maker's Formula (Review), Newton's lens equation, magnification-lateral, longitudinal and angular. Equivalent focal length of two thin lenses, thick lens, cardinal points of thick lens, Ramsden and Huygens eyepiece. Aberration: Spherical Aberration, Reduction of spherical Aberration, Chromatic aberration and condition for achromatic aberration. Interference: Interference in thin films, Fringes in Wedge shaped films, Newton's Rings (Reflective)	2 4 3 3 2		
	Unit-III	15	Month of September up to first week of October 2020	
3	Behaviour of real gases and real gas equation, Van der Waal equation. Thermodynamic Systems, Zeroth law of Thermodynamics, Concept of Heat, The first law, Non Adiabatic process and Heat as a path function, Internal energy, Heat Capacity and specific heat, Application of first law to simple processes, general relations from the first law, Indicator diagrams, Work done during isothermal and adiabatic processes, Worked examples, problems.	3 5 5 2 3		Fundamental of thermodynamics discussed Topic discussed, conversion of Heat mechanical energy and work done discussed Graph of energy, Heat capacity plotted with numericals in tabular form are discussed Topic discussed Discussed, solved numericals


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

Teaching Plan 2020-21 Semester: II

Department of Physics

Duration: Nov 2020 to April 2021

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 Scalar fields, Vector fields, problem based on vector Algebra Scalar or Dot products, cross or vector product Commutative and Distributive laws, scalar triple product Vector triple product, problems and applications based on vector and Triple product	15	Nov 2020 to -Dec 2020	Dot and cross products with different examples were solved. Properties of different laws are discussed. Students are able to understand and solved many numericals
	Gradient, Divergence and Curl			
	The del operator Definition and physical significance of Gradient Divergence and curl 2. Distributive laws for Gradient Divergence and curl ,problems based on Gradient Divergence and curl Numerical on this Topic			Derived curl ,comparatively solved derivations students are able to solve derivation and numerical
2	Unit II			
	1.Differential equations Introduction ,Ordinary Differential Equations First order homogeneous and non homogeneous equations with variable coefficients Exact differentials General first order LDE,second order homogeneous equations with constant coefficients Problems Depicting physical situations like LC and LR circuits Simple harmonic motions spring mass systems 2.Transient response of circuits Series LR,CR,LCR circuits Growth of decay of currents/charge	15	Dec 2020 To Jan 2021	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. Types of circuit are discussed compared with practical's performed in laboratory
3	Unit III			
	1.Super positions of collinear Harmonic oscillations Linearly and superposition principle, superposition of two collinear oscillations having Equal frequencies and Different frequencies I.e. Beats 2.Super positions of two perpendicular Harmonic oscillations Graphical and analytical Methods Lissajous Figures with equal and unequal Frequency and their uses 3.wave motion Transverse wave on string, Travelling and standing waves on a string Group velocity, phase velocity, plane waves Spherical waves, wave intensity	15	Jan 2021 to Feb 2021 Feb-to Last week-Feb 2021	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.


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

Teaching Plan Year (2020–2021) Semester: I

Department: Physics

Duration of Teaching: June 2020 to December 2020

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: To determine modulus of rigidity of wire	2	2	August to Second Week of September
2	Bifilar Pendulum: Determination of Moment of Inertia	2	2	
3	Moment of Inertia of Flywheel	2	2	
4	Young's Modulus of wire by vibration method	2	2	
	GROUP-B	8		
1	Frequency of AC Mains using Sonometer	2	2	Second Week of September to October
2	Thermistor Characteristics (Resistance vs Temperature)	2	2	
3	Determination of Capacitance in AC Circuit	2	2	
4	Determination of 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 (Binding Energy & Packing Fraction)	3	3	
3	Spectrometer – Schuster's	3	3	

	Method			
4	Resistance & Capacitance using Colour Code and Multimeter	3	3	
5	Use of 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: 2020–2021

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

Subject & Paper: Physics Practicals

Course Code: USPHP2

Duration of Teaching: December 2020 to March 2021

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

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

Duration: Nov 2020 to May 2021

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 2020	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		
		3		
	Intensity t a point inside the geometrical shadow	2		
	Diffraction due to narrow slit	2		
	Diffraction due to Narrow wire			
	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		
		2		
	Plane Diffraction Grating, Theory of plane Diffraction Grating	1		
	Width of principal maxima			
2	Unit II: Polarisation	15	4	Concept of Lens, types of polaroid's, practical examples. Types of
	Types of polarisations, plane polarised light	1		

	Circularly polarised light, Elliptical polarised light, partially polarised light	1	Dec 2020 to Jan2021	crystal, crystal Growth,
	Production of plane polarised light, polarisation by reflection from dielectric surface	2		
	Polarisation by refraction pile of plates, polarisation by scattering	2		Refractive index, Braggs law, law of Malus, bending of light waves, shaping of waves
	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 Superposition of waves linearly polarised right angles, superposition of E-ray and O-ray, Retarders, Quarter wave plates Half wave plate, production of linearly polarised light, production of epiphytically polarised light Production of circularly polarised light, Analysis of polarised light, Application of polarised light	2		Practical input of Refraction Production of various polarised light Applications in commercialism
		2		
		2		
		1		
3	Unit III			
	Digital Electronics	15	Jan to last week of march	Types of Gates ,NAND ,NOR ,OR,NOT,etc
	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 - subtracter	5	2021	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		


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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
	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			,magnetic materials, susceptibility's, periodic elements were discussed ,properties of materials, various types of characterizations like X ray, TGA,DSC,DTA,BAND GAP,V.B.THEORY


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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: Nov 2020 to May 2021

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	7	4	Introduction to Geophysics, Geomagnetism, Seismic belts, Seismicity and plate movements. Magnetic

	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 and Magnetic methods. 6 Instrumentation, field procedures used in geophysical studies.			methods.
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	15	4	Building Concept of Microprocessor, 8085 Microprocessor, Instruction Register, 8085 Instruction Set. Introduction, Flowchart

	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.			
	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 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.	15		Basics of Communication: Block diagram of communication system, Amplitude Modulation: Need of modulation, concept of modulation, AM


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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

	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 Year (2020-2021) Semester: VI
Department of Physics
Semester Duration: Nov 2020 to May 2021
Duration of Teaching: Nov 2020 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 2020 to Jan 2021	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 2021	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 2021	
	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 last week of April 2021	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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**Dr.S.D.Devsey Arts College and Commerce & Science College
Wada, Dist: Palghar**

Teaching Plan 2020-2021 Semester: VI

Department of Physics

Semester Duration: Nov 2020 to May 2021

Duration of Teaching: Nov 2020 to April 2021

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 2020 to Jan 2021	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 2021	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 2021	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 April to last week of April 2021	
	1. Non linear mechanics: Qualitative	5		Undamped and damped harmonic and forced

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


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Dr.S.D. Devsey Arts College and Commerce & Science College**Wada, Dist.: Palghar****Teaching Plan 2020-2021****Department of Physics****Subject: Solid State Physics****Class: T.Y.B.Sc****Course: USPH502****Duration of Semester: Jun 2020 to Nov 2020****Teaching Duration: Jun 2020 to Oct 2020**

Sr.no.	Topics	Number of hours planned	Lectures per week 4	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 2020 to second week of July 2020	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 2020 to second week of Aug 2020	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, wave functions, 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 Aug2020	
	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	2020	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 2020 to-first -week of Oct 2020	
	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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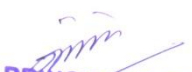
Dr.S.D.Devsey Arts College and Commerce & Science College
Wada, Dist: Palghar Teaching Plan 2020-2021
Semester: V Department of Physics
Class: T.Y.B.Sc Subject: ELECTRODYNAMICS Course: USPH504
Duration of Semester: Jun 2020 to Nov 2020
Teaching Duration: Jun 2020 to Oct 2020

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 Jun 2020 to 11 July 2020	Fundamentals from coulombs law, concept of Flux, Revision of Divergence, curl.
	Field lines, Flux and Gauss law, The divergence of E	2		Properties of lines of force and tubes of force
	Application of gauss law	2		
	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 July 2020 to 14 Aug 2020	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, susceptibility, permittivity, 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 Aug 2020 to first week of Sep 2020	Distinguish between Para magnetism, magnetic susceptibility, charge distribution, electrodynamic
	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		s before Maxwell.
	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		
	1. The continuity equation,	2		
	Poynting theorem Newtons 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		
			Second week of sept 2020 to first week of Oct 2020	Types of waves, momentum of waves, concept of transmission


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