"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Dr. G. J. Navathe**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total			
B.Sc. III	12	-	12	Introduction to Quantum Mechanics	Origin of quantum mechanics, Review of black body radiation, Photoelectric effect, matter waves, De-Broiglie hypothesis, experimental evidence of de Broglie theory (Davisson and Germer experiment), wave particle duality, Heisenberg's uncertainty principle and different forms uncertainty principle	Covered
B.Sc. II	12	-	12	Semiconductor Diodes and Applications	Introduction to semiconductor, p-n junction diode, LED, Zener diode, Rectifier diode, Tunnel diode, Variable capacitance diode, Photodiode, solar cell. Bipolar Junction Transistor: BJT Operation, BJT voltages and currents, BJT amplification, Common base, Common emitter, Common collector characteristics, Numerical examples as applicable.	Covered
B.Sc. II	-	40	40	Practicals	1) 'Y' by cornu's method. 2) Measurement of heat capacity of solid. 3) S. T. tension by drop weight method. 4) Young's modulus by vibration using AFG.	Covered

Month July				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lect ures	Practicals	Total	The Schrodinger's Equation	The Schrodinger's Equation Physical interpretation of wave function, Schrodinger's time dependent and independent equation (one and three dimensional) Requirements of wave function, Eigen value, Eigen function, Normalized orthogonal and orthonormal wave functions, Probability current density (Continuity equation). Examples on Normalization of wave function	Covered
B.Sc. III	12	-	12			
B.Sc. II	12	-	12	Operational Amplifiers:	Ideal OP-AMP, Inverting and Non-Inverting OP-AMP circuits, OP-AMP applications: voltage follower, addition, subtraction, integration, Differentiation, Numerical examples as applicable.	Covered
B.Sc. II	-	40	40	Practicals	1) Double refracting prism 2) Diameter of lycopodium powder. 3) Spherical aberration. 4) Absorption of spectrum of $KMnO_4$ solution.	Covered
Month August				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lect ures	Practicals	Total		Operator in Quantum Mechanics	Covered

B.Sc. III	12	-	12	Operator in Quantum Mechanics	Definition of an operator in quantum mechanics, commutation relation in quantum mechanics, position, momentum and angular momentum operator, Angular momentum operator in spherical polar coordinate system, Hamilton operator, Hamilton operator commutation relation between x' and p. Expectation value of an operator communication relation between L2 and components of L, Raising and lowering operator L+ and L-. Eigen values of L2 and L1. Con cept of parity operator. Concept of Hermitian operator.	Covered
B.Sc. II	12	-	12	Digital Electronics	Number Systems: Decimal Number System, Binary Number System, Converting Decimal to Binary, Hexadecimal Number System: Converting Binary to Hexadecimal, Hexadecimal to Binary, Converting Hexadecimal to Decimal, Converting Decimal to Hexadecimal, Octal Numbers: Binary to Octal Conversion, Complement of Binary Numbers, Boolean Algebra Theorems, De Morgan's theorem, Digital Circuits, Logic gates: Fundamental and derived gates, NAND Implementation, NOR Implementation, Half adder, Full adder.	Covered
B.Sc. III	-	40	40	Practicals	1) Double refracting prism 2) Diameter of lycopodium powder. 3) Spherical aberration. 4) Absorption of spectrum of $KMnO_4$ solution.	Covered
Month September				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
B.Sc. III	Lect ures	Practicals	Total	Applications of	Quantum mechanics treatment of particle in rigid box (1D and 3D). Step	

	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
	12	-	12	Schrodinger's Steady State Equation	potential relation and transmission coefficient. Barrier potential-Tunnelling effect, α-decay, simple harmonic oscillator.	Covered
B.Sc. II	16	-	16	Communication Systems	Introduction, Elements of Communication Systems, Modulation: Amplitude Modulation, Spectrum Power, AM Detection (Demodulation), Frequency and Phase Modulation, Comparison between Amplitude and Frequency Modulation	Covered
B.Sc. III	-	40	40	Practicals	1) e/m of electron by Thomson's method. 2) Measurement of dielectric constant. 3) Resistivity of semiconductor crystal with temperature by four probe method. 4) Calibration of wire using Carey-foster key.	Covered

Month October/November				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
	Lectures	Practicals	Total	Examination	Examination	-

Month December				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
	Lectures	Practicals	Total			
B.Sc. III	12	-	12	Elementary band theory	Introduction of free electron theory (Classical and Quantum mechanical) , Kronig Penny model, Effective mass of an electron, Band Gaps. Conductors, Semiconductors and insulators. P and N type semiconductors. Conductivity of Semiconductors, mobility, Hall Effect, Hall voltage and Hall coefficient.	Covered

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. I	16	-	16	Electricity	Introduction – DC and varying currents, LR Circuit, RC circuit and LC circuit, Growth and decay of currents, Theory of B.G. and constants of B.G., time constants Τ	Covered
B.Sc. II	-	64	64	Practicals	1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	Covered

Month January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total			
B.Sc. III	12	-	12	Dielectric Properties of Materials	Dielectric Properties of Materials Polarization. Local Electric Field at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mosotti Equation. Classical Theory of Electric Polarizability. Normal and Anomalous Dispersion. Cauchy and Sellmeir relations. Langevin-Debye equation. Complex Dielectric Constant. Optical Phenomena. Application: Plasma Oscillations, Plasma Frequency, Plasmons.	Covered
B.Sc. II	12	-	12	Complex Numbers:	Introduction to complex numbers, geometrical representation of imaginary number, Argand diagram, Addition of complex numbers, Addition of complex numbers by geometry, Subtraction, Types of complex numbers, power of 'i', De-Moivre's theorem (statement only), problems.	Covered

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. III	-	40	40	Practicals	1) Band gap energy of semiconductor using P-N junction. 2) Determination of plank's constant. 3) FET characteristics. 4) FET as VVR.	Covered
Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	X-Ray Diffraction	X-Ray Diffraction Reciprocal lattice and its properties, concept of Brillouin zone , diffraction of X-rays by crystals, Ewald construction, Bragg's law in reciprocal lattice, X-ray diffraction methods: 1) Laue method. 2) Rotating crystal 3) Powder method - Principle, Construction, Working , analysis of cubic crystal by powder crystal method	
B.Sc. III	12	-	12			Covered
B.Sc. II	12	-	12	Matrix:	Introduction, Definition, Types of matrices, Addition of matrix, Subtraction of matrix, Scalar multiple of matrix, Multiplication, Properties of multiplication, Inverse of matrix, Rank of matrix, Problems.	Covered
B.Sc. II	-	64	64	Practicals	1) Band gap energy of semiconductor using P-N junction. 2) Determination of plank's constant. 3) FET characteristics. 4) FET as VVR.	Covered
Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**

Course	Lect ures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. III	12	-	12	Magnetic Materials and their Properties	Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.	Covered
B.Sc. II	12	-	12	Basic Concepts of Thermodynamics	Thermodynamic state of a system, Thermal Equilibrium, Zeroth law of Thermodynamics, Internal Energy of System-Concept of heat, Equation of State for a perfect Gas, First law of Thermodynamics, Thermodynamic Processess-Isothermal, Adiabatic, Isobaric, Isochoric, Adiabatic relations of system for perfect gas, Work done during Isothermal and Adiabatic changes, Reversible and Irreversible changes. Problems.	Covered
B.Sc. II	-	64	64	Practicals	1) Obtain interference fringes using Biprism. 2) Thermal expansion of Quartz using LASER. 3) Measurement of refractive index of air. 4) Refractive index of glass by Brewster's law.	Covered
Month April				**Module/Unit:**	**Sub-units planned**	Syllabus Covered/ Not Covered
Lectures	Practicals	Total	Examination		Examination	-

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Teacher Incharge

ESTD JUNE 1984

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Dr. S. S. Latthe
HEAD
DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"Dissemination of Education for Knowledge, Science and Culture"
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Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Dr. S. S. Latthe**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered / Not Covered
Course	Lectures	Practicals	Total		Kinetic model of an ideal gas, Mean free path and its expression, Derivation of Maxwell's law of distribution of velocities and its experimental verification, Transport Phenomena: transport of momentum (viscosity), Transport of thermal energy (conduction), Transport of mass (diffusion), Law of equipartition of energy (qualitative) and its applications to specific heat of monoatomic and diatomic gases, Thermometry: Concept of heat and temperature, Temperature scales, Principle of thermometry, Mercury thermometer, Platinum resistance thermometer, Thermocouple (Principle, construction and theory), Thermoelectric thermometer.	
B.Sc. II	24	-	24	Kinetic Theory of Gases and thermometry		Covered
B.Sc. III	-	40	40	Practicals	1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method.	Covered

				Module/Unit:	4) Y & η using flat spiral spring.	

Month July				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Course	Lectures	Practicals	Total		Thermodynamic system, Thermodynamic variables, Thermodynamic state, equation of state, Thermodynamic equilibrium, Zeroth Law of thermodynamics, Internal energy, First law of thermodynamics, Conversion of heat into work, Specific heats CP & CV, Applications of First Law thermodynamics (Isothermal process, Adiabatic process, Isochoric, Isobaric), Relation between CP & CV, Workdone during isothermal and adiabatic processes, Reversible & irreversible processes, Second law of thermodynamics, Carnot's ideal heat engine, Carnot's cycle (Working & efficiency), Carnot's theorem, Entropy (concept & significance), Change in entropy, Entropy changes in reversible & irreversible processes, Third law of thermodynamics, Entropy change in conduction of heat, Diffusion of gases, Physical significance of entropy, Un-attainability of absolute zero, Zero point energy	Covered
B.Sc. II	24	-	24	Laws of Thermodynamics		

					1) 'Y' by Koenig's method.	
B.Sc. III	-	40	40	Practicals	2) 'Y' by cornu's method. 3) Measurement of heat capacity of solid. 4) S. T. tension by drop weight method. 5) Young's modulus by vibration using AFG.	Covered

Month August				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Course	Lectures	Practicals	Total		Linearity and superposition principle, Composition of two simple harmonic motions, Superposition of two collinear harmonic oscillationsfor oscillations having equal frequencies (Analytical and geometrical methods) and oscillations having different frequencies (Beats), Superposition of two perpendicular harmonic oscillations - for oscillations having equal frequencies (Graphical and analytical methods) and oscillations having different frequencies (Lissajous figures). Uses of Lissajous figures. Coupled Oscillations: Normal modes of vibration, Normal coordinates, Degrees of freedom, Types of coupling, Frequency of oscillatory systems, Energy transfer in coupled oscillatory system.	
B.Sc. II	24	-	24	Superposition of Harmonic Oscillations		Covered

							Syllabus Covered / Not Covered
B.Sc. II	-	40	40	Practicals	1) Cardinal points by turn table method. 2) Cardinal points by Newton's method. 3) Diffraction at single slit. 4) Diffraction at cylindrical obstacle. 5) Diffraction at straight edge		Covered
Month September				**Module/Unit:**	**Sub-units planned**		**Syllabus Covered / Not Covered**
B.Sc. III	Lect ures	Practicals	Total	Sound and Acoustics of buildings	Transducers and their characteristics, Types of microphones, Moving coil loudspeaker, Intensity and loudness of sound, Decibels, Intensity levels, Musical notes, Musical scale. Acoustics of buildings: Reverberation and reverberation time, Absorption coefficient, Concept of perfect absorber, Optimum reverberation, Sabine's 15 formula for measurement of reverberation time, Acoustic aspects of halls and auditoria. Viscosity: Revision of viscosity, Stream line flow, turbulent flow, Coefficient of viscosity, Critical velocity, Rate		Covered

	24	-	24		flow of liquid in a capillary tube - Poiseuille's formula, Experimental determination of coefficient of viscosity of a liquid by Poiseuille's apparatus method, Variation in viscosity of a liquid with temperature, Lubrication and pressure. Physics of low pressure: Definition of vacuum, Production and measurement of low pressure: Exhaust pump, Rotary pump, Diffusion pump, Molecular pump, Knudsen absolute gauge, Pirani gauge, Detection of leakage.	Covered
B.Sc. III	-	40	40	Practicals	1) Lloyd's single mirror. 2) Double refracting prism 3) Diameter of lycopodium powder. 4) Spherical aberration. 5) Absorption of spectrum of KMno4 solution.	Covered
Month October/November				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
	Lect ures	Practicals	Total	Examination	Examination	-
Month December				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
	Lect ures	Practicals	Total		Energy functions of Enthalpy, Gibbs free energy, Helmholtz	Covered

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered / Not Covered
B.Sc. II	24	-	24	Thermodynamic Potentials	free energy, Internal energy, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron equation, Expression for (CP – CV), CP/CV, TdS equations. Theory of Radiation: Thermal radiations, Blackbody radiation and its importance, Black body in practice and its temperature dependence, Emissive power, Absorptive power, Pressure of radiation, Experimental study of black body radiation spectrum, Concept of energy density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh-Jeans Law,	Covered
B.Sc. III	-	40	40	Practicals	1) Self inductance by Owen's bridge. 2) Self inductance by Rayleigh's method. 3) Self inductance by Maxwell bridge. 4) Measurement of BV, BH and θ using earth inductor. 5) Hysteresis by magnetometer.	Covered
Month January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Course	Lectures	Practicals	Total	Classical statistics	Degrees of freedom, Momentum space, Position space, Phase space, Microstate	Covered

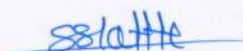| Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered / Not Covered
B.Sc. III	24	-	24		and Macrostate, Accessible microstates, Priory probability, Thermodynamic probability, Probability distribution, Maxwell-Boltzmann distribution law, Evaluation of constants α and β, Entropy and thermodynamic probability, Distribution of molecular speeds. Quantum statistics: Need of quantum statistics, Comparison of M.B., B.E., and F.D. statistics, Bose-Einstein distribution law	Covered
B.Sc. III	-	40	40	Practicals	1) e/m of electron by Thomson's method. 2) Measurement of dielectric constant. 3) Resistivity of semiconductor crystal with temperature by four probe method. 4) Calibration of wire using Carey-foster key..	Covered

Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Course	Lectures	Practicals	Total			
B.Sc. III	24	-	24	Cardinal points	Thick lens, Combination of lenses (system), Cardinal points of an optical system (definitions only), Graphical construction of image using cardinal points, Newton's formula, Relation between f and f' for any optical system, Relation between lateral, axial and angular magnifications. Resolving Power of optical instruments: Resolution, Resolving power of optical instruments: telescope and microscope, Rayleigh's criterion for the limit of resolution, Modified Rayleigh's criterion, Comparison between	Covered

					magnification and resolution, Resolving power of plane diffraction grating and prism.	
B.Sc. III	-	64	64	Practicals	1) Study of divergence of LASER beam. 2) Measurement of wavelength of LASER using grating. 3) Lattice constant using XRD powder. 4) To measure numerical aperture of optical fibre. 5) Obtain interference fringes using Biprism.	Covered
Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Course	Lect ures	Practicals	Total	Interference & Diffraction	Principle of Superposition, Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyd's single mirror (determination of wavelength of monochromatic source), Division of amplitude	Covered

				Interference in thin parallel films (reflected light only), Wedge shaped films, Newton's rings and its application for determination of wavelength and refractive index of light. Revision of wave fronts and diffraction, Fraunhofer diffraction - elementary theory of plane diffraction grating, Determination of wavelength of light using diffraction grating, Theory of Fresnel's half period zones, Zone plate (construction, working and its properties), Fresnel's diffraction at a straight edge.	
B.Sc. III	12	-	12			Covered
B.Sc. III	-	64	64	Practicals	1) UJT as voltage sweep generator. 2) Astable multivibrator by using IC 555 timer. 3) Monostable multivibrator by using IC 555 timer. 4) IV characteristics of P-N diode and LED. 5) Inverting amplifier using op - Amp 741.	Covered
Month April				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not Covered**
Lectures	Practicals	Total	Examination	Examination		-

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Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Dr. S. I. Inamdar**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
Course	Lectures	Practicals	Total		Del operator, Gradient of a scalar field and its physical significance, Divergence	
B.Sc. I	12	-	12	Vector analysis	of vector field and its physical significance, Curl of vector field, Line, Surface	Covered
					and volume integral (definitions only), Gauss divergence theorem and Stoke's theorem (statements only).	
B.Sc. III	12	-	12	Crystal Structure	Types of the solids, Amorphous, crystalline, lattice, lattice translation vectors, lattice with basis (Central , non central elements) Unit cell , Examples of crystal structure NaCl, KCl, ZnS, Diamond, Miller Indices, Calculations of coordination number, lattice constant, reciprocal lattices, types of lattices, Brillouin Zones, Diffraction of X-rays, Bragg's law, atomic, geometrical factor, Bragg's X-ray spectrometer	Covered

| B.Sc. III | - | 40 | 40 | Practicals | 1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring. | Covered |

Month July				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
Course	Lectures	Practicals	Total		Coulomb's law, Electrostatic field, Electric flux, Gauss's theorem of electrostatics, Electric potential as line integral of electric field, Potential due to a point charge, Electric dipole, Uniformly charged spherical shell and solid sphere, Calculation of electric field from potential.	
B.Sc. I	12	-	12	Electrostatics		Covered
B.Sc. III	12	-	12	Lattice Vibration and Thermal Properties of Solid	Lattice vibrations, Phonons, normal modes of one dimensional and diatomic chain, Acoustical and optical phonons, Phonons spectrum in solids, Dulong Petit's law (Classical Theory), Einstein and Debye theories of specific heat of solids.	Covered
B.Sc. III	-	40	40	Practicals	1) 'Y' by Koenig's method. 2) 'Y' by cornu's method. 3) Measurement of heat capacity of solid. 4) S. T. tension by drop weight method. 5) Young's modulus by vibration using AFG.	Covered

Month August				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
Course	Lectures	Practicals	Total			
B.Sc. I	12	-	12	Dielectrics	Introduction to Dielectrics, Polar and Non polar molecules, Dielectric medium, Polarization vector, Displacement vector, Electric vector, Relation between E, P and D vectors, Electric susceptibility of dielectrics	Covered
B.Sc. III	12	-	12	Magnetic Properties of Materials	Magnetic materials, permeability, susceptibility, magnetization, magnetic moment, electron spin, Diamagnetic materials, Paramagnetic materials, ferromagnetic, ferromagnetic, classical theory of diamagnetism and paramagnetism, Curie law, Curie constant, Weiss theory of ferromagnetism, and ferromagnetic domain, Hysteresis loop for ferromagnetic materials.	Covered
B.Sc. III	-	40	40	Practicals	1) Cardinal points by turn table method. 2) Cardinal points by Newton's method. 3) Diffraction at single slit. 4) Diffraction at cylindrical obstacle. 5) Diffraction at straight edge	Covered

Month September				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
B.Sc. I	Lectures	Practicals	Total	Magnetostatics	Introduction to magnetization and intensity of Magnetization, Biot-Savart's law & its applications-straight conductor, Circular coil, Solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law	Covered
	12	-	12			
B.Sc. III	12	-	12	Superconductivity	Idea of superconductivity, Critical temperature, Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth, Isotope effect	Covered
B.Sc. III	-	40	40	Practicals	1) Lloyd's single mirror. 2) Double refracting prism 3) Diameter of lycopodium powder. 4) Spherical aberration. 5) Absorption of spectrum of KMno4 solution.	Covered
Month October/November				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
	Lectures	Practicals	Total	Examination	Examination	-
Month December				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
	Lectures	Practicals	Total	Elasticity	Introduction to elasticity, Stress, Strain, Hooke's law, Elastic

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered/Not Covered
B.Sc. I	12	-	12		moduli, Relation between elastic constants, Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants, Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beam supported at both the ends (without considering weight of beam). Torsional oscillation, Determination of Rigidity modulus and moment of inertia - q, η and σ by Searle's method.	Covered
B.Sc. III	12	-	12	Instrumentations	Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.	Covered
B.Sc. III	-	40	40	Practicals	1) Self inductance by Owen's bridge. 2) Self inductance by Rayleigh's method. 3) Self inductance by Maxwell bridge. 4) Measurement of BV, BH and θ using earth inductor. 5) Hysteresis by magnetometer.	Covered

Month January				Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
Course	Lectures	Practicals	Total	Surface tension	Surface tension (definition), Angle of contact and wettability, Relation between surface tension, excess of pressure and radius of curvature, Experimental determination of surface tension by Jaeger's method, Applications of surface tension.	Covered
B.Sc. I	12	-	12			

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
B.Sc. III	12	-	12	Special functions of ICs	IC 555, Block diagram and special functions if ICs, Astable Operation: Circuit diagram, frequency of oscillation and duty cycle, Applications as tone brust oscillator, voltage controlled frequency shifters. Monostable operation: circuit diagram, Applications as touch switch and frequency divider. Bistable Operation: Circuit diagram and circuit action.	Covered
B.Sc. III	-	40	40	Practicals	1) e/m of electron by Thomson's method. 2) Measurement of dielectric constant. 3) Resistivity of semiconductor crystal with temperature by four probe method. 5) Calibration of wire using Carey-foster key..	Covered
Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not Covered**
Course	Lectures	Practicals	Total			
B.Sc. I	12	-	12	Fluid dynamics	Introduction, Concept of viscous force and viscosity, Coefficient of viscosity, Steady and Turbulent flow, Reynolds number, Equation of continuity, Bernoulli's Theorem, practical applications: (i) Law of hydrostatic pressure (ii) Filter pump (iii) Speed of efflux (iv) Venturi tube	Covered
B.Sc. III	12	-	12	Digital Electronics	Introduction to logic gates, De-Morgan's theorem, NAND and NOR gates as universal gates, R-S and J-K flip flops, half and full adder, parallel binary adder.	Covered

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/Not Covered
B.Sc. III	-	40	40	Practicals	1) Study of divergence of LASER beam. 2) Measurement of wavelength of LASER using grating. 3) Lattice constant using XRD powder. 4) To measure numerical aperture of optical fibre. 5) Obtain interference fringes using Biprism.	Covered

Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not Covered**
Course	Lectures	Practicals	Total	Viscosity	Introduction, Ideal and viscous fluids, Flow of liquid through capillary tube, Poiseuille's equation, Experimental determination of coefficient of viscosity of liquid by Poiseuille's method, effect of temperature and pressure on viscosity of liquid	Covered
B.Sc. I	12	-	12			
B.Sc. III	12	-	12	Bipolar Junction transistors	n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Current gains α and β. Relations between α and β. Load Line analysis of Transistors. DC Load line and Q point. Active, Cut-off, and Saturation Regions. Voltage Divider Bias Circuit for CE Amplifier. h- parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.	Covered

B.Sc. III	-	40	40	**Practicals**	**Practicals :** 1) UJT as voltage sweep generator. 2) Astable multivibrator by using IC 555 timer. 3) Monostable multivibrator by using IC 555 timer. 4) IV characteristics of P-N diode and LED. 5) Inverting amplifier using op - Amp 741.	Covered
Month April				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not Covered**
Lectures	Practicals	Total	Examination	Examination		-

Teacher Incharge

Dr. S. S. Latthe

Vivekanand College, Kolhapur
(Empowered Autonomous)
Department of Physics
Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Mr. A. R. Gaikwad**

Month- June				Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
Course	Lectures	Practicals	Total	Nuclear Radiation Detectors	Introduction: Ionization chamber,	Syllabus Covered / Not covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. II	-	16	16	Practicals	1) Verification of truth table of basic gates (AND, OR, NOT) using ICs. 2) Construction of basic gates (AND, OR, NOT) using NOR and NAND gates	Covered
Month- July				Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
Course	Lectures	Practicals	Total			

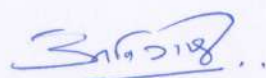| Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered / Not covered
B.Sc. III	04	-	04	Nuclear Radiation Detectors	G. M. counter, (principle, construction, working mechanism, limitations, merits)	Covered
B.Sc. I	-	32	32	Practicals:	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. II	-	16	16	Practicals	1) Construction and study of half adder using NAND gates. 2) Construction and study of full adder using NAND gates.	Covered
Month- August				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not covered**
Course	Lectures	Practicals	Total	Nuclear Radiation Detectors	Scintillation Counter (principle, construction, working, advantages)	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. II	-	16	16	Practicals	1) Study of Colpitts oscillator 2) Study of Hartley Oscillator	Covered

Month- September				Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
Course	Lectures	Practicals	Total	Nuclear Radiation Detectors	Introduction to cosmic radiations, Wilson cloud chamber, Bubble chamber.	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. II	-	16	16	Practicals	1) Study of low pass and high pass filter using resistance and capacitance 2) To study input out characteristics of solar cell	Covered
Month- October				Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
	Lectures	Practicals	Total	Examination	Examination	-
Month- December				Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
	Lectures	Practicals	Total	Laser Physics	Ordinary Light, Laser, Spontaneous and stimulated emission,	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered

| B.Sc. II | - | 16 | 16 | Practicals | 1) To determine Coefficient of Thermal Conductivity of a bad conductor by Lees method. 2) To determine temperature coefficient of resistance by platinum resistance thermometer. | Covered |

Month- January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not covered**
Course	Lectures	Practicals	Total	Laser Physics		
B.Sc. III	04	-	04		Populations Inversion, Monochromaticity, directionality	Covered
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practicals	1) To calibrate Resistance Temperature Device (RTD) using null method / off-balance bridge. 2) Surface Tension of liquid by Capillary method.	Covered

Month- February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not covered**
Course	Lectures	Practicals	Total	Laser Physics	Pumping (optical, electrical) Ruby laser He-Ne laser	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered / Not covered
B.Sc. II	-	16	16	Practicals	1) Measurement of log decrement by Exponential Decay. 2) Numerical Integration.	Covered
Month- March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not covered**
Course	Lectures	Practicals	Total	Laser Physics	Diode laser, Laser applications, (Industrial, medical, nuclear, optical) , Types of lasers	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4) Verification of Kirchoff's voltage and current law	Covered
B.Sc. II	-	16	16	Practicals	1) Numerical Differentiation. 2) Solution of ordinary differential equation	Covered
Month April				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered / Not covered**
Lectures		Practicals	Total	Examination	Examination	-

Teacher Incharge

Dr. S. S. Latthe

HEAD
DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Dr. N. A. Narewadikar**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total	Nucleus (Nuclear Structure & General Properties of nuclei)	Introduction, Constituents of nuclei, Nuclear size, Nuclear magnetic moment,	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. III	-	20	20	Practicals	Measurement of heat capacity of solid.	Covered
Month July				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total			

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. III	04	-	04	Nucleus (Nuclear Structure & General Properties of nuclei)	Electric quadrupole moment, Nuclear spin, Unit of atomic mass (amu), Mass defect,	Covered
B.Sc. I	-	32	32	Practicals:	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. III	-	20	20	Practicals:	Absorption of spectrum of $KMnO_4$ solution.	Covered

Month August				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total	Nucleus (Nuclear Structure & General Properties of nuclei)	Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces,	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered

| B.Sc. III | - | 20 | 20 | Practicals: | Measurement of B_V, B_H and using earth inductor. | Covered |

Name of the teacher: **Mr. A.N. Gore**

Month September				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total	Nucleus (Nuclear Structure & General Properties of nuclei)	Liquid drop model, Semiempirical B.E. formula, Magic numbers, Introduction of elementary particles.	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. III	-	20	20	Practicals	IV characteristics of P-N diode and LED.	Covered

Month October				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
	Lectures	Practicals	Total	Examination	Examination	-

Month December				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
	Lectures	Practicals	Total	Atomic Physics	Quantum numbers, spatial quantization, vector atom model, Alkali Spectra,	Covered
B.Sc. III	04	-	04			

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. I	-	32	32	Practicals :	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practical	Lattice constant using XRD powder.	Covered

Month January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Atomic Physics	Optical spectral series, Spectral term spectral notation	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practicals	Refractive index of glass by Brewster's law.	Covered

Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Atomic Physics	energy level diagram of sodium, spin orbit interaction Zeeman effect	Covered
B.Sc. III	04	-	04			

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. I	-	32	32	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered
B.Sc. III	-	20	20	Practical	Assemble of given electronic circuit.	Covered
Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total			
B.Sc. III	04	-	04	Atomic Physics	Explanation of Anomalous Zeeman effect on vector atom model, Anomalous Splitting of D_1 and D_2 Line	Covered
B.Sc. I	-	32	32	Practicals :	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered
B.Sc. III	-	20	20	Practicals	Study of hysteresis using anchor ring and C. R. O.	Covered
Month April				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Lectures	Practicals	Total		Examination	Examination	-

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-Shikshanmaharshi Dr. Bapuji Salunkhe

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Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Dr. S. S. Kumbhar**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total	Particles Accelerators	Need of accelerators, Types of accelerators (Qualitative) orbital accelerators,	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. III	-	20	20	Practicals	Resonance pendulum.	Covered
Month July				Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
Course	Lectures	Practicals	Total			

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
						Covered
B.Sc. III	04	-	04	Particles Accelerators	Cyclotron, (Principle, construction, working, theory, merits, demerits).	Covered
B.Sc. I	-	32	32	Practicals:	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. III	-	20	20	Practicals:	Diffraction at straight edge	Covered
Month August				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Particles Accelerators	Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. III	-	20	20	Practicals:	Self inductance by Maxwell bridge.	Covered

Name of the teacher: **Mrs. M.R. Barale**						
Month September				Module/Unit:	Sub-units planned	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Particles Accelerators	Betatron, (principle, construction, working, mathematical theory, merits) Accelerators in India.	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. III	-	20	20	Practicals	IV characteristics of P-N diode and LED.	Covered
Month October				Module/Unit:	Sub-units planned	**Syllabus Covered/ Not Covered**
	Lectures	Practicals	Total	Examination	Examination	-
Month December				Module/Unit:	Sub-units planned	
	Lectures	Practicals	Total	Molecular Physics	Molecular system, type of bonds, diatomic molecule as a rigid rotator	Covered
B.Sc. III	04	-	04			

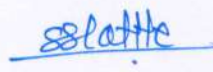| Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practical	Lattice constant using XRD powder.	Covered
Month January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Molecular Physics	Optical spectral series, Spectral term spectral notation,	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practicals	Refractive index of glass by Brewster's law.	Covered
Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Molecular Physics	Rotational states of diatomic molecule, Raman effect	Covered
B.Sc. III	04	-	04			

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned	Syllabus Covered/ Not Covered
B.Sc. I	-	32	32	Practicals	Practicals : 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered
B.Sc. III	-	20	20	Practical	Assemble of given electronic circuit.	Covered
Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Course	Lectures	Practicals	Total	Molecular Physics	Experimental study of Raman effect, classical theory of Raman effect, Applications of Raman effect.	Covered
B.Sc. III	04	-	04			
B.Sc. I	-	32	32	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered
B.Sc. III	-	20	20	Practical	Study of hysteresis using anchor ring and C. R. O.	Covered
Month April				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/ Not Covered**
Lectures		Practicals	Total	Examination	Examination	-

Teacher Incharge

Dr. S. S. Latthe

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Mr. A. V. Shinde**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total		Introduction to Cartesian, spherical polar and cylindrical co-ordinate systems, concept of orthogonal curvilinear co-ordinates, unit tangent vectors, arc length, area and volume elements in orthogonal curvilinear co-ordinate system, gradient, divergence, curl, del and Laplacian in orthogonal curvilinear co-ordinate system, extension of gradient, divergence, curl, del and Laplacian in Cartesian, spherical polar and cylindrical coordinate systems	
B.Sc. III	12	-	12	Orthogonal Curvilinear Co-ordinates:		Covered
B.Sc. II	12	-	12	Energy:	Man and Environment, Energy and Thermodynamics, Some well-known Forms of Energy, Energy Chains, Energy Resources, Energy Demands, Age of Renewables and Alternatives.	Covered
B.Sc. III	08	-	08	Vectors:	Vector algebra: Definition of vector, Polar vectors and axial vectors, Addition of vectors, Rectangular resolution of vectors, Unit vector (definition), Position vector of a point, Product of two vector, Scalar and vector products- scalar or dot products and its geometrical interpretation, Work done as a scalar product, Vector or cross product and their useful results, Area of	Covered

					parallelogram, Scalar triple product, Vector triple product, Problems.	
B.Sc. II	-	32	32	Practicals	1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.	Covered

Month July				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total	Differential Equations	Types of differential equations, degree, order, linearity, homogeneity of differential equations, Method of separation of variables for olving partial differential equations, solutions of Laplace equation in two dimensions	
B.Sc. III	12	-	12			Covered
B.Sc. II	12	-	12	Solar Energy:	Essential subsystems in solar energy plants, Solar energy chains. Solar energy from satellite station through microwave to earth station, Solar photovoltaic systems, Merits and limitation of solar PV Panel system, Power of solar cell and solar PV panel.	Covered
B.Sc. I	08	-	08	Ordinary Differential Equations Momentum and Energy	Introduction to differential equation, Ordinary and Partial differential Equations, 1st order homogeneous differential equations, 2nd order homogeneous differential equations with constants coefficients, examples Introduction to mechanics. Mechanics of a particle: Conservation	Covered

					theorem of linear momentum, angular momentum, energy, Concept of Centre of Mass, Mechanics of system of particles: Conservation theorem of linear momentum, angular momentum, energy	
B.Sc. II	-	32	32	Practicals	1) Measurement of rise, fall and delay time using a CRO 2) Measurement of distortion of a RF signal generator using distortion factor meter. 3) . Measurement of R, L and C using a LCR bridge/ universal bridge. 4) Measurement of time period, frequency, average period using using universal counter/frequency counter.	Covered
Month August				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**
Course	Lect ures	Practicals	Total	Fourier series and integrals	Fourier series and Fourier transform, Dirichlet condition, (Statement only) Properties of Fourier series: 1) convergence, 2) Integration 3) Differentiation. Physical applications of Fourier series 4) square wave (high frequencies) 5) full wave rectifier, Differentiation and integration of Fourier series, Fourier transform, Inverse functions.	
B.Sc. III	12	-	12			Covered
B.Sc. II	12	-	12	Wind Energy	Application of wind energy, wind power density, Types of wind, Turbine Generator unit, Planning of wind farm, Horizontal axis propeller type wind turbine generator units, Mono, Twin and Three blade HAWT.	Covered

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
B.Sc. I	08	-	08	Laws of motion	Introduction of coordinate systems (Cartesian, Polar, Cylindrical, and Spherical), Definition of translational and rotational motion, force and torque, Frames of reference - Inertial and Non-inertial frames with examples, Newton's laws of motion (first, second and third) and their proofs.	Covered
B.Sc. II	-	32	32	Practicals	1) To determine wavelength of 1) Sodium &2)spectrum of Mercury light using plane diffraction grating. 2) Goniometer I-To study cardinal points of optical system. 3) Goniometer II- To study the equivalent focal length of optical system. 4) To study angle of specific rotation of sugar using Polarimeter.	Covered

Name of the teacher: **Mrs. P.T. Patil**

Month September				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total			
B.Sc.III	12	-	12	Complex analysis	Complex analysis Revision of complex numbers and their graphical representation, Euler's formula, DeMoiver's theorem, Roots of complex number, Functions of complex numbers, Analyticity and Cauchy- Reimann condition, examples of analytical function, Singular functions, Poles and branch points, order of singularity, Integration of function of complex	Covered

	Lectures	Practicals	Total	Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
					variable, Cauchy's inequality, Cauchy's integral formula	
B.Sc.II	12	-	12	Biomass Energy	Origin of biomass, Biomass energy resources, Biomass conversion processes. Ocean Energy: Ocean energy resources, Off-shore and on-shore ocean energy conversion technologies, advantages and limitations of ocean-energy conversion, The guidelines for ocean energy conversions plants, Ocean energy.	Covered
B.Sc.I	08	-	08	Rotational motion	Rotational variables - Angular position, Angular displacement, Angular velocity, Angular acceleration, Moment of inertia – definition, M.I. of a spherical shell about its axis of symmetry, M.I. of solid cylinder about its symmetry axis, Motion of spherical shell and solid cylinder rolling down an inclined plane.	Covered
B.Sc. II	-	32	32	Practicals	1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.	Covered
Month October				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**
	Lectures	Practicals	Total	Examination	Examination	-
Month December				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**

	Lectures	Practicals	Total			
B.Sc. III	12	-	12	Lagrangian Dynamics	Introduction Basic Concepts: (1) Co-ordinate system (2) Degrees of freedom; Constraints: Holonomic constraints, Nonholonomic constraints, Forces of constraints, Configuration space, Generalized Co-ordinates, Principle of virtual work, D'Alembert's principal. Lagrange's equation from D'Alembert's principle. Application of Lagrange's equation to a particle in a space, Atwood's machine and bead sliding on uniformly rotating wire under force free condition, simple pendulum unit.	Covered
B.Sc. II	12	-	12	Environmental Pollution:	Environmental Problems, Standards for Environmental Quality, Sun Light and the Solar Spectrum, Photosynthesis, Greenhouse Effect, Human Induced Changes, Natural Changes, Ozone and Life, Solar UV and Biological Molecules, The Ozone Filter, Ozone in the Troposphere.	Covered
B.Sc. 1	08	-	08	A.C. circuits	Complex numbers and their application in solving a. c. series LCR circuit using j operator and phasor diagram, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Resonance in LCR Parallel circuit, complex Impedance, Reactance, Admittance, and Susceptance, Examples of series and parallel resonance, A.C. Bridge - Owen's Bridge Q-factor (definition only).	Covered
B.Sc. II	-	32	32	Practicals :	1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	Covered

Month January				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lect ures	Practicals	Total	Variational principles	Variational principles Hamilton's principle, Deduction of Hamilton's principle from D' Alembert's principle, Deduction of Lagrange's equation from Hamilton's principle. Application of Hamilton's principle: shortest distance between two points in plane, Brachistochrone problem.	Covered
B.Sc. III	12	-	12			
B.Sc. II	12	-	12	Environmental Pollution	Environmental Problems, Standards for Environmental Quality, Sun Light and the Solar Spectrum, Photosynthesis, Greenhouse Effect, Human Induced Changes, Natural Changes, Ozone and Life, Solar UV and Biological Molecules, The Ozone Filter, Ozone in the Troposphere.	Covered
B.Sc. I	08	-	08	Electromagnet ic induction	Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field.	Covered
B.Sc. II	-	32	32	Practicals	1) To determine the wavelength of sodium light using Fresenel Biprism. 2) To determine the Resolving Power of a Prism. 3) To determine the Resolving Power of a Plane Diffraction Grating. 4) To determine wavelength of Laser light using diffraction of single slit .	Covered

Month February				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total		Inertial and non-inertial framed of reference Fictitious or Pseudo force, centrifugal force, uniformly rotating frame, Motion relative to earth. Application of Coriolis force: 1) Formation of cyclone, 2) Particles in a horizontal plane, 3) Freely falling body at earth's surface	
B.Sc. III	12	-	12	Non-inertial and Rotating co-ordinate system		Covered
B.Sc. II	12	-	12	Atmosphere and Energy	Energy Transport in the Atmosphere and to the Poles, Vertical Structure of the Atmosphere, Vertical Motion of Humid Air, The Adiabats, Cumulus Cloud Formation, Horizontal Motion of Air, Newton's Equations of Motion, Geostrophic Flow, Origin of Pressure Difference, Atmosphere-Ocean Interaction, The Big Oceans, EL Nino and NAO.	Covered
B.Sc. I	08	-	08	Ballistic galvanometer	Construction and working of B. G., expression for charge flowing through ballistic galvanometer, Correction for damping in galvanometer, Constants of the ballistic galvanometer	Covered
B.Sc. II	-	32	32	Practicals	1)To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance. 2) To observe the limitations of a multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter.	Covered

					4) Measurement of voltage, frequency, time period and phase angle using CRO.	
Month March				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**
Course	Lectures	Practicals	Total		Introduction: Galilean transformation, the Michelson-Morley experiment, Ether hypothesis	
B.Sc. III	12	-	12	Special theory of Relativity	Postulates of special theory of relativity, Lorentz transformations, Relativistic addition of velocities, Length contraction, Time dilation, Variation of mass with velocity, Mass energy relation.	Covered
B.Sc. II	12	-	12	Atmosphere and Energy:	Energy Transport in the Atmosphere and to the Poles, Vertical Structure of the Atmosphere, Vertical Motion of Humid Air, The Adiabats, Cumulus Cloud Formation, Horizontal Motion of Air, Newton's Equations of Motion, Geostrophic Flow, Origin of Pressure Difference, Atmosphere-Ocean Interaction, The Big Oceans, EL Nino and NAO.	Covered
B.Sc. I	08	-	08	Magnetic materials and their properties	Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. diamagnetic, paramagnetic, ferromagnetic: Hysteresis and hysteresis curve, ferrimagnetic and antiferromagnetic materials.	Covered

B.Sc. II	-	32	32	Practicals	1)To determine the value of Stefan's Constant. 2) To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 3) To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. 4) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.	Covered	
Month April				**Module/Unit:**	**Sub-units planned**		
Lectures	Practicals	Total	Examination	Examination		-	

Teacher Incharge

Dr. S. S. Latthe

Vivekanand College, Kolhapur

(Empowered Autonomous)

Department of Physics

Syllabus Completion Report (UG)

Academic Year: 2024-25
Subject: Physics
Name of the teacher: **Mr. U. S. Bodhgire**

Month June				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total		1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	
B.Sc. I	-	32	32	Practicals		Covered
B.Sc. II	-	16	16	Practicals	1) To determine Coefficient of Thermal Conductivity of a bad conductor by Lees method. 2) To determine temperature coefficient of resistance by platinum resistance thermometer.	Covered
Month July				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered

Course	Lectures	Practicals	Total			
B.Sc. 1	-	32	32	Practicals:	1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered
B.Sc. II	-	16	16	Practicals	1) To calibrate Resistance Temperature Device (RTD) using null method / off-balance bridge. 2)Surface Tension of liquid by Capillary method.	Covered

Month August				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total			
B.Sc. I	-	32	32	Practicals:	Practicals: 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. II	-	16	16	Practicals	1) Demonstration of Training modules on Solar energy, wind energy, etc.	Covered

					2) Conversion of thermal energy into voltage using thermoelectric effect.	

Name of the teacher: Mr. K.Y. Khandale

Month September				Module/Unit:	Sub-units planned	**Syllabus Covered/Not covered**
Course	Lectures	Practicals	Total	Practicals:	1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered
B.Sc. I	-	32	32			
B.Sc. II	-	16	16	Practicals	1) Familiarization with renewable energy gadgets. 2) To study biogas plants.	Covered
Month October				Module/Unit:	Sub-units planned	**Syllabus Covered/Not covered**
	Lectures	Practicals	Total	Examination	Examination	-
Month December				Module/Unit:	Sub-units planned	**Syllabus Covered/Not covered**
	Lectures	Practicals	Total	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge.	Covered
B.Sc. I	-	32	32			

Course	Lectures	Practicals	Total		Sub-units planned	
					4) To determine impedance of series LCR circuit.	
B.Sc. II	-	16	16	Practicals	1)Study of Colpitts oscillator 2) Study of Hartley Oscillator	Covered

Month January				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**
Course	Lectures	Practicals	Total			
B.Sc. I	-	32	32	Practicals	1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	Covered
B.Sc. III	-	20	20	Practicals	1) Study of low pass and high pass filter using resistance and capacitance 2) To study input out characteristics of solar cell	Covered

Month February				**Module/Unit:**	**Sub-units planned**	**Syllabus Covered/Not covered**
Course	Lectures	Practicals	Total			
B.Sc. I	-	32	32	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge.	Covered

					4)) Verification of Kirchoff's voltage and current law	
B.Sc. II	-	16	16	Practicals	1) To study about solar lighting. 2) To study of solar cooker.	Covered

Month March				Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Course	Lectures	Practicals	Total	Practicals	1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4) Verification of Kirchoff's voltage and current law	Covered
B.Sc. I	-	32	32	Practicals		
B.Sc. II	-	16	16	Practicals	1) To study of wind energy 2) To study of characteristics of LDR	Covered

Month April			Module/Unit:	Sub-units planned	Syllabus Covered/Not covered
Lectures	Practicals	Total	Examination	Examination	-

Kalyani

Teacher Incharge

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Dr. S. S. Latthe

HEAD
DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
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