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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Dr.M. M. Karanjkar**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	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	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
B.Sc. III	12	-	12		
B.Sc. I	16	-	16	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its
B.Sc. II	-	64	64	**Practicals :**	**Practicals :**

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				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.	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.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**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	**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
B.Sc. III	12	-	12		
B.Sc. I	16	-	16	**Elasticity** Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity	**Elasticity** Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity

				modulus and moment of inertia, Determination of Y, η and σ by Searles method	modulus and moment of inertia, Determination of Y, η and σ by Searles method
B.Sc. II	-	64	64	**Practicals :** 1) To determine wavelength of 1) Sodium &2)spectrum of Mercury light usingplane diffraction grating. 2). Goniometer I-To study cardinal points of opticalsystem. 3) Goniometer II- To study the equivalent focal length of opticalsystem. 4) To study angle of specific rotation of sugar using Polarimeter.	**Practicals :** 1) To determine wavelength of 1) Sodium &2)spectrum of Mercury light usingplane diffraction grating. 2). Goniometer I-To study cardinal points of opticalsystem. 3) Goniometer II- To study the equivalent focal length of opticalsystem. 4) To study angle of specific rotation of sugar using Polarimeter.
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Operator in Quantum Mechanics** Definition of an operator in quantum mechanics, commutation relation in quantum mechanics, position, momentum and angular momentum operator, Angular	**Operator in Quantum Mechanics** Definition of an operator in quantum mechanics, commutation relation in quantum mechanics, position, momentum and angular momentum operator, Angular

B.Sc. III	12	-	12	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. Concept of parity operator. Concept of Hermitian operator.	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. Concept of parity operator. Concept of Hermitian operator.
B.Sc. I	16	-	16	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its
B.Sc. II	-	64	64	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator

Month September				Module/Unit:	Sub-units planned
B.Sc. III	Lectures	Practicals	Total	**Applications of Schrodinger's Steady State Equation** Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.	**Applications of Schrodinger's Steady State Equation** Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.
	12	-	12		
B.Sc. I	16	-	16	**Surface Tension** Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.	**Surface Tension** Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.
B.Sc. II	-	64	64	**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	**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

Month October/November				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**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	**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
B.Sc. III	12	-	12		
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	**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
B.Sc. II	-	64	64	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Introduction of free electron theory (Classical and	Introduction of free electron theory (Classical and

B.Sc. III	12	-	12	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.	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.
B.Sc. I	16	-	16	**A.C. Circuits** Complex numbers and their application in solving a. c. series LCR circuit, complex impedance,Reactance, Admittance, and Susceptance, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Q-factor (definition only) A.C. Bridge - Owen's Bridge	**A.C. Circuits** Complex numbers and their application in solving a. c. series LCR circuit, complex impedance,Reactance, Admittance, and Susceptance, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Q-factor (definition only) A.C. Bridge - Owen's Bridge
B.Sc. II	-	64	64	**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.	**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.
Month February				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total		
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.	**Magnetic Materials and their Properties:** Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.
B.Sc. I	16	-	16	**Magnetism** 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 lawat earth's surface	**Magnetism** 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 lawat earth's surface
B.Sc. II	-	64	64	**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 ofa multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter.	**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 ofa multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter.

<table>
<tr><td colspan="3"></td><td></td><td>4) Measurement of voltage, frequency, time period and phase angle using CRO</td><td>4) Measurement of voltage, frequency, time period and phase angle using CRO</td></tr>
<tr><td colspan="4">Month March</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">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</td><td rowspan="2">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</td></tr>
<tr><td>B.Sc. III</td><td>12</td><td>-</td><td>12</td></tr>
<tr><td>B.Sc. I</td><td>16</td><td>-</td><td>16</td><td>Network Theorems

Introduction, Node, Junction, Branch, Loop, Active and passive elements, Thevenin's theorem, Nortan's theorem and equivalence between them, problems.</td><td>Network Theorems

Introduction, Node, Junction, Branch, Loop, Active and passive elements, Thevenin's theorem, Nortan's theorem and equivalence between them, problems.</td></tr>
</table>

B.Sc. II	-	64	64	**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	**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
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Techer Incharge

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Head of the
Department of Physics
Vivekanand College, Kolhapur

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. C. J. Kamble**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Superposition of Harmonic Oscillations**	**Superposition of Harmonic Oscillations**
B.Sc. II	12	-	12	Linearity and superposition principle, Composition of two simple harmonic motions, Superposition of two collinear harmonic oscillations- for oscillations having equal frequencies (Analytical and geometrical methods) and oscillations having different frequencies (Beats)	Linearity and superposition principle, Composition of two simple harmonic motions, Superposition of two collinear harmonic oscillations- for oscillations having equal frequencies (Analytical and geometrical methods) and oscillations having different frequencies (Beats)
B.Sc. III	12	-	12	**Nuclear Radiation Detectors** Introduction : Ionization chamber, G. M. counter, (principle, construction, working mechanism, limitations, merits) Scintillation Counter (principle, construction, working, advantages) Introduction to cosmic radiations, Wilson cloud chamber, Bubble chamber.	**Nuclear Radiation Detectors** Introduction : Ionization chamber, G. M. counter, (principle, construction, working mechanism, limitations, merits) Scintillation Counter (principle, construction, working, advantages) Introduction to cosmic radiations, Wilson cloud chamber, Bubble chamber.
B.Sc. III	-	80	80	**Practicals :**	**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	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
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Superposition of Harmonic Oscillations** 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.	**Superposition of Harmonic Oscillations** 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.
B.Sc. II	12	-	12		
B.Sc. III	12	-	12	**Nucleus (Nuclear Structure & General Properties of nuclei)** Introduction, Constituents of nuclei, Nuclear size, Nuclear magnetic moment, Electric quadrupole moment, Nuclear spin, Unit of atomic mass (amu), Mass defect, Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces, Liquid drop model, Semiempirical B.E. formula, Magic numbers, Introduction of elementary particles.	**Nucleus (Nuclear Structure & General Properties of nuclei)** Introduction, Constituents of nuclei, Nuclear size, Nuclear magnetic moment, Electric quadrupole moment, Nuclear spin, Unit of atomic mass (amu), Mass defect, Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces, Liquid drop model, Semiempirical B.E. formula, Magic numbers, Introduction of elementary particles.

<table>
<tr><td>B.Sc. III</td><td>-</td><td>80</td><td>80</td><td>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.</td><td>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.</td></tr>
<tr><td colspan="4">Month August</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Coupled Oscillations:
Normal modes of vibration, normal coordinates, degrees of freedom, types of coupling,
frequency of oscillatory systems, Energy transfer in coupled oscillatory system.</td><td rowspan="2">Coupled Oscillations:
Normal modes of vibration, normal coordinates, degrees of freedom, types of coupling,
frequency of oscillatory systems, Energy transfer in coupled oscillatory system.</td></tr>
<tr><td>B.Sc. II</td><td>12</td><td>-</td><td>12</td></tr>
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B.Sc. III	12	-	12	**Particles Accelerators** Need of accelerators, Types of accelerators (Qualitative) orbital accelerators, Cyclotron, (Principle, construction, working, theory, merits, demerits) . Limitation of cyclotron, Synchrocyclotron, (construction, working, theory) . Betatron, (principle, construction, working, mathematical theory, merits) Accelerators in India.	**Particles Accelerators** Need of accelerators, Types of accelerators (Qualitative) orbital accelerators, Cyclotron, (Principle, construction, working, theory, merits, demerits) . Limitation of cyclotron, Synchrocyclotron, (construction, working, theory) . Betatron, (principle, construction, working, mathematical theory, merits) Accelerators in India.
B.Sc. III	-	80	80	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.
Month September				Module/Unit:	Sub-units planned
B.Sc. II	Lect ures	Practicals	Total	**Waves Motionand Ultrasonic waves** Waves Motion: Transverse waves on a string, travelling	**Waves Motionand Ultrasonic waves** Waves Motion: Transverse waves on a string, travelling

	12	-	12	and standing waves on a string, Normal modes of a string, Group velocity and Phase velocity, Plane waves, Spherical waves. Ultrasonic waves: Piezo-electric effect, Production of ultrasonic waves by Piezo-electric generator, Detection of ultrasonic waves, Properties ultrasonic waves, Applications of ultrasonic waves.	and standing waves on a string, Normal modes of a string, Group velocity and Phase velocity, Plane waves, Spherical waves. Ultrasonic waves: Piezo-electric effect, Production of ultrasonic waves by Piezo-electric generator, Detection of ultrasonic waves, Properties ultrasonic waves, Applications of ultrasonic waves.
B.Sc. III	12	-	12	**Radioactive Decay** Natural radioactivity, Artificial radioactivity, Study of alpha decay by magnetic spectrograph, Velocity of alpha particles, Range of α-particles, α- disintegration energy, fine structure of αrays. Beta decay, Study by β - ray spectrometer, continuous nature, neutrino hypothesis, Gamma Decay, origin & gamma rays, γ- ray spectrum, internal conversion, Isomerism.	**Radioactive Decay** Natural radioactivity, Artificial radioactivity, Study of alpha decay by magnetic spectrograph, Velocity of alpha particles, Range of α-particles, α- disintegration energy, fine structure of αrays. Beta decay, Study by β - ray spectrometer, continuous nature, neutrino hypothesis, Gamma Decay, origin & gamma rays, γ- ray spectrum, internal conversion, Isomerism.
B.Sc. III	-	80	80	**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.	**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.

Month October/November				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**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.	**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.
B.Sc. II	12	-	12		
B.Sc. III	12	-	12	**Atomic Physics** Quantum numbers , spatial quantization, vector atom model, Alkali Spectra, Optical spectral series, Spectral term spectral notation, energy level diagram of sodium, spin orbit interaction Zeeman effect, Explanation of Anomalous Zeeman effect on vector atom model, Anomalous Splitting of D1 and D2 Line	**Atomic Physics** Quantum numbers , spatial quantization, vector atom model, Alkali Spectra, Optical spectral series, Spectral term spectral notation, energy level diagram of sodium, spin orbit interaction Zeeman effect, Explanation of Anomalous Zeeman effect on vector atom model, Anomalous Splitting of D1 and D2 Line

B.Sc. III	-	80	80	**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.	**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.
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Resolving Power of optical instruments** Resolution, Resolving power of optical instruments, Rayleigh's criterion for the limit of resolution, Modified Rayleigh's criterion, comparison between magnification and resolution, resolving power of plane diffraction grating, resolving power of a prism.	**Resolving Power of optical instruments** Resolution, Resolving power of optical instruments, Rayleigh's criterion for the limit of resolution, Modified Rayleigh's criterion, comparison between magnification and resolution, resolving power of plane diffraction grating, resolving power of a prism.
B.Sc. II	12	-	12		

B.Sc. III	12	-	12	**Molecular Physics** Molecular system, type of bonds, diatomic molecule as a rigid rotator rotational states of diatomic molecule, Raman effect, Experimental study of Raman effect, classical theory of Raman effect, Applications of Raman effect. .	**Molecular Physics** Molecular system, type of bonds, diatomic molecule as a rigid rotator rotational states of diatomic molecule, Raman effect, Experimental study of Raman effect, classical theory of Raman effect, Applications of Raman effect. .
B.Sc. III	-	80	80	**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..	**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..
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Practicals :**	**Practicals :**

B.Sc. II	12	-	12	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.	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.
B.Sc. III	12	-	12	Principle of Superposition ,Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyds single mirror(determination of wavelength of light of monochromatic source),Division of amplitude- 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.	Principle of Superposition ,Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyds single mirror(determination of wavelength of light of monochromatic source),Division of amplitude- 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.

B.Sc. III	-	80	80	**Polarization of light** Revision of plane of vibration , plane polarization, perpendicular vibration ,parallel vibrations, polarization by reflection and refraction, Idea of polarization, polarization by double refraction, Huygens explanation of double refraction through uniaxial crystals, Nicol prism(construction, working), production and detection of circularly and elliptically polarized light, optical rotation - laws of rotation of plane of polarization, polarimeter.	**Polarization of light** Revision of plane of vibration , plane polarization, perpendicular vibration ,parallel vibrations, polarization by reflection and refraction, Idea of polarization, polarization by double refraction, Huygens explanation of double refraction through uniaxial crystals, Nicol prism(construction, working), production and detection of circularly and elliptically polarized light, optical rotation - laws of rotation of plane of polarization, polarimeter.

Month March					
Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. II	12	-	12	**Laser Physics** Ordinary Light, Laser, Spontaneous and stimulated emission, Populations Inversion, Monochromaticity, directionality , Pumping (optical, electrical) Ruby laser He-Ne laser, Diode laser, Laser applications, (Industrial, medical, nuclear, optical) , Types of lasers	**Laser Physics** Ordinary Light, Laser, Spontaneous and stimulated emission, Populations Inversion, Monochromaticity, directionality , Pumping (optical, electrical) Ruby laser He-Ne laser, Diode laser, Laser applications, (Industrial, medical, nuclear, optical) , Types of lasers

B.Sc. III	12	-	12	**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.	**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.
B.Sc. III	-	80	80	**Space Science** Cosmology, Big-bang theory, oscillating theory, steady-state theory, Hubble's law, cosmological tests, Milky way galaxy, our solar system, features of sun, interior of sunspots, static characteristics of earth and mars.	**Space Science** Cosmology, Big-bang theory, oscillating theory, steady-state theory, Hubble's law, cosmological tests, Milky way galaxy, our solar system, features of sun, interior of sunspots, static characteristics of earth and mars.
Month April				Module/Unit:	Sub-units planned
Lectures	Practicals	Total		Examination	Examination

Teacher Incharge

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Head of the Department of Physics
Vivekanand College, Kolhapur

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. S. V. Malgaonkar**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Kinetic Theory of Gases and thermometry**	**Kinetic Theory of Gases and thermometry**
B.Sc. II	12	-	12	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)	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
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	**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
B.Sc. III	-	80	80	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution.	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution.

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				3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.	3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Kinetic Theory of Gases and thermometry**	**Kinetic Theory of Gases and thermometry**
B.Sc. II	12	-	12	Mean free path, expression, approximate method 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),	Mean free path, expression, approximate method 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),
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,	**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,

B.Sc. III	-	80	80	**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.	**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.
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Laws of Thermodynamics** 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 (Isothermal process, Adiabatic process, Isochoric, Isobaric), relation between CP & CV	**Laws of Thermodynamics** 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 (Isothermal process, Adiabatic process, Isochoric, Isobaric), relation between CP & CV
B.Sc. II	12	-	12		

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.	**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.
B.Sc. III	-	80	80	**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	**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
Month September				Module/Unit:	Sub-units planned
B.Sc. II	Lectures	Practicals	Total	**Laws of Thermodynamics** Work done during isothermal and adiabatic processes, reversible & irreversible processes, Second law	**Laws of Thermodynamics** Work done during isothermal and adiabatic processes, reversible & irreversible processes, Second law

	12	-	12	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.	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.
B.Sc. III	12	-	12	**Instrumentations :Introduction to CRO** Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.	**Instrumentations :Introduction to CRO** Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.
B.Sc. III	-	80	80	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.	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.
Month October/November				Module/Unit:	Sub-units planned

	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Thermodynamic Potentials** Enthalpy, Gibbs, Helmholtz, Internal Energy functions, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron equation, Expression for (CP – CV), CP/CV, TdS equations.	**Thermodynamic Potentials** Enthalpy, Gibbs, Helmholtz, Internal Energy functions, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron equation, Expression for (CP – CV), CP/CV, TdS equations.
B.Sc. II	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	**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
B.Sc. III	-	80	80	**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.	**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.
Month January				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total		
B.Sc. II	12	-	12	**Theory of Radiation** Thermal radiations, Blackbody radiation and its importance, Black body in practice, 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, Stefan Boltzmann Law and Wien's displacement law from Planck's law.	**Theory of Radiation** Thermal radiations, Blackbody radiation and its importance, Black body in practice, 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, Stefan Boltzmann Law and Wien's displacement law from Planck's law.
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.	**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.

B.Sc. III	-	80	80	**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..	**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..
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Classical statistics** Degrees of freedom ,momentum space, position space ,Phase space, Microstate and Macrostate, Accessible microstates, priory probability thermodynamic probability, probability distribution, Maxwell-Boltzmann distribution law, energy or speed, evaluation of constants α and β, Entropy and Thermodynamic probability, Distribution of molecular speeds.	**Classical statistics** Degrees of freedom ,momentum space, position space ,Phase space, Microstate and Macrostate, Accessible microstates, priory probability thermodynamic probability, probability distribution, Maxwell-Boltzmann distribution law, energy or speed, evaluation of constants α and β, Entropy and Thermodynamic probability, Distribution of molecular speeds.
B.Sc. II	12	-	12		
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.	**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.

B.Sc. III	-	80	80	**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.	**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.
Month March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Quantum statistics**	**Quantum statistics**
B.Sc. II	12	-	12	Need of quantum statics ,Bose-Einstein distribution law, photon gas, Planck, s radiation law Fermi-Dirac distribution law, free electron in metal ,electron gas, comparison of M.B., B.E., and F.D. statistics.	Need of quantum statics ,Bose-Einstein distribution law, photon gas, Planck, s radiation law Fermi-Dirac distribution law, free electron in metal ,electron gas, comparison of M.B., B.E., and F.D. statistics.
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.	**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

				Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.	Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.
B.Sc. III	-	80	80	**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.	**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.
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher Incharge

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Head of the
Department of Physics
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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Dr. S. S. Latthe**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Nucleus (Nuclear Structure & General Properties of nuclei)**	**Nucleus (Nuclear Structure & General Properties of nuclei)**
B.Sc. II	12	-	12	Introduction, Constituents of nuclei, Nuclear size, Nuclear magnetic moment, Electric quadrupole moment, Nuclear spin, Unit of atomic mass (amu), Mass defect, Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces, Liquid drop model, Semiempirical B.E. formula, Magic numbers, Introduction of elementary particles.	Introduction, Constituents of nuclei, Nuclear size, Nuclear magnetic moment, Electric quadrupole moment, Nuclear spin, Unit of atomic mass (amu), Mass defect, Packing fraction, Packing fraction curve, Binding energy, B.E. curve, Nuclear forces, Liquid drop model, Semiempirical B.E. formula, Magic numbers, Introduction of elementary particles.
B.Sc. III	12	-	12	**Particles Accelerators** Need of accelerators, Types of accelerators (Qualitative) orbital accelerators, Cyclotron, (Principle, construction, working, theory, merits, demerits) . Limitation of cyclotron, Synchrocyclotron, (construction, working, theory) . Betatron, (principle, construction, working, mathematical theory, merits) Accelerators in India.	**Particles Accelerators** Need of accelerators, Types of accelerators (Qualitative) orbital accelerators, Cyclotron, (Principle, construction, working, theory, merits, demerits) . Limitation of cyclotron, Synchrocyclotron, (construction, working, theory) . Betatron, (principle, construction, working, mathematical theory, merits) Accelerators in India.

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B.Sc. III	-	80	80	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution. 3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Superposition of Harmonic Oscillations** 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.	**Superposition of Harmonic Oscillations** 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.
B.Sc. II	12	-	12		
B.Sc. III	12	-	12	**Superposition of Harmonic Oscillations** Linearity and superposition principle, Composition of two simple harmonic motions, Superposition of two collinear harmonic oscillations- for oscillations having equal frequencies (Analytical and geometrical methods) and oscillations having different frequencies (Beats)	**Superposition of Harmonic Oscillations** Linearity and superposition principle, Composition of two simple harmonic motions, Superposition of two collinear harmonic oscillations- for oscillations having equal frequencies (Analytical and geometrical methods) and oscillations having different frequencies (Beats)

B.Sc. III	-	80	80	**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.	**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.
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Coupled Oscillations:** Normal modes of vibration, normal coordinates, degrees of freedom, types of coupling, frequency of oscillatory systems, Energy transfer in coupled oscillatory system.	**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	12	-	12		

B.Sc. III	12	-	12	**Nuclear Radiation Detectors** Introduction : Ionization chamber, G. M. counter, (principle, construction, working mechanism, limitations, merits) Scintillation Counter (principle, construction, working, advantages) Introduction to cosmic radiations, Wilson cloud chamber, Bubble chamber.	**Nuclear Radiation Detectors** Introduction : Ionization chamber, G. M. counter, (principle, construction, working mechanism, limitations, merits) Scintillation Counter (principle, construction, working, advantages) Introduction to cosmic radiations, Wilson cloud chamber, Bubble chamber.
B.Sc. III	-	80	80	**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	**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
Month September				Module/Unit:	Sub-units planned
B.Sc. II	Lect ures	Practicals	Total	**Waves Motionand Ultrasonic waves** Waves Motion: Transverse waves on a string, travelling	**Waves Motionand Ultrasonic waves** Waves Motion: Transverse waves on a string, travelling

	12	-	12	and standing waves on a string, Normal modes of a string, Group velocity and Phase velocity, Plane waves, Spherical waves. Ultrasonic waves: Piezo-electric effect, Production of ultrasonic waves by Piezo-electric generator, Detection of ultrasonic waves, Properties ultrasonic waves, Applications of ultrasonic waves.	and standing waves on a string, Normal modes of a string, Group velocity and Phase velocity, Plane waves, Spherical waves. Ultrasonic waves: Piezo-electric effect, Production of ultrasonic waves by Piezo-electric generator, Detection of ultrasonic waves, Properties ultrasonic waves, Applications of ultrasonic waves.
B.Sc. III	12	-	12	**Radioactive Decay** Natural radioactivity, Artificial radioactivity, Study of alpha decay by magnetic spectrograph, Velocity of alpha particles, Range of α-particles, α- disintegration energy, fine structure of αrays. Beta decay, Study by β - ray spectrometer, continuous nature, neutrino hypothesis, Gamma Decay, origin & gamma rays, γ- ray spectrum, internal conversion, Isomerism.	**Radioactive Decay** Natural radioactivity, Artificial radioactivity, Study of alpha decay by magnetic spectrograph, Velocity of alpha particles, Range of α-particles, α- disintegration energy, fine structure of αrays. Beta decay, Study by β - ray spectrometer, continuous nature, neutrino hypothesis, Gamma Decay, origin & gamma rays, γ- ray spectrum, internal conversion, Isomerism.
B.Sc. III	-	80	80	**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.	**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.

Month October/November				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Cardinal points**	**Cardinal points**
B.Sc. II	12	-	12	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.	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.
B.Sc. III	12	-	12	**Atomic Physics** Quantum numbers , spatial quantization, vector atom model, Alkali Spectra, Optical spectral series, Spectral term spectral notation, energy level diagram of sodium, spin orbit interaction Zeeman effect, Explanation of Anomalous Zeeman effect on vector atom model, Anomalous Splitting of D1 and D2 Line	**Atomic Physics** Quantum numbers , spatial quantization, vector atom model, Alkali Spectra, Optical spectral series, Spectral term spectral notation, energy level diagram of sodium, spin orbit interaction Zeeman effect, Explanation of Anomalous Zeeman effect on vector atom model, Anomalous Splitting of D1 and D2 Line

B.Sc. III	-	80	80	**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..	**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..
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Resolving Power of optical instruments**	**Resolving Power of optical instruments**
B.Sc. II	12	-	12	Resolution, Resolving power of optical instruments, Rayleigh's criterion for the limit of resolution, Modified Rayleigh's criterion, comparison between magnification and resolution, resolving power of plane diffraction grating, resolving power of a prism.	Resolution, Resolving power of optical instruments, Rayleigh's criterion for the limit of resolution, Modified Rayleigh's criterion, comparison between magnification and resolution, resolving power of plane diffraction grating, resolving power of a prism.

B.Sc. III	12	-	12	**Molecular Physics** Molecular system, type of bonds, diatomic molecule as a rigid rotator rotational states of diatomic molecule, Raman effect, Experimental study of Raman effect, classical theory of Raman effect, Applications of Raman effect. .	**Molecular Physics** Molecular system, type of bonds, diatomic molecule as a rigid rotator rotational states of diatomic molecule, Raman effect, Experimental study of Raman effect, classical theory of Raman effect, Applications of Raman effect. .
B.Sc. III	-	80	80	**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.	**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.
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Polarization of light**	**Polarization of light**

B.Sc. II	12	-	12	Revision of plane of vibration , plane polarization, perpendicular vibration ,parallel vibrations, polarization by reflection and refraction, Idea of polarization, polarization by double refraction, Huygens explanation of double refraction through uniaxial crystals, Nicol prism(construction, working), production and detection of circularly and elliptically polarized light, optical rotation - laws of rotation of plane of polarization, polarimeter.	Revision of plane of vibration , plane polarization, perpendicular vibration ,parallel vibrations, polarization by reflection and refraction, Idea of polarization, polarization by double refraction, Huygens explanation of double refraction through uniaxial crystals, Nicol prism(construction, working), production and detection of circularly and elliptically polarized light, optical rotation - laws of rotation of plane of polarization, polarimeter.
B.Sc. III	12	-	12	Principle of Superposition ,Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyds single mirror(determination of wavelength of light of monochromatic source),Division of amplitude- 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.	Principle of Superposition ,Coherence and condition for interference, Division of amplitude and division of wave front, Division of wave front – Lloyds single mirror(determination of wavelength of light of monochromatic source),Division of amplitude- 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.

B.Sc. III	-	80	80	**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.	**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.
Month March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Laser Physics** Ordinary Light, Laser, Spontaneous and stimulated emission, Populations Inversion, Monochromaticity, directionality , Pumping (optical, electrical) Ruby laser He-Ne laser, Diode laser, Laser applications, (Industrial, medical, nuclear, optical) , Types of lasers	**Laser Physics** Ordinary Light, Laser, Spontaneous and stimulated emission, Populations Inversion, Monochromaticity, directionality , Pumping (optical, electrical) Ruby laser He-Ne laser, Diode laser, Laser applications, (Industrial, medical, nuclear, optical) , Types of lasers
B.Sc. II	12	-	12		

B.Sc. III	12	-	12	**Space Science** Cosmology, Big-bang theory, oscillating theory, steady-state theory, Hubble's law, cosmological tests, Milky way galaxy, our solar system, features of sun, interior of sunspots, static characteristics of earth and mars.	**Space Science** Cosmology, Big-bang theory, oscillating theory, steady-state theory, Hubble's law, cosmological tests, Milky way galaxy, our solar system, features of sun, interior of sunspots, static characteristics of earth and mars.
B.Sc. III	-	80	80	**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.	**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.
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher Incharge

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Head of the Department of Physics Vivekanand College, Kolhapur

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Dr. G. J. Navathe**

<table>
<tr><td colspan="4">Month June</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">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</td><td rowspan="2">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</td></tr>
<tr><td>B.Sc. III</td><td>12</td><td>-</td><td>12</td></tr>
<tr><td>B.Sc. I</td><td>16</td><td>-</td><td>16</td><td>Oscillations
Simple harmonic motion (SHM), Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Damped oscillations, Forced oscillations.</td><td>Oscillations
Simple harmonic motion (SHM), Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Damped oscillations, Forced oscillations.</td></tr>
<tr><td>B.Sc. II</td><td>-</td><td>64</td><td>64</td><td>Practicals :</td><td>Practicals :</td></tr>
</table>

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

				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.	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.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**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	**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
B.Sc. III	12	-	12		
B.Sc. I	16	-	16	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning

				idea of global positioning system (GPS) and its	system (GPS) and its applications
B.Sc. II	-	64	64	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Operator in Quantum Mechanics**	**Operator in Quantum Mechanics**
B.Sc. III	12	-	12	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. Concept of parity operator.	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.	Concept of Hermitian operator.
B.Sc. I	16	-	16	**Elasticity** Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity modulus and moment of inertia, Determination of Y, η and σ by Searles method.	**Elasticity** Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity modulus and moment of inertia, Determination of Y, η and σ by Searles method.
B.Sc. II	-	64	64	**Practicals :** 1) To determine wavelength of 1) Sodium &2)spectrum of Mercury light usingplane diffraction grating. 2). Goniometer I-To study cardinal points of opticalsystem. 3) Goniometer II- To study the equivalent focal length of opticalsystem.	**Practicals :** 1) To determine wavelength of 1) Sodium &2)spectrum of Mercury light usingplane diffraction grating. 2). Goniometer I-To study cardinal points of opticalsystem. 3) Goniometer II- To study the equivalent focal length of opticalsystem.

				4) To study angle of specific rotation of sugar using Polarimeter.	4) To study angle of specific rotation of sugar using Polarimeter.
Month September				Module/Unit:	Sub-units planned
B.Sc. III	Lectures	Practicals	Total	**Applications of Schrodinger's Steady State Equation** Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.	**Applications of Schrodinger's Steady State Equation** Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.
	12	-	12		

B.Sc. I	16	-	16	**Surface Tension** Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.	**Surface Tension** Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.
B.Sc. II	-	64	64	**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	**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
Month October/November				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Elementary band theory**	**Elementary band theory**

B.Sc. III	12	-	12	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.	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.
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	**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
B.Sc. II	-	64	64	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Dielectric Properties of Materials**	**Dielectric Properties of Materials**

B.Sc. III	12	-	12	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.	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.
B.Sc. I	16	-	16	**A.C. Circuits** Complex numbers and their application in solving a. c. series LCR circuit, complex impedance,Reactance, Admittance, and Susceptance, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Q-factor (definition only) A.C. Bridge - Owen's Bridge	**A.C. Circuits** Complex numbers and their application in solving a. c. series LCR circuit, complex impedance,Reactance, Admittance, and Susceptance, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Q-factor (definition only) A.C. Bridge - Owen's Bridge

B.Sc. II	-	64	64	**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.	**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.
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**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	**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		
B.Sc. I	16	-	16	**Magnetism** 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 lawat earth's surface	**Magnetism** 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 lawat earth's surface

B.Sc. II	-	64	64	**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	**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
Month March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Magnetic Materials and their Properties:** Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.	**Magnetic Materials and their Properties:** Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.
B.Sc. III	12	-	12		

B.Sc. I	16	-	16	**Network Theorems** Introduction, Node, Junction, Branch, Loop, Active and passive elements, Thevenin's theorem, Nortan's theorem and equivalence between them, problems.	**Network Theorems** Introduction, Node, Junction, Branch, Loop, Active and passive elements, Thevenin's theorem, Nortan's theorem and equivalence between them, problems.
B.Sc. II	-	64	64	**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 ofa multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter. 4) Measurement of voltage, frequency, time period and phase angle using CRO	**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 ofa multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter. 4) Measurement of voltage, frequency, time period and phase angle using CRO
Month April				Module/Unit:	Sub-units planned
Lectures	Practicals	Total		Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416003

HOD
Head of the
Department of Physics
Vivekanand College, Kolhapur

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Dr. S. I. Inamdar**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Kinetic Theory of Gases and thermometry**	**Kinetic Theory of Gases and thermometry**
B.Sc. II	12	-	12	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)	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
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	**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
B.Sc. III	-	80	80	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution.	**Practicals :** 1) Resonance pendulum. 2) S. T. of soap solution.

				3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.	3) S. T. by Fergusson modified method. 4) Y & η using flat spiral spring.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Kinetic Theory of Gases and thermometry** Mean free path, expression, approximate method 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),	**Kinetic Theory of Gases and thermometry** Mean free path, expression, approximate method 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),
B.Sc. II	12	-	12		
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,	**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,

B.Sc. III	-	80	80	**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.	**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.
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Laws of Thermodynamics** 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 (Isothermal process, Adiabatic process, Isochoric, Isobaric), relation between CP & CV	**Laws of Thermodynamics** 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 (Isothermal process, Adiabatic process, Isochoric, Isobaric), relation between CP & CV
B.Sc. II	12	-	12		

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.	**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.
B.Sc. III	-	80	80	**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	**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
Month September				Module/Unit:	Sub-units planned
B.Sc. II	Lectures	Practicals	Total	**Laws of Thermodynamics** Work done during isothermal and adiabatic processes, reversible & irreversible processes, Second law	**Laws of Thermodynamics** Work done during isothermal and adiabatic processes, reversible & irreversible processes, Second law

	12	-	12	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.	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.
B.Sc. III	12	-	12	**Instrumentations :Introduction to CRO** Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.	**Instrumentations :Introduction to CRO** Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.
B.Sc. III	-	80	80	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.	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.
Month October/November				Module/Unit:	Sub-units planned

	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Thermodynamic Potentials** Enthalpy, Gibbs, Helmholtz, Internal Energy functions, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron equation, Expression for (CP – CV), CP/CV, TdS equations.	**Thermodynamic Potentials** Enthalpy, Gibbs, Helmholtz, Internal Energy functions, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron equation, Expression for (CP – CV), CP/CV, TdS equations.
B.Sc. II	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	**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
B.Sc. III	-	80	80	**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.	**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.
Month January				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total		
B.Sc. II	12	-	12	**Theory of Radiation** Thermal radiations, Blackbody radiation and its importance, Black body in practice, 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, Stefan Boltzmann Law and Wien's displacement law from Planck's law.	**Theory of Radiation** Thermal radiations, Blackbody radiation and its importance, Black body in practice, 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, Stefan Boltzmann Law and Wien's displacement law from Planck's law.
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.	**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.

B.Sc. III	-	80	80	**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..	**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..
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Classical statistics** Degrees of freedom ,momentum space, position space ,Phase space, Microstate and Macrostate, Accessible microstates, priory probability thermodynamic probability, probability distribution, Maxwell-Boltzmann distribution law, energy or speed, evaluation of constants α and β, Entropy and Thermodynamic probability, Distribution of molecular speeds.	**Classical statistics** Degrees of freedom ,momentum space, position space ,Phase space, Microstate and Macrostate, Accessible microstates, priory probability thermodynamic probability, probability distribution, Maxwell-Boltzmann distribution law, energy or speed, evaluation of constants α and β, Entropy and Thermodynamic probability, Distribution of molecular speeds.
B.Sc. II	12	-	12		
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.	**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.

B.Sc. III	-	80	80	**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.	**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.
Month March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Quantum statistics**	**Quantum statistics**
B.Sc. II	12	-	12	Need of quantum statics ,Bose-Einstein distribution law, photon gas, Planck, s radiation law Fermi-Dirac distribution law, free electron in metal ,electron gas, comparison of M.B., B.E., and F.D. statistics.	Need of quantum statics ,Bose-Einstein distribution law, photon gas, Planck, s radiation law Fermi-Dirac distribution law, free electron in metal ,electron gas, comparison of M.B., B.E., and F.D. statistics.
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.	**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

				Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.	Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.
B.Sc. III	-	80	80	**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.	**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.
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE * ESTD. JUNE 1964 * KOLHAPUR (M.S.)

Head of the Department of Physics Vivekanand College, Kolhapur

HOD

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. V. S. Ashtekar**

<table>
<tr><td colspan="4">Month June</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td></td><td>Practicals</td><td>Lectures</td><td>Total</td><td rowspan="2">Practicals:
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1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope.
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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.</td><td>Practicals:
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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

B.Sc. I	16	-	16	**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.	**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.
Month October/November				Module/Unit:	Sub-units planned
B.Sc. I	16		16	Examination	Examination
Month December				Module/Unit:	Sub-units planned
B.Sc. I	16 B.Sc. I	-	16	**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.	**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.
Month January				Module/Unit:	Sub-units planned
B.Sc. I	16		16		
B.Sc. I	16	-	16	**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.	**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.
Month February				Module/Unit:	Sub-units planned

B.Sc. I	16	-	16	**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	**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
Month March				Module/Unit:	Sub-units planned
B.Sc. I	16	-	16	**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	**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
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

V. S. Astekar

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

HOD

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

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. A. V. Shinde**

Month June				Module/Unit:	Sub-units planned
	Practicals	Lectures	Total	**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	**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
B.Sc. I	16	-	16		
Month July				Module/Unit:	Sub-units planned
B.Sc. I	16	-	16	**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	**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
Month August				Module/Unit:	Sub-units planned
B.Sc. I	16	-	16	**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.	**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.
Month September				Module/Unit:	Sub-units planned

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

B.Sc. I	16	-	16	**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.	**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.
Month October/November				Module/Unit:	Sub-units planned
B.Sc. I	16		16	Examination	Examination
Month December				Module/Unit:	Sub-units planned
B.Sc. I	16 B.Sc. I	-	16	**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.	**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.
Month January				Module/Unit:	Sub-units planned
B.Sc. I	16		16		
B.Sc. I	16	-	16	**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.	**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.
Month February				Module/Unit:	Sub-units planned

B.Sc. I	16	-	16	**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	**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
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B.Sc. I	16	-	16	**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	**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
Month April				Module/Unit:	Sub-units planned
Lectures	Practicals	Total		Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

Head of the
Department of Physics
Vivekanand College, Kolhapur

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Miss P. Y. Hawaldar**

<table>
<tr><td colspan="4">Month June</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td></td><td>Practicals</td><td>Lectures</td><td>Total</td><td rowspan="2">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.
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<tr><td colspan="4">Month July</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
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<tr><td>B.Sc. I</td><td>16</td><td>-</td><td>16</td><td>Practicals:
1)Modulus of rigidity of material of wire by torsional oscillations.
2) Y/η of Wire by Searle's method.
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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

B.Sc. I	16	-	16	**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.	**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.
Month October/November				Module/Unit:	Sub-units planned
B.Sc. I	16		16	Examination	Examination
Month December				Module/Unit:	Sub-units planned
B.Sc. I	16 B.Sc. I	-	16	**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.	**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.
Month January				Module/Unit:	Sub-units planned
B.Sc. I	16		16		
B.Sc. I	16	-	16	**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.	**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.
Month February				Module/Unit:	Sub-units planned

B.Sc. I	16	-	16	**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	**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
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Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

P.Y. Hawaldar

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

HOD

Head of the
Department of Physics
Vivekanand College, Kolhapur

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Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. R. P. Mungale**

<table>
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<tr><td>B.Sc. I</td><td>16</td><td>-</td><td>16</td><td>Practicals:
1)Modulus of rigidity of material of wire by torsional oscillations.
2) Y/η of Wire by Searle's method.
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VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

B.Sc. I	16	-	16	**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.	**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.
Month October/November				Module/Unit:	Sub-units planned
B.Sc. I	16		16	Examination	Examination
Month December				Module/Unit:	Sub-units planned
B.Sc. I	16 B.Sc. I	-	16	**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.	**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.
Month January				Module/Unit:	Sub-units planned
B.Sc. I	16		16		
B.Sc. I	16	-	16	**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.	**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.
Month February				Module/Unit:	Sub-units planned

B.Sc. I	16	-	16	**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	**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
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B.Sc. I	16	-	16	**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	**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
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2022-23**
Subject: Physics
Name of the teacher: **Mr. Anurath Nagnath Gore**

<table>
<tr><td colspan="4">Month July</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Paper</td><td>Lectures</td><td>Total</td><td rowspan="2">Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its applications.</td><td rowspan="2">Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its applications.</td></tr>
<tr><td>B.Sc. I</td><td>Mechanics – II</td><td>16</td><td>16</td></tr>
<tr><td>B.Sc. II</td><td>-</td><td>Practicals
32</td><td>32</td><td>1.Measurement of Planck's constant using Black body radiation.
2. To determine the value of Stefan's 4 th. power of low.
3. To study Lissajous figures by using CRO.
4.To determine the frequency of an electrically maintained tuning fork by Melde's experiment
and to verify λ2– T Law.
5. Goniometer I-To study cardinal points of optical system.
6.To determine the Resolving Power of a Plane Diffraction Grating.
7. Characteristics of Transistor.
8.A.C/D.C Sentivity by C.R.O</td><td>1.Measurement of Planck's constant using Black body radiation.
2. To determine the value of Stefan's 4 th. power of low.
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<tr><td colspan="4">Month August</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Paper</td><td>Lectures</td><td>Total</td><td rowspan="2">Simple harmonic motion (SHM), Differential</td><td rowspan="2">Simple harmonic motion (SHM), Differential</td></tr>
<tr><td>B.Sc. I</td><td>Mechanics – II</td><td>16</td><td>16</td></tr>
</table>

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

				equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Damped oscillations, Forced oscillations.	equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Damped oscillations, Forced oscillations.
B.Sc. II	Practicals	32	32	1. Measurement of Planck's constant using Black body radiation. 2. To determine the value of Stefan's 4 th. power of low. 3. To study Lissajous figures by using CRO. 4.To determine the frequency of an electrically maintained tuning fork by Melde's experiment and to verify λ2– T Law. 5. Goniometer I-To study cardinal points of optical system. 6.To determine the Resolving Power of a Plane Diffraction Grating. 7. Characteristics of Transistor. 8.A.C/D.C Sentivity by C.R.O	1. Measurement of Planck's constant using Black body radiation. 2. To determine the value of Stefan's 4 th. power of low. 3. To study Lissajous figures by using CRO. 4.To determine the frequency of an electrically maintained tuning fork by Melde's experiment and to verify λ2– T Law. 5. Goniometer I-To study cardinal points of optical system. 6.To determine the Resolving Power of a Plane Diffraction Grating. 7. Characteristics of Transistor. 8.A.C/D.C Sentivity by C.R.O
Month September					
Course	paper	Lectures	Total	Module/Unit:	Sub-units planned
B.Sc. I	**Mechanics – II**	16	16	Unit-II- 3 .Elasticity Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity modulus and moment of inertia, Determination of Y, η and σ by Searles method	Unit-II- 3 .Elasticity Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beamsupported at both the ends (without considering weight of beam). Torsional oscillation, Work done in twisting a wire, Twisting couple on a cylinder, Torsional pendulum - Determination of Rigidity modulus and moment of inertia, Determination of Y, η and σ by Searles method
Course		Practicals	Total	Module/Unit:	Sub-units planned

B.Sc-II	32	32	1. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. 2. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method. 3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's Method. 4.Viscosity of liquid by Searl's viscometer. 5. Goniometer II- To study the equivalent focal length of optical system. 6. To determine the Resolving Power of a Prism. 7. Transistor as a regulated power supply. 8.Costant of B.G.	1. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. 2. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method. 3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's Method. 4.Viscosity of liquid by Searl's viscometer. 5. Goniometer II- To study the equivalent focal length of optical system. 6. To determine the Resolving Power of a Prism. 7. Transistor as a regulated power supply. 8.Costant of B.G.
Month October			Module/Unit:	Sub-units planned
Course- B.Sc. I	Lecture	Total	Unit-II .4. Surface Tension: Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.	Unit-II .4. Surface Tension: Surface Tension, 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, Factors affecting surface tension, Applications of surface tension.
Mechanics – II	16	16		
Course	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc-II			1. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. 2. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method. 3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's	1. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. 2. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method. 3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's

			Method. 4. Viscosity of liquid by Searl's viscometer. 5. Goniometer II- To study the equivalent focal length of optical system. 6. To determine the Resolving Power of a Prism. 7. Transistor as a regulated power supply. 8. Costant of B.G	Method. 4. Viscosity of liquid by Searl's viscometer. 5. Goniometer II- To study the equivalent focal length of optical system. 6. To determine the Resolving Power of a Prism. 7. Transistor as a regulated power supply. 8. Costant of B.G
Month December			Module/Unit:	Sub-units planned
Course: B.Sc.-I **Paper- ELECTRICITY AND MAGNETISM – II**	Lecture 16	Total 16	Unit-1.1. Vector Differential (07) Introduction, Del operator, gradient of scalar field and its physical significance, divergence of vector field and its physical significance, curl of vector field	1. Vector Differential: (07) Introduction, Del operator, gradient of scalar field and its physical significance, divergence of vector field and its physical significance, curl of vector field
B.Sc-II	Practicals 32	Total 32	1. To determine the the thermal conductivity of good conductor by Forb's Method. 2. Temperature of flame. 3. To determine the velocity of sound in air by resonating bottle. 4. To determine the velocity of sound in air by Kundt's tube. 5. Determination of Cuachy's constant. 6. Determination of wavelength of light using Newton's ring. 7. Resistance of B.G. by half deflection method. 8. Bridge rectifier with π filter.	1. To determine the the thermal conductivity of good conductor by Forb's Method. 2. Temperature of flame. 3. To determine the velocity of sound in air by resonating bottle. 4. To determine the velocity of sound in air by Kundt's tube. 5. Determination of Cuachy's constant. 6. Determination of wavelength of light using Newton's ring. . 7. Resistance of B.G. by half deflection method 8. Bridge rectifier with π filter
Month January				
Course- B.Sc.-I			Module/Unit:	Module/Unit:
Paper- ELECTRICITY AND MAGNETISM – II	Lecture 16	Total 16	Unit-1.2. Vector Integral Line integral, surface integral, volume integral (definitions only), Gauss divergence theorem (statements and proof), Statements of Stoke's theorem, Greens symmetrical theorem	Unit-1.2. Vector Integral Line integral, surface integral, volume integral (definitions only), Gauss divergence theorem (statements and proof), Statements of Stoke's theorem, Greens symmetrical theorem

Course- B.Sc.-II	Practicals 32	Total 32	Module/Unit:	Module/Unit:
			1. To determine the the thermal conductivity of good conductor by Forb's Method. 2. Temperature of flame. 3. To determine the velocity of sound in air by resonating bottle. 4. To determine the velocity of sound in air by Kundt's tube. 5. Determination of Cuachy's constant. 6. Resolving power of grating. 7. Transistor as regulated power supply.	1. To determine the the thermal conductivity of good conductor by Forb's Method. 2. Temperature of flame. 3. To determine the velocity of sound in air by resonating bottle. 4. To determine the velocity of sound in air by Kundt's tube. 5. Determination of Cuachy's constant. 6. Resolving power of grating. 7. Transistor as regulated power supply.
Month February	Lecture	Total	Module/Unit	Sub-units planned
Paper- ELECTRICITY AND MAGNETISM – II	16	16	1. Electrostatics: (10) 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, capacitance of an isolated spherical conductor, parallel plate, spherical and cylindrical condenser, energy per unit volume in electrostatic field.	1. Electrostatics: (10) 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, capacitance of an isolated spherical conductor, parallel plate, spherical and cylindrical condenser, energy per unit volume in electrostatic field.
Course- B.Sc-II	Practicals 32	Total 32	1. To determine the temperature of coefficient of resistance of platinum resistance thermometer. 2. Variation of thermos emf across two junction of thermocouple with temperature. 3. To investigate the motion of coupled oscillators. 4. Coilpitt's oscillator. 5. Determination of thickness of thin film using interference of wedge shaped thin film. 6. Polarimeter. 7. Calibration of bridge wire by Griffith's method.	1. To determine the temperature of coefficient of resistance of platinum resistance thermometer. 2. Variation of thermos emf across two junction of thermocouple with temperature. 3. To investigate the motion of coupled oscillators. 4. Coilpitt's oscillator. 5. Determination of thickness of thin film using interference of wedge shaped thin film. 6. Polarimeter. 7. Calibration of bridge wire by Griffith's method.

			8.High resistance by Leakage method.	8.High resistance by Leakage method.
Month March Course- B.Sc.-I	Lecture	Total	Module/Unit	Sub-units planned
Paper- ELECTRICITY AND MAGNETISM – II	16	16	unit-II.4. Dielectrics: Dielectric medium, polarization vector, displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.	unit-II.4. Dielectrics Dielectric medium, polarization vector, displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.
Course- B.Sc-II			Module/Unit	Sub-units planned
	Practicals 32	Total 32	1.To determine the temperature of coefficient of resistance of platinum resistance thermometer. 2.Variation of thermos emf across two junction of thermocouple with temperature. 3. To investigate the motion of coupled oscillators. 4.Coilpitt's oscillator. 5.Determination of thickness of thin film using interference of wedge shaped thin film. 6.Polarimeter. 7.Calibration of bridge wire by Griffith's method. 8.High resistance by Leakage method.	1.To determine the temperature of coefficient of resistance of platinum resistance thermometer. 2.Variation of thermos emf across two junction of thermocouple with temperature. 3. To investigate the motion of coupled oscillators. 4.Coilpitt's oscillator. 5.Determination of thickness of thin film using interference of wedge shaped thin film. 6.Polarimeter. 7.Calibration of bridge wire by Griffith's method. 8.High resistance by Leakage method.
Month April	Lecture	Total	Module/Unit	Sub-units planned
	-	-	Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

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Head of the
Department of Physics
Vivekanand College, Kolhapur