"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: **2023-24**
Subject: Physics
Name of the teacher: **Dr. S. S. Latthe**

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	**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,	**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,

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				Introduction of elementary particles.	Introduction of elementary particles.
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	**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,	**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.	mathematical theory, merits) Accelerators in India.
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** 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	**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	**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	-	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	**Interference** 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.	**Interference** 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. 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

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Department of Physics

Annual Teaching Plan

Academic Year: **2023-24**
Subject: Physics
Name of the teacher: **Dr. G. J. Navathe**

<table>
<tr><td colspan="3">Month June</td><td>Total</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td></td><td>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</td><td>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</td></tr>
<tr><td>B.Sc. III</td><td>12</td><td>-</td><td>12</td><td></td><td></td></tr>
<tr><td>B.Sc. I</td><td>16</td><td>-</td><td>16</td><td>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 applications.</td><td>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 applications.</td></tr>
<tr><td>B.Sc. II</td><td>-</td><td>64</td><td>64</td><td>Practicals :</td><td>Practicals :</td></tr>
</table>

				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	**The Schrodinger's Equation** Physical interpretation of wave function, Schrodinger's time dependent and independent equation (one and three dimensional) Requirements of wave function, Eigen value, Eigen function, Normalized orthogonal and orthonormal wave functions, Probability current density (Continuity equation). Examples on Normalization of wave function	**The Schrodinger's Equation** Physical interpretation of wave function, Schrodinger's time dependent and independent equation (one and three dimensional) Requirements of wave function, Eigen value, Eigen function, Normalized orthogonal and orthonormal wave functions, Probability current density (Continuity equation). Examples on Normalization of wave function
B.Sc. III	12	-	12		
B.Sc. I	16	-	16	**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.	**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.

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 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. Concept of Hermitian 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.

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. 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 September				Module/Unit:	Sub-units planned
B.Sc. III	Lect ures	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	**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

	12	-	12	effect, α-decay, simple harmonic oscillator.	effect, α-decay, simple harmonic oscillator.
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) 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 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 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 March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Magnetic Materials and their Properties:**	**Magnetic Materials and their Properties:**

B.Sc. III	12	-	12	Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.	Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Hysteresis and hysteresis curve, diamagnetic, paramagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic materials.
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 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.	**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.
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2023-24**
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	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, ZnS, Diamond, Miller Indices, Calculations of coordination number, lattice constant, reciprocal lattices, types of lattices, Brillouin Zones, Diffraction of X-rays, Bragg's law, atomic, geometrical factor, Bragg's X-ray spectrometer	**Crystal Structure** Types of the solids, Amorphous, crystalline, lattice, lattice translation vectors, lattice with basis (Central , non central elements) Unit cell , Examples of crystal structure NaCl, KCl, ZnS, Diamond, Miller Indices, Calculations of coordination number, lattice constant, reciprocal lattices, types of lattices, Brillouin Zones, Diffraction of X-rays, Bragg's law, atomic, geometrical factor, Bragg's X-ray spectrometer

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	**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 and Debye theories of specific heat of solids.	**Lattice Vibration and Thermal Properties of Solid** Lattice vibrations, Phonons, normal modes of one dimensional and diatomic chain, Acoustical and optical phonons, Phonons spectrum in solids, Dulong Petit's law (Classical Theory), Einstein and Debye theories of specific heat of solids.

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	**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	Lect ures	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	**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) 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	**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	**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	**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) 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	**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) 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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DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"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: **2023-24**
Subject: Physics
Name of the teacher: **Mr. A. V. Shinde**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total		
B.Sc. III	12	-	12	**Orthogonal Curvilinear Co-ordinates:** Introduction to Cartesian, spherical polar and cylindrical co-ordinate systems, concept of orthogonal curvilinear co-ordinates, unit tangent vectors, arc length, area and volume elements in orthogonal curvilinear co-ordinate system, gradient, divergence, curl, del and Laplacian in orthogonal curvilinear co-ordinate system, extension of gradient, divergence, curl, del and Laplacian in Cartesian, spherical polar and cylindrical coordinate systems	**Orthogonal Curvilinear Co-ordinates:** Introduction to Cartesian, spherical polar and cylindrical co-ordinate systems, concept of orthogonal curvilinear co-ordinates, unit tangent vectors, arc length, area and volume elements in orthogonal curvilinear co-ordinate system, gradient, divergence, curl, del and Laplacian in orthogonal curvilinear co-ordinate system, extension of gradient,divergence, curl, del and Laplacian in Cartesian, spherical polar and cylindrical coordinate systems
B.Sc. II	-	32	32	**Practicals :** 1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow	**Practicals :** 1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow

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				method.	method.
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Differential Equations:** Types of differential equations, degree, order, linearity, homogeneity of differential equations, Method of separation of variables for olving partial differential equations, solutions of Laplace equation in two dimension	**Differential Equations:** Types of differential equations, degree, order, linearity, homogeneity of differential equations, Method of separation of variables for olving partial differential equations, solutions of Laplace equation in two dimension
B.Sc. III	12	-	12		
B.Sc. II	-	32	32	**Practicals :** 1) Measurement of rise, fall and delay time using a CRO 2) Measurement of distortion of a RF signal generator using distortion factor meter. 3) . Measurement of R, L and C using a LCR bridge/ universal bridge. 4) Measurement of time period, frequency, average period using using universal counter/frequency counter.	**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 August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Fourier series and integrals**	**Fourier series and integrals**

B.Sc. III	12	-	12	Fourier series and Fourier transform, Dirichlet condition, (Statement only) Properties of Fourier series: 1) convergence, 2) Integration 3) Differentiation. Physical applications of Fourier series 4) square wave (high frequencies) 5) full wave rectifier, Differentiation and integration of Fourier series, Fourier transform, Inverse functions.	Fourier series and Fourier transform, Dirichlet condition, (Statement only) Properties of Fourier series: 1) convergence, 2) Integration 3) Differentiation. Physical applications of Fourier series 4) square wave (high frequencies) 5) full wave rectifier, Differentiation and integration of Fourier series, Fourier transform, Inverse functions.
B.Sc. II	-	32	32	**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 September				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Complex analysis** Revision of complex numbers and their graphical representation, Euler's formula, DeMoiver's theorem, Roots of complex number, Functions of complex numbers, Analyticity and Cauchy-	**Complex analysis** Revision of complex numbers and their graphical representation, Euler's formula, DeMoiver's theorem, Roots of complex number, Functions of complex numbers, Analyticity and Cauchy-Reimann condition, examples

B.Sc.III	12	-	12	Reimann condition, examples of analytical function, Singular functions, Poles and branch points, order of singularity, Integration of function of complex variable, Cauchy's inequality, Cauchy's integral formula	of analytical function, Singular functions, Poles and branch points, order of singularity, Integration of function of complex variable, Cauchy's inequality, Cauchy's integral formula
B.Sc. II	-	08	08	**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 October				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Lagrangian Dynamics**	**Lagrangian Dynamics**

B.Sc. III	12	-	12	Introduction Basic Concepts: (1) Co-ordinate system (2) Degrees of freedom; Constraints: Holonomic constraints, Nonholonomic constraints, Forces of constraints, Configuration space, Generalized Co-ordinates, Principle of virtual work, D'Alembert's principal. Lagrange's equation from D'Alembert's principle. Application of Lagrange's equation to a particle in a space, Atwood's machine and bead sliding on uniformly rotating wire under force free condition, simple pendulum unit.	Introduction Basic Concepts: (1) Co-ordinate system (2) Degrees of freedom; Constraints: Holonomic constraints, Nonholonomic constraints, Forces of constraints, Configuration space, Generalized Co-ordinates, Principle of virtual work, D'Alembert's principal. Lagrange's equation from D'Alembert's principle. Application of Lagrange's equation to a particle in a space, Atwood's machine and bead sliding on uniformly rotating wire under force free condition, simple pendulum unit.
B.Sc. II	-	32	32	**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	**Variational principles**	**Variational principles**

B.Sc. III	12	-	12	Hamilton's principle, Deduction of Hamilton's principle from D' Alembert's principle, Deduction of Lagrange's equation from Hamilton's principle. Application of Hamilton's principle: shortest distance between two points in plane, Brachistochrone problem.	Hamilton's principle, Deduction of Hamilton's principle from D' Alembert's principle, Deduction of Lagrange's equation from Hamilton's principle. Application of Hamilton's principle: shortest distance between two points in plane, Brachistochrone problem.
B.Sc. II	-	32	32	**Practicals :** 1) To determine the wavelength of sodium light using Fresenel Biprism. 2) To determine the Resolving Power of a Prism. 3) To determine the Resolving Power of a Plane Diffraction Grating. 4) To determine wavelength of Laser light using diffraction of single slit.	**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	**Non-inertial and Rotating co-ordinate system**	**Non-inertial and Rotating co-ordinate system**

B.Sc. III	12	-	12	Inertial and non-inertial framed of reference Fictitious or Pseudo force, centrifugal force, uniformly rotating frame, Motion relative to earth. Application of Coriolis force: 1) Formation of cyclone, 2) Particles in a horizontal plane, 3) Freely falling body at earth's surface	Inertial and non-inertial framed of reference Fictitious or Pseudo force, centrifugal force, uniformly rotating frame, Motion relative to earth. Application of Coriolis force: 1) Formation of cyclone, 2) Particles in a horizontal plane, 3) Freely falling body at earth's surface
B.Sc. II	-	32	32	**Practicals :** 1)To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance. 2) To observe the limitations 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 March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Special theory of Relativity**	**Special theory of Relativity**

B.Sc. III	12	-	12	Introduction: Galilean transformation, the Michelson-Morley experiment, Ether hypothesis Postulates of special theory of relativity, Lorentz transformations, Relativistic addition of velocities, Length contraction, Time dilation, Variation of mass with velocity, Mass energy relation.	Introduction: Galilean transformation, the Michelson-Morley experiment, Ether hypothesis Postulates of special theory of relativity, Lorentz transformations, Relativistic addition of velocities, Length contraction, Time dilation, Variation of mass with velocity, Mass energy relation.
B.Sc. II	-	32	32	**Practicals :** 1) To determine the value of Stefan's Constant. 2) To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 3) To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. 4) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.	**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

Teacher Incharge

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"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: **2023-24**
Subject: Physics
Name of the teacher: **Dr. Namrata A. Narewadikar**

Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Vectors**	**Vectors**
B.Sc. I	28	-	28	Vector algebra: Definition of vector, polar vectors and axial vectors, addition of vectors, rectangular resolution of vectors, unit vector (Def) position vector of a point, product of two vector, scalar and vector products- scalar or dot products and its geometrical interpretation, work done as a scalar product, vector or cross product and their useful results, area of parallelogram, scalar triple product, vector triple product and its geometrical interpretation, problems. **Momentum and Energy** Introduction to mechanics, Mechanics of a particle-Conservation theorem of linear momentum, angular momentum, and energy	Vector algebra: Definition of vector, polar vectors and axial vectors, addition of vectors, rectangular resolution of vectors, unit vector (Def) position vector of a point, product of two vector, scalar and vector products- scalar or dot products and its geometrical interpretation, work done as a scalar product, vector or cross product and their useful results, area of parallelogram, scalar triple product, vector triple product and its geometrical interpretation, problems. **Momentum and Energy** Introduction to mechanics, Mechanics of a particle-Conservation theorem of linear momentum, angular momentum, and energy

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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
Course	Lectures	Practicals	Total	**Momentum and Energy** Concept of Centre of Mass, Mechanics of system of particles- Conservation theorem of linear momentum, angular momentum and energy **Differential Equation** Introduction to differential equation, Ordinary and Partial differential Equations, 1st order homogenous differential equation, 2nd order homogenous differential equations with constants coefficients, examples	**Momentum and Energy** Concept of Centre of Mass, Mechanics of system of particles- Conservation theorem of linear momentum, angular momentum and energy **Differential Equation** Introduction to differential equation, Ordinary and Partial differential Equations, 1st order homogenous differential equation, 2nd order homogenous differential equations with constants coefficients, examples
B.Sc. I	28	-	28		

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 September				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Laws of motion**	**Laws of motion**
B.Sc. I	28	-	28	Introduction of coordinate systems (Cartesian, Polar, Cylindrical and Spherical), Definition of translational and rotational motion, force, and torque, Frame of reference-Inertial and Non inertial frame with examples, Newtons laws of motion (first, second and third) with proofs	Introduction of coordinate systems (Cartesian, Polar, Cylindrical and Spherical), Definition of translational and rotational motion, force, and torque, Frame of reference-Inertial and Non inertial frame with examples, Newtons laws of motion (first, second and third) with proofs
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				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total	**Rotational motion** Rotational variables- Angular position, Angular displacement, Angular velocity, Angular acceleration, Torque, Moment of Inertia-definition, M.I. of a spherical shell about its axis of symmetry, M.I. of solid cylinder about its symmetry axis, Motion of spherical shell and solid cylinder rolling down an inclined plane	**Rotational motion** Rotational variables- Angular position, Angular displacement, Angular velocity, Angular acceleration, Torque, Moment of Inertia-definition, M.I. of a spherical shell about its axis of symmetry, M.I. of solid cylinder about its symmetry axis, Motion of spherical shell and solid cylinder rolling down an inclined plane
B.Sc. I	28	-	28		
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 December				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Vector Differential** Introduction, Del operator, gradient of scalar field and its physical significance, divergence of vector field and its physical significance, curl of vector field	**Vector Differential** 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. I	28	-	28		

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 January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Vector Integral:** Line integral, surface integral, volume integral (definitions only), Gauss divergence theorem (statements and proof), Stoke's theorem, Greens symmetrical theorem.	**Vector Integral:** Line integral, surface integral, volume integral (definitions only), Gauss divergence theorem (statements and proof), Stoke's theorem, Greens symmetrical theorem
B.Sc. I	28	-	28		

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
Course	Lectures	Practicals	Total	**Electrostatics**	**Electrostatics**
B.Sc. I	28	-	28	Electrostatic field, electric flux, Gauss, theorem of electrostatics, electric potential as line integral of electric field, potential due to a point charge and group of point charges, 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, problems.	Electrostatic field, electric flux, Gauss, theorem of electrostatics, electric potential as line integral of electric field, potential due to a point charge and group of point charges, 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, problems.

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
Course	Lectures	Practicals	Total	**Dielectrics**	**Dielectrics**
B.Sc. I	28	-	28	Dielectric medium, polarization vector, displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.	Dielectric medium, polarization vector, displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.
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

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DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"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: **2023-24**
Subject: Physics
Name of the teacher: **Dr. T. U. Urunkar**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Basic Tools of Astronomers** Optical telescopes-Galilean, Newtonian, Cassegranian, Hubble space telescope, Magnifying power of telescope, Resolving power of telescope, Spectroscope (prism, grating), UV, IR, Radio, X-Ray.	**Basic Tools of Astronomers** Optical telescopes-Galilean, Newtonian, Cassegranian, Hubble space telescope, Magnifying power of telescope, Resolving power of telescope, Spectroscope (prism, grating), UV, IR, Radio, X-Ray.
B.Sc. I	08	-	08		
B.Sc. II		32	12	**Practicals :** 1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow	**Practicals :** 1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow
B.Sc. I	32	-	32	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation.	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation.

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				4) Solution of ordinary differential equations.	4) Solution of ordinary differential equations.
Month July					
Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. I	08	-	08	**The Nature of Light and Message of The Star Light** Light as an electromagnetic wave, Electromagnetic spectrum. Electromagnetic radiation from heated object, Doppler shift, and its applications.	**The Nature of Light and Message of The Star Light** Light as an electromagnetic wave, Electromagnetic spectrum. Electromagnetic radiation from heated object, Doppler shift, and its applications.
B.Sc. II	-	32	32	**Practicals :** 1) Measurement of rise, fall and delay time using a CRO 2) Measurement of distortion of a RF signal generator using distortion factor meter. 3) . Measurement of R, L and C using a LCR bridge/ universal bridge. 4) Measurement of time period, frequency, average period using using universal counter/frequency counter.	**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.
B.Sc. I	-	32	32	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation. 4) Solution of ordinary differential equations.	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation. 4) Solution of ordinary differential equations.
Month August				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. I	08	-	08	**Theories on origin of stars** Nebular hypothesis, Spectral classification of stars, O,B,A,F,G,K,M., Nuclear Reactions in stars, Luminosity of star, Photon diffusion time, luminosity of star, gravitational potential energy of a star, internal temperature and pressure of a star.	**Theories on origin of stars** Nebular hypothesis, Spectral classification of stars, O,B,A,F,G,K,M., Nuclear Reactions in stars, Luminosity of star, Photon diffusion time, luminosity of star, gravitational potential energy of a star, internal temperature and pressure of a star.
B.Sc. II	-	32	32	**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.

B.Sc. I	32	-	32	**Practicals :** 1) Measurement of terrestrial distance using Sextant. 2) Total internal reflection in prism. 3) To use idea of parallax to determine large distance 4) Adjustment of spectrometer for parallel light using Schuster's method	**Practicals :** 1) Measurement of terrestrial distance using Sextant. 2) Total internal reflection in prism. 3) To use idea of parallax to determine large distance 4) Adjustment of spectrometer for parallel light using Schuster's method
Month September				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Study of spectra**	**Study of spectra**
B.Sc. I	08	-	08	Atomic spectra-emission and absorption spectra (Fraunhofer lines), Stellar spectra, Classification of stellar spectra.	Atomic spectra-emission and absorption spectra (Fraunhofer lines), Stellar spectra, Classification of stellar spectra.
B.Sc. II	-	32	32	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.	**Practicals :** 1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.

B.Sc. II	-	32	32	**Practicals :** 1) Measurement of terrestrial distance using Sextant. 2) Total internal reflection in prism. 3) To use idea of parallax to determine large distance 4) Adjustment of spectrometer for parallel light using Schuster's method	**Practicals :** 1) Measurement of terrestrial distance using Sextant. 2) Total internal reflection in prism. 3) To use idea of parallax to determine large distance 4) Adjustment of spectrometer for parallel light using Schuster's method
Month October/November				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Fluids**	**Galaxies**
B.Sc. I	08	-	08		**Fluids**
				Perfect Fluid: Assumptions, Equation of state, equation of motion, stars of uniform density, limit of mass to radius ratio. Basic equations of fluid mechanics, Energy equation, continuity equation viscosity, gas dynamics, waves and instabilities, turbulence, orbit theory, properties	Perfect Fluid: Assumptions, Equation of state, equation of motion, stars of uniform density, limit of mass to radius ratio. Basic equations of fluid mechanics, Energy equation, continuity equation viscosity, gas dynamics, waves and instabilities, turbulence, orbit theory, properties
B.Sc. II	-	32	32	**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.

B.Sc. I	-	32	32	**Practicals :** 1)I-V Characteristics of solar cell. 2) Goniometer: Equivalent focal length 3) Study of Lissajous figures using CRO. 4) Determination of wavelength of light by spectrometer.	**Practicals :** 1)I-V Characteristics of solar cell. 2) Goniometer: Equivalent focal length 3) Study of Lissajous figures using CRO. 4) Determination of wavelength of light by spectrometer.
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total		
B.Sc. I	08	-	08	**Hydrodynamics** Equation of continuity - conservation of mass, Ideal fluid and Euler's equation of motion, Navier Stokes equation for viscous fluid.	**Hydrodynamics** Equation of continuity - conservation of mass, Ideal fluid and Euler's equation of motion, Navier Stokes equation for viscous fluid.
B.Sc. II	-	32	32	**Practicals :** 1) To determine the wavelength of sodium light using Fresenel Biprism. 2) To determine the Resolving Power of a Prism. 3) To determine the Resolving Power of a Plane Diffraction Grating. 4) To determine wavelength of Laser light using diffraction of single slit.	**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.

B.Sc. I	-	32	32	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.
Month February				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Stellar evolution I**	**Stellar evolution I**
B.Sc. I	08	-	08	Birth of a star, maturity of a star, ageing of stars, death of a star, supernova explosion, pulsars and black holes.	Birth of a star, maturity of a star, ageing of stars, death of a star, supernova explosion, pulsars and black holes.

B.Sc. II	-	32	32	**Practicals :** 1) To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance. 2) To observe the limitations 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.
B.Sc. I	-	32	32	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.
Month March				Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total		
				Stellar evolution II Hertzsprung-Russell (H-R) diagram- white and red dwarfs, electron in a white dwarf, Chandrasekhar limit, Neutron stars	**Stellar evolution II** Hertzsprung-Russell (H-R) diagram- white and red dwarfs, electron in a white dwarf, Chandrasekhar limit, Neutron stars
B.Sc. I	08	-	08		
B.Sc. II	-	32	32	**Practicals :** 1) To determine the value of Stefan's Constant. 2) To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 3) To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. 4) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.	**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.

B.Sc. I	-	32	32	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.	**Practicals :** 1) Determination of Planck's constant using LED 2) Divergence of LASER beam 3) Measurement of wavelength of given LASER source using diffraction grating. 4) Calibration of spectrometer.
Month April				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher Incharge

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"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: **2023-24**
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.
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></tr>
<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">Unit-I. 2. Oscillations</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>

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					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 $\lambda 2-$ 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 $\lambda 2-$ 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
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.
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 Method.	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	4. Viscosity of liquid bySearl'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	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.
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. 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 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.
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 March	Lecture	Total	Module/Unit	Sub-units planned
	-	-	Examination	Examination

Teacher Incharge

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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DEPARTMENT OF PHYSICS
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"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: **2023-24**
Subject: Physics
Name of the teacher: **Miss S. P. Patil**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**History of Astronomy**	**History of Astronomy**
B.Sc. I	08	-	08	Babylonian astronomy, Greek astronomy, Aristotle work, Ptolemy's astronomical work, Copernican heliocentric theory, Tychonian system.	Babylonian astronomy, Greek astronomy, Aristotle work, Ptolemy's astronomical work, Copernican heliocentric theory, Tychonian system
B.Sc. II	12	-	12	**History of Astronomy and Apparent Luminosity of Stars:-** Babylonian astronomy, Greek astronomy, Aristotle work, Ptolemy's astronomical work, Copernican heliocentric theory, Tychonian system, Luminosity of stars, Magnitude scale, expression for luminosity ,flux and magnitude ,Luminosity measurement(1)Visual method (2) Photographic method, and (3) Photoelectric method.	**History of Astronomy and Apparent Luminosity of Stars:-** Babylonian astronomy, Greek astronomy, Aristotle work, Ptolemy's astronomical work, Copernican heliocentric theory, Tychonian system, Luminosity of stars, Magnitude scale, expression for luminosity ,flux and magnitude ,Luminosity measurement(1)Visual method (2) Photographic method, and (3) Photoelectric method.
B.Sc. I	32	-	32	**Practicals:** 1)Measurements of length (or diameter) using Vernier calliper, screw gauge,	**Practicals:** 1)Measurements of length (or diameter) using Vernier calliper, screw gauge,

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				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	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 July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**The Sky, Calendar and Celestial coordinates** The moon, Sun and stars as calendars, sidereal day, sidereal time.	**The Sky, Calendar and Celestial coordinates** The moon, Sun and stars as calendars, sidereal day, sidereal time.
B.Sc. I	08	-	08		
B.Sc. II	12	-	12	**The Sky , Calendar and Celestial coordinates** The moon, Sun and stars as calendars, sidereal day, sidereal time, appearance of the celestial, sphere and its parts, celestial co-ordinates, longitude and latitude on the earth celestial co-ordinates,	**The Sky , Calendar and Celestial coordinates** The moon, Sun and stars as calendars, sidereal day, sidereal time, appearance of the celestial, sphere and its parts, celestial co-ordinates, longitude and latitude on the earth celestial co-ordinates,
B.Sc. I	-	32	32	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation. 4) Solution of ordinary differential equations.	**Practicals :** 1) Numerical Integration. 2) Numerical Differentiation. 3) Numerical interpolation. 4) Solution of ordinary differential equations.

Month August				Module/Unit:	Sub-units planned
B.Sc. I	08	-	08	**The Stellar distances** Measurement of terrestrial distances, distance of moon, distance of planets, Astronomical unit aberration of star light,	**The Stellar distances** Measurement of terrestrial distances, distance of moon, distance of planets, Astronomical unit aberration of star light,
B.Sc. II	12	-	12	**The Stellar distances** Measurement of terrestrial distances, distance of moon, distance of planets, Astronomical unit aberration of star light, Definition of parallax and Geocentric parallax, Trigonometric parallax of stars, light years and parsec.	**The Stellar distances** Measurement of terrestrial distances, distance of moon, distance of planets, Astronomical unit aberration of star light, Definition of parallax and Geocentric parallax, Trigonometric parallax of stars, light years and
B.Sc. I	32	-	32	**Practicals:** 1) Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	**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 September				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Constellations, Comets, Asteroids, Meteors**	**Constellations, Comets, Asteroids, Meteors**
B.Sc. I	08	-	08	Identification of stars ,Constellations – Aries, Pisces, Orion, Asterisms – summer triangle and Big Dipper (Saptarishi). Comets, Asteroids, Meteors- Structure, chemical composition and orbits.	Identification of stars ,Constellations – Aries, Pisces, Orion, Asterisms – summer triangle and Big Dipper (Saptarishi). Comets, Asteroids, Meteors- Structure, chemical composition and orbits.
B.Sc. II	12	-	12	**Constellations, Comets, Asteroids, Meteors** Identification of stars ,Constellations – Aries, Pisces, Orion, Asterisms – summer triangle and Big Dipper (Saptarishi). Comets, Asteroids, Meteors- Structure, chemical composition and orbits.	**Constellations, Comets, Asteroids, Meteors** Identification of stars ,Constellations – Aries, Pisces, Orion, Asterisms – summer triangle and Big Dipper (Saptarishi). Comets, Asteroids, Meteors- Structure, chemical composition and orbits.
B.Sc. II	-	32	32	**Practicals:** 1) Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3) To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	**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
	Lectures	Practicals	Total	Examination	Examination

Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Galaxies**	**Galaxies**
B.Sc. I	08	-	08	Components of the Universe: Introduction of Stars, Planets, Asteroids, Meteors, Comets, Galaxies, Formation of galaxies, visual morphology of galaxy, Types of galaxiesElliptical, Spiral, Barred spiral, irregular, Hubble tuning fork diagram, Peculiar galaxies, Radio galaxies, Seyfert galaxy, Quasars. [Galaxy: Nomenclature, observation theory, Types and morphology, properties, formation and evolution, large scale structure]	Components of the Universe: Introduction of Stars, Planets, Asteroids, Meteors, Comets, Galaxies, Formation of galaxies, visual morphology of galaxy, Types of galaxiesElliptical, Spiral, Barred spiral, irregular, Hubble tuning fork diagram, Peculiar galaxies, Radio galaxies, Seyfert galaxy, Quasars. [Galaxy: Nomenclature, observation theory, Types and morphology, properties, formation and evolution, large scale structure]
B.Sc. II	12	-	12	**Galaxies** Components of the Universe: Introduction of Stars, Planets, Asteroids, Meteors, Comets, Galaxies, Formation of galaxies, visual morphology of galaxy, Types of galaxiesElliptical, Spiral, Barred spiral, irregular, Hubble tuning fork diagram, Peculiar galaxies, Radio galaxies, Seyfert galaxy, Quasars. [Galaxy: Nomenclature, observation theory, Types and morphology, properties, formation and evolution, large scale structure]	**Galaxies** Components of the Universe: Introduction of Stars, Planets, Asteroids, Meteors, Comets, Galaxies, Formation of galaxies, visual morphology of galaxy, Types of galaxiesElliptical, Spiral, Barred spiral, irregular, Hubble tuning fork diagram, Peculiar galaxies, Radio galaxies, Seyfert galaxy, Quasars. [Galaxy: Nomenclature, observation theory, Types and morphology, properties, formation and evolution, large scale structure]
B.Sc. I	-	32	32	**Practicals:** 1) Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method.	**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.	3) To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.
Month January				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total		
B.Sc. I	08	-	08	**Milky Way galaxy** Shape of the galaxy, interstellar medium and molecules, Radio emission from interstellar carbon monoxide, clusters of stars, Galactic clusters. [Appearance, size and mass, contents, structure, formation, environment, astronomical history]	**Milky Way galaxy** Shape of the galaxy, interstellar medium and molecules, Radio emission from interstellar carbon monoxide, clusters of stars, Galactic clusters. [Appearance, size and mass, contents, structure, formation, environment, astronomical history]
B.Sc. II	12	-	12	**Milky Way galaxy** Shape of the galaxy, interstellar medium and molecules, Radio emission from interstellar carbon monoxide, clusters of stars, Galactic clusters. [Appearance, size and mass, contents, structure, formation, environment, astronomical history]	**Milky Way galaxy** Shape of the galaxy, interstellar medium and molecules, Radio emission from interstellar carbon monoxide, clusters of stars, Galactic clusters. [Appearance, size and mass, contents, structure, formation, environment, astronomical history]

B.Sc. II	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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
Course	Lectures	Practicals	Total	**Cosmology**	**Cosmology**
B.Sc. I	08	-	08	The expanding universe, Big Bang universe, the steady state cosmology and oscillating universe, Hubble law. Hubble constant, cosmological tests.	The expanding universe, Big Bang universe, the steady state cosmology and oscillating universe, Hubble law. Hubble constant, cosmological tests.
B.Sc. II	12	-	12	**Cosmology** The expanding universe, Big Bang universe, the steady state cosmology and oscillating universe, Hubble law. Hubble constant, cosmological tests.	**Cosmology** The expanding universe, Big Bang universe, the steady state cosmology and oscillating universe, Hubble law. Hubble constant, cosmological tests.

B.Sc. I	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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 March				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**The Solar system** Origin of the solar system and planets, Basic structure of Sun -Sun's interior, the photosphere, the solar atmosphere (chromospheres and corona). Sunspots, Sun's rotation and Solar magnetic field, Explanation for observed features of sunspots, Planetary properties and quick facts of Mercury, Venus, and Mars. Moon, Structure of the moon and its quick facts	**The Solar system** Origin of the solar system and planets, Basic structure of Sun -Sun's interior, the photosphere, the solar atmosphere (chromospheres and corona). Sunspots, Sun's rotation and Solar magnetic field, Explanation for observed features of sunspots, Planetary properties and quick facts of Mercury, Venus, and Mars. Moon, Structure of the moon and its quick facts
B.Sc. I	08	-	08		

B.Sc. II	12	-	12	**The Solar system** Origin of the solar system and planets, Basic structure of Sun -Sun's interior, the photosphere, the solar atmosphere (chromospheres and corona). Sunspots, Sun's rotation and Solar magnetic field, Explanation for observed features of sunspots, Planetary properties and quick facts of Mercury, Venus, and Mars. Moon, Structure of the moon and its quick facts	**The Solar system** Origin of the solar system and planets, Basic structure of Sun -Sun's interior, the photosphere, the solar atmosphere (chromospheres and corona). Sunspots, Sun's rotation and Solar magnetic field, Explanation for observed features of sunspots, Planetary properties and quick facts of Mercury, Venus, and Mars. Moon, Structure of the moon and its quick facts
B.Sc. I	-	32	32	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	**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

Patil
Teacher Incharge

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2023-24**
Subject: Physics
Name of the teacher: **Miss G. G. Jadhav**

<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">Stellar evoluation
Birth of a star, maturity of a star, ageing of stars, death of a star , supernova explosion, pulsars and black holes.</td><td rowspan="2">Stellar evoluation
Birth of a star, maturity of a star, ageing of stars, death of a star , supernova explosion, pulsars and black holes..</td></tr>
<tr><td>B.Sc. II</td><td>12</td><td>-</td><td>12</td></tr>
<tr><td>B.Sc. I</td><td>-</td><td>32</td><td>32</td><td>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</td><td>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</td></tr>
<tr><td colspan="4">Month July</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>Stellar evoluation</td><td>Stellar evoluation</td></tr>
</table>

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B.Sc. II	12	-	12	Hertzsprung-Russell (H-R) diagram- white and red dwarfs, electron in a white dwarf, Chandrasekhar limit, Neutron stars	Hertzsprung-Russell (H-R) diagram- white and red dwarfs, electron in a white dwarf, Chandrasekhar limit, Neutron stars
B.Sc. I	-	32	32	**Practicals:** 1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	**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
Course	Lectures	Practicals	Total	**Theories on origin of stars** Nebular hypothesis ,Spectral classification of stars, O,B,A,F,G,K,M., Nuclear Reactions in stars,	**Theories on origin of stars** Nebular hypothesis ,Spectral classification of stars, O,B,A,F,G,K,M., Nuclear Reactions in stars,
B.Sc. II	12	-	12		

B.Sc. I	-	32	32	**Practicals:** 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	**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
Course	Lectures	Practicals	Total	**Theories on origin of stars** Luminosity of star, Photon diffusion time, luminosity of star, gravitational potential energy of a star, internal temperature and pressure of a star.	**Theories on origin of stars** Luminosity of star, Photon diffusion time, luminosity of star, gravitational potential energy of a star, internal temperature and pressure of a star.
B.Sc. II	12	-	12		
B.Sc. I	-	32	32	**Practicals:** 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	**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				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Magneto hydrodynamics**	**Magneto hydrodynamics**

B.Sc. II	12	-	12	Motion of charged particle in electromagnetic field, Ideal hydro magnetic equation, Characteristics of plasma in magnetic field plasma	Motion of charged particle in electromagnetic field, Ideal hydro magnetic equation, Characteristics of plasma in magnetic field plasma
B.Sc. I	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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
Course	Lectures	Practicals	Total	**Magneto hydrodynamics** Diffusion and frozening effect, Magnetohydrodynamic equation -magnetic pressure and magnetic tension, confinement of	**Magneto hydrodynamics** Diffusion and frozening effect, Magnetohydrodynamic equation -magnetic pressure and magnetic tension, confinement of
B.Sc. II	12	-	12		

B.Sc. I	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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
Course	Lectures	Practicals	Total	**Hydrodynamics** Equation of continuity - conservation of mass, Ideal fluid and Euler's equation of motion, Navier-Stokes equation for viscous fluid.	**Hydrodynamics** Equation of continuity - conservation of mass, Ideal fluid and Euler's equation of motion, Navier-Stokes equation for viscous fluid.
B.Sc. II	12	-	12		

B.Sc. I	-	32	32	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	**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
Course	Lectures	Practicals	Total	**Hydrodynamics** Ideal fluid and Euler's equation of motion, Navier-Stokes equation for viscous fluid.	**Hydrodynamics** Ideal fluid and Euler's equation of motion, Navier-Stokes equation for viscous fluid.
B.Sc. II	12	-	12		
B.Sc. I	-	32	32	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	**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

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Vivekanand College, Kolhapur (Autonomous)

Department of Physics

Annual Teaching Plan

Academic Year: **2023-24**
Subject: Physics
Name of the teacher: **Miss S. S. Gawade**

Month June				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**The Nature of Light and Message of The Star Light**	**The Nature of Light and Message of The Star Light**
B.Sc. II	12	-	12	Light as an electromagnetic waves, Electromagnetic spectrum. Electromagnetic radiation	Light as an electromagnetic waves, Electromagnetic spectrum. Electromagnetic radiation
B.Sc. I	-	32	32	**Practicals:** 1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	**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 materialof Bar by vibration
Month July				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total		

B.Sc. II	12	-	12	**The Nature of Light and Message of The Star Light** Heated object, Doppler shift and its applications, Atomic spectra-emission and absorption spectra (Fraunhofer lines), Stellar spectra, Classification of stellar spectra	**The Nature of Light and Message of The Star Light** Heated object, Doppler shift and its applications, Atomic spectra-emission and absorption spectra (Fraunhofer lines), Stellar spectra, Classification of stellar spectra
B.Sc. I	-	32	32	**Practicals:** 1)Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	**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 materialof Bar by vibration
Month August				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Basic Tools of Astronomers**	**Basic Tools of Astronomers**
B.Sc. III	12	-	12	Optical telescopes-Galilean, Newtonian, Cassegranian, Hubble space telescope,	Optical telescopes-Galilean, Newtonian, Cassegranian, Hubble space telescope,

B.Sc. I	-	32	32	**Practicals:** 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	**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
Course	Lectures	Practicals	Total	**Basic Tools of Astronomers** Magnifying power of telescope, Resolving power of telescope, Spectroscope (prism, grating), UV, IR, Radio, X-Ray and Gravitational waves astronomy.	**Basic Tools of Astronomers** Magnifying power of telescope Resolving power of telescope Spectroscope (prism, grating) UV, IR, Radio, X-Ray and Gravitational waves astronomy.
B.Sc. II	12	-	12		
B.Sc. I	-	32	32	**Practicals:** 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	**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				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	Examination	Examination
Month December				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Fluids**	**Fluids**

B.Sc. II	12	-	12	Perfect Fluid: Assumptions ,Equation of state, equation of motion, TOV equation, stars of uniform density, limit of mass to radius ratio.	Perfect Fluid: Assumptions ,Equation of state, equation of motion, TOV equation, stars of uniform density, limit of mass tc radius ratio.
B.Sc. I	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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
Course	Lectures	Practicals	Total	**Fluids**	**Fluids**
B.Sc. II	12	-	12	Basic equations of fluid mechanics, Energy equation, continuity equation viscosity, gas dynamics, waves and instabilities, turbulence, orbit theory, properties	Basic equations of fluid mechanics, Energy equation, continuity equation viscosity, gas dynamics, waves and instabilities, turbulence, orbit theory, properties

B.Sc. I	-	32	32	**Practicals :** 1)Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c), Checking electrical fuses and Continuity. 2) To determine constants of B. G. 3) To compare capacitances using De'Sauty's bridge. 4) To determine impedance of series LCR circuit.	**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
Course	Lectures	Practicals	Total	**Electrodynamics**	**Electrodynamics**
B.Sc. II	12	-	12	Scalar electric potentiall (φ),Vector magnetic potential(A), Poisson's and Laplace's equation, Maxwell's equation in vacuum, Electromagnetic waves in vacuum- wave equation and wave	Scalar electric potential(φ),Vector magnetic potential(A), Poisson's and Laplace's equation, Maxwell's equation in vacuum Electromagnetic waves in vacuum- wave equation and wave
B.Sc. I	-	32	32	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	**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
Course	Lectures	Practicals	Total	**Electrodynamics**	**Electrodynamics**
B.Sc. II	12	-	12	velocity, Scattering of light, scattering cross section, Thomson's and Rayleigh scattering, explanation for blue color of the sky, red color of sunset and sunrise.	velocity, Scattering of light, scattering cross section, Thomson's and Rayleigh scattering, explanation for blue color of the sky, red color of sunset and sunrise.
B.Sc. I	-	32	32	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	**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

Sayali

Teacher Incharge

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