"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
Syllabus Completion Report

Academic Year: 2021-22

Subject: Physics

Name of the teacher: **Dr.M.M. Karanjkar**

Month June				Module/Unit:	Syllabus covered/Not covered	Remarks
Course	Lect ures	Practicals	Total	Physical interpretation of wave function, Schrodinger's time dependent and independent equation (one and three dimensional) Requirements of wave function, Eigen value, Eigen function, Normalized orthogonal and orthonormal wave functions, Probability current density (Continuity equation). Examples on Normalization of wave function	Covered	
B.Sc. III	12	-	12			
B.Sc. I	16	-	16	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement only), Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS) and its	Covered	

Course	Lectures	Practicals	Total	Practicals :	Covered	
B.Sc. II	-	64	64	1) Characteristics of Transistor. 2) Use of sextant to measure height of object. 3) Crystal Oscillator. 4) Colpitts oscillator.		
Month July				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**Introduction to Quantum Mechanics**		
B.Sc. III	12	-	12	Origin of quantum mechanics, Review of black body radiation, Photoelectric effect, matter waves, De-Broiglie hypothesis , experimental evidence of de Broglie theory (Davisson and Germer experiment), wave particle duality, Heisenberg's uncertainty principle and different forms uncertainty principle		
B.Sc. 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	Covered	

Course	Lect ures	Practicals	Total	Module/Unit:		
B.Sc. II	-	64	64	**Practicals :** 1) To record and analyze the cooling temperature of hot object as a function of time using a thermocouple. 2) To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge 3) Temperature of flame. 4) To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.	Covered	

Month August

Course	Lect ures	Practicals	Total	Module/Unit:		
B.Sc. III	12	-	12	**Applications of Schrodinger's Steady State Equation** Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.	Covered	

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.	Covered	
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.	Covered	
Month September				Module/Unit:	Covered	
B.Sc. III	Lect ures	Practicals	Total	**Operator in Quantum Mechanics** Definition of an operator in quantum mechanics, commutation relation in quantum mechanics, position,		

	12	-	12	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.		
B.Sc. I	16	-	16	**Electricity** Introduction – DC and varying currents, LR Circuit, RC circuit and LC circuit, Growth and decay of currents, Theory of B.G. and constants of B.G., time constants τ	Covered	
B.Sc. II	-	64	64	**Practicals :** 1) 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	Covered	

				period using using universal counter/frequency counter		
Month October/November				Module/Unit:		
	Lect ures	Practicals	Total	Examination		
Month December				Module/Unit:	Covered	
	Lect ures	Practicals	Total	**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		
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.	Covered	

Course	Lectures	Practicals	Total	Module/Unit	Covered	
B.Sc. II	-	64	64	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	Covered	
Month January				Module/Unit:	Covered	
Course	Lectures	Practicals	Total	**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.		
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	Covered	

| 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. | Covered | |

Month February				Module/Unit:	Covered	
Course	Lectures	Practicals	Total	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. 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	Covered	

Course	Lectures	Practicals	Total		Covered	
B.Sc. II	-	64	64	**Practicals :** 1) To determine the value of Stefan's Constant. 2) To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 3) To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. 4) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method	Covered	

Month March				Module/Unit:		
Course	Lectures	Practicals	Total	**X-Ray Diffraction**	Covered	
B.Sc. III	12	-	12	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. 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.	Covered	
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 of a multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter. 4) Measurement of voltage, frequency, time period and phase angle using CRO	Covered	
Month April				Module/Unit:		
Lectures		Practicals	Total	Examination		

Teacher Incharge

HOD-
Department of Physics
Vivekanand College, Kolhapur

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

Academic Year: 2021-22
Subject: Physics
Name of the teacher: Mr S. V. Malgaonkar

Month June				Module/Unit:	Syllabus covered/Not covered	Remarks
Course	Lect ures	Practicals	Total	**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,	Covered	
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.	Covered	
B.Sc. III	-	80	80	**Practicals :** 1) Resonance pendulum.	Covered	

				2) S. T. of soap solution.	
				3) S. T. by Fergusson modified method.	
				4) Y & η using flat spiral spring.	

Month July

Course	Lectures	Practicals	Total	Module/Unit:	Covered
				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),	
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	Covered

| 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 | Covered | |

Month August

| | | | | Module/Unit: | Covered | |

Course	Lect ures	Practicals	Total	**Laws of Thermodynamics**		
B.Sc. II	12	-	12	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. III	12	-	12	**Kinetic Theory of Gases and thermometry** 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)	Covered	
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.	Covered	
Month September				Module/Unit:	Covered	
B.Sc. II	Lect ures	Practicals	Total	**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.		
B.Sc. III	12	-	12	**Superconductivity** Idea of superconductivity, Critical temperature, Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth, Isotope effect	Covered	
B.Sc. III	-	80	80	1) 'Y' by Koenig's method. 2) 'Y' by cornu's method. 3) Measurement of heat capacity of solid. 4) S. T. tension by drop weight method. 5) Young's modulus by vibration using AFG.	Covered	
Month October/November				Module/Unit:		

	Lect ures	Practicals	Total	Examination		
Month December				Module/Unit:	Covered	
	Lect ures	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.		
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.	Covered	
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.	Covered	
Month January				Module/Unit:		

Course	Lect ures	Practicals	Total	Theory of Radiation	Covered	
B.Sc. II	12	-	12	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	**Digital Electronics** Introduction to logic gates, De-Morgan's theorem, NAND and NOR gates as universal gates, R-S and J-K flip flops, half and full adder, parallel binary adder.	Covered	

Course	Lect ures	Practicals	Total		
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..	Covered
Month February				Module/Unit:	Covered
Course	Lect ures	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.	
B.Sc. II	12	-	12		
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	Covered

				divider. Bistable Operation: Circuit diagram and circuit action.		
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.	Covered	

Month March

Course	Lect ures	Practicals	Total	Module/Unit: **Quantum statistics**	Covered	
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.		

B.Sc. III	12	-	12	**Bipolar Junction transistors:** n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Current gains α and β. Relations between α and β. Load Line analysis of Transistors. DC Load line and Q point. Active, Cut-off, and Saturation Regions. Voltage Divider Bias Circuit for CE Amplifier. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance, Current, Voltage and Power Gains.	Covered	
B.Sc. III	-	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.	Covered	
Month April			·	Module/Unit:		
Lectures		Practicals	Total	Examination		

![signature] **Teacher Incharge**

Head of the
Department of Physics
Vivekanand College, Kolhapur

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

Academic Year: 2021-22
Subject: Physics
Name of the teacher: **Dr. G. J. Navathe**

Month June				Module/Unit:	Syllabus covered/Not covered	Remark
Course	Lect ures	Practicals	Total	**Operator in Quantum Mechanics**	Covered	
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.		

Course	Lectures	Practicals	Total	Module/Unit		
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.	Covered	
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.	Covered	
Month July				Module/Unit:	Covered	
Course	Lectures	Practicals	Total	**Applications of Schrodinger's Steady State Equation**		
B.Sc. III	12	-	12	Quantum mechanics treatment of particle in rigid box (1D and 3D). Step potential relation and transmission coefficient. Barrier potential- Tunnelling effect, α-decay, simple harmonic oscillator.		

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

B.Sc. III	12	-	12	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. 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.	Covered
B.Sc. II	-	64	64	**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	Covered

				method.		

Month September				Module/Unit:	Covered	
B.Sc. III	Lect ures	Practicals	Total	**Introduction to Quantum Mechanics** Origin of quantum mechanics, Review of black body radiation, Photoelectric effect, matter waves, De-Broiglie hypothesis ,		
	12	-	12	experimental evidence of de Broglie theory (Davisson and Germer experiment), wave particle duality, Heisenberg's uncertainty principle and different forms uncertainty principle		

B.Sc. I	16	-		16	**Oscillations**	Covered	
					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 :**	Covered	
					1) Measurement of rise, fall and delay time using a CRO		
					2) Measurement of distortion of a RF signal generator using distortion factor meter.		
					3) . Measurement of R, L and C using a LCR bridge/ universal bridge.		
					4) Measurement of time period, frequency, average period using using universal counter/frequency counter		

Month October/November

	Lectures	Practicals	Total	Module/Unit:		
				Examination		

Month December

	Lectures	Practicals	Total	Module/Unit:	Covered	
				Elementary band theory		

Course	Lectures	Practicals	Total		
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.	
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	Covered
B.Sc. II	-	64	64	**Practicals :** 1) Ic 555 timer. 2) Electronic switch using transistor. 3) Characteristics of FET. 4) FET as VVR.	Covered
Month January				Module/Unit:	
Course	Lectures	Practicals	Total	**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.		
B.Sc. I	16	-	16	**Electricity** Introduction – DC and varying currents, LR Circuit, RC circuit and LC circuit, Growth and decay of currents, Theory of B.G. and constants of B.G., time constants τ	Covered	

Course	Lect ures	Practicals	Total	Module/Unit	Covered	
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.	Covered	
Month February				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**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.		

Course	Lectures	Practicals	Total	Module/Unit		
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	Covered	
B.Sc. II	-	64	64	**Practicals :** 1) To determine the value of Stefan's Constant. 2) To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 3) To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. 4) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method	Covered	
Month March				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**X-Ray Diffraction**		

B.Sc. III	12	-		12	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. 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.	Covered	
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 of a multimeter for measuring high frequency voltage and currents. 3) To measure Q of a coil and its dependence on frequency using a Q-meter. 4) Measurement of voltage, frequency, time period and phase angle using CRO	Covered	

Month April					
				Module/Unit:	Sub-units planned
Lectures		Practicals	Total	Examination	Examination

Teacher/Incharge

HOD
Department of Physics
Vivekanand College, Kolhapur

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-**Shikshanmaharshi Dr. Bapuji Salunkhe**

Shri Swami Vivekanand Shikshan Sanstha's

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

Academic Year: 2021-22

Subject: Physics

Name of the teacher: **Dr. S. I. Inamdar**

Month June				Module/Unit:	Syllabus Covered/Not covered	Remarks
Course	Lectures	Practicals	Total	**Kinetic Theory of Gases and thermometry**	Covered	
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)		
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,	Covered	
B.Sc. III	-	80	80	**Practicals :** 1) Cardinal points by turn table method. 2) Cardinal points by Newton's method.	Covered	

				3) Diffraction at single slit.		
				4) Diffraction at cylindrical obstacle.		
				5) Diffraction at straight edge		
Month July				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**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),		
B.Sc. III	12	-	12	**Magnetic Properties of Materials** Magnetic materials, permeability, susceptibility, magnetization, magnetic moment, electron spin, Diamagnetic materials, Paramagnetic materials, ferromagnetic, ferromagnetic, classical theory of diamagnetism and paramagnetism, Curie law, Curie constant, Weiss theory of ferromagnetism, and ferromagnetic domain, Hysteresis loop for ferromagnetic materials.	Covered	

Course		Practicals	Total		Covered	
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.	Covered	

Month August				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**Laws of Thermodynamics** Work done during isothermal		
B.Sc. II	12	-	12	and adiabatic processes, reversible & irreversible processes, Second law of thermodynamics, Carnot's ideal heat engine, Carnot's cycle (Working, efficiency), Carnot's theorem, Entropy (concept & significance),change in entropy, Entropy changes in reversible & irreversible processes, Third law of thermodynamics, Entropy change in conduction of heat, diffusion of gases ,physical significance of entropy, Un-attainability of absolute zero. Zero point energy.		

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	Covered
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	Covered
Month September				Module/Unit:	Covered
B.Sc. II	Lect ures	Practicals	Total	**Thermodynamic Potentials** Enthalpy, Gibbs, Helmholtz, Internal Energy functions, Maxwell's thermodynamical relations, Joule-Thomson effect, Clausius- Clapeyron	

	12	-		12	equation, Expression for (CP − CV), CP/CV, TdS equations.	
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.	Covered
B.Sc. III	-	80		80	1) 'Y' by Koenig's method. 2) 'Y' by cornu's method. 3) Measurement of heat capacity of solid. 4) S. T. tension by drop weight method. 5) Young's modulus by vibration using AFG.	Covered
Month October/November					Module/Unit:	
	Lect ures	Practicals		Total	Examination	
Month December					Module/Unit:	Covered
	Lect ures	Practicals		Total	**Laws of Thermodynamics**	

B.Sc. II	12	-	12	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. III	12	-	12	**Superconductivity** Idea of superconductivity, Critical temperature, Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth, Isotope effect	Covered	
B.Sc. III	-	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.	Covered	
Month January				Module/Unit:		

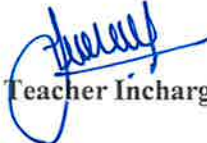| Course	Lect ures	Practicals	Total	Classical statistics	Covered	
B.Sc. II	12	-	12	Degrees of freedom ,momentum space, position space ,Phase space, Microstate and Macrostate, Accessible microstates, priory probability thermodynamic probability, probability distribution, Maxwell-Boltzmann distribution law, energy or speed, evaluation of constants α and β, Entropy and Thermodynamic probability, Distribution of molecular speeds.		
B.Sc. III	12	-	12	**Special functions of ICs** IC 555, Block diagram and special functions if ICs, Astable Operation: Circuit diagram, frequency of oscillation and duty cycle, Applications as tone brust oscillator, voltage controlled frequency shifters. Monostable operation: circuit diagram, Applications as touch switch and frequency divider. Bistable Operation: Circuit diagram and circuit action.	Covered	

Course	Lectures	Practicals	Total	Module/Unit		
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..	Covered	
Month February				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**Theory of Radiation** Thermal radiations,		
B.Sc. II	12	-	12	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	**Digital Electronics** Introduction to logic gates, De-Morgan's theorem, NAND and NOR gates as universal gates, R-S and J-K flip flops, half and full adder, parallel binary adder.	Covered	

Course	Lectures	Practicals	Total	Module/Unit		
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.	Covered	
Month March				Module/Unit:	Covered	
Course	Lect ures	Practicals	Total	**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.		
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.	Covered	

				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.	Covered	
Month April				Module/Unit:	Sub-units planned	
Lectures		Practicals	Total	Examination	Examination	

Teacher Incharge

HOD

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

Academic Year: 2021-22

Subject: Physics

Name of the teacher: Mr. A. V. Shinde

Month June				Module/Unit:	Syllabus covered/ Not covered	Remark
	Practicals	Lectures	Total	**Practicals:** 1) Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered	
B.Sc. I	36		36			
Month July				Module/Unit:	Covered	
B.Sc. I	36	-	36	**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:	Covered	
B.Sc. I	36	-	36	**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:	Covered	

B.Sc. I	36	-		36	**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:	
B.Sc. I	36			36	Examination	

Month December

					Module/Unit:	Covered
B.Sc. I	36 B.Sc. I	-		36	**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:	Covered
B.Sc. I	36			36	**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.	
B.Sc. I	36	-		36		

Month February

					Module/Unit:	

B.Sc. I	36	-	36	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered	
Month March				Module/Unit:	Covered	
B.Sc. I	36	-	36	**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		Practical s	Total	Examination	Examination	

Suinder

Teacher Incharge

Head of the
Department of Physics
Vivekanand College, Kolhapur

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

Academic Year: 2021-22
Subject: Physics
Name of the teacher: Mr. V. S. Ashtekar

Month June				Module/Unit:	Syllabus covered/ Not covered	Remark
	Practicals	Lectures	Total	**Practicals:** 1) Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered	
B.Sc. I	36		36			
Month July				Module/Unit:	Covered	
B.Sc. I	36	-	36	**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:	Covered	
B.Sc. I	36	-	36	**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:	Covered	

B.Sc. I	36	-	36	**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:		
B.Sc. I	36		36	Examination		
Month December				Module/Unit:	Covered	
B.Sc. I	36 B.Sc. I	-	36	**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:	Covered	
B.Sc. I	36		36	**Practicals :**		
B.Sc. I	36	-	36	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:		

B.Sc. I	36	-	36	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered	
Month March				Module/Unit:		
B.Sc. I	36	-	36	**Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered	
Month April				Module/Unit:	Sub-units planned	
Lectures		Practical s	Total	Examination	Examination	

Astekar

Teacher Incharge

HOD
Head of the
Department of Physics
Vivekanand College, Kolhapur

Shri Swami Vivekanand Shikshan Sanstha's

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

Academic Year: 2021-22
Subject: Physics
Name of the teacher: Mr. R. P. Mungale

Month June				Module/Unit:	Syllabus covered/Not covered	Remarks
	Practicals	Lectures	Total	**Practicals:** 1) Measurements of length (or diameter) using Vernier calliper, screw gauge, spherometer and travelling microscope. 2) To determine the Moment of Inertia of a Flywheel. 3) To determine the Moment of inertia of a disc using auxiliary annular ring. 4) Young's modulus of material of Bar by vibration	Covered	
B.Sc. I	36		36			
Month July				Module/Unit:	Covered	
B.Sc. I	36	-	36	**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:		

B.Sc. I	36	-	36	**Practicals:** 1)Modulus of rigidity of material of wire by torsional oscillations. 2) Y/η of Wire by Searle's method. 3)To determine g by Bar Pendulum. 4) To determine g by Kater's Pendulum.	Covered	
Month September				Module/Unit:	Covered	
B.Sc. I	36	-	36	**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:		
B.Sc. I	36		36	Examination		
Month December				Module/Unit:	Covered	
B.Sc. I	36 B.Sc. I	-	36	**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:	Covered	
B.Sc. I	36		36			

B.Sc. I	36	-		36	**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

B.Sc. I	36	-		36	Module/Unit: **Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered

Month March

B.Sc. I	36	-		36	Module/Unit: **Practicals :** 1) To verify the Thevenin theorem. 2) To verify the Norton theorem. 3) Determination of low resistance using Carey foster's Bridge. 4)) Verification of Kirchoff's voltage and current law	Covered

Month April

Lectures		Practicals	Total	Module/Unit: Examination		

Mungalepp

Teacher Incharge

Head of the
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