

Dr. V.D.Kulkarni,
Dept of Physics
HutatmaRajguruMahavidyalaya,
Rajgurunagar (Pune)

Syllabus Completion Report (Sem-I)

(2021-22)

T.Y.B.Sc. PH 335: Computational Physics

Sr. No.	Completed Topics	Month
01	1. Concepts of programming: Definition and Properties of algorithms, Algorithm development,	28/10/2021 To 01/11/2021
02	Algorithm development, Flow charts- symbols and simple flowcharts	
03	Flow charts and Algorithms for Kinematic equations, Free fall, Equation of state, Factorial of a number.	
04	Types of programming language: Lower, middle and higher level languages.	
05	1. C Programming Structure of C program, Character set, key words,	15/11/2021 To 15/12/2021
06	Constants and variables, Variable names,	
07	Data types and their declarations, Symbolic Constants.	
08	Input/output functions: scanf (), printf (), getchar (), putchar (), getch (), gets (), puts ().	
09	Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators,	
10	Assignment Operators, Conditional Operator. Formatted input/output	
11	Control statements: If, if else, while, do while for loop, nested control structures	

12	(nested if, nested loops), break, continue, switch- case statement, goto statement.	
13	Use of Library functions: e.g. mathematical, trigonometric, graphics.	
14	3. Arrays and Pointers in C Arrays: 1-D, 2-D and String	20/12/2021 To 21/12/2021
15	Examples: Arranging numbers in descending and ascending order,	
16	Sum of matrices, multiplication of matrices.	
17	Concept of Pointers	
18	4. User Defined Function in C User defined functions: Definitions and declaration of function, function prototype.	22/12/2021 To 29/12/2021
19	Passing arguments (Call by value, Call by reference).	
20	Storage Classes: Auto, External, Static, Register variables.	
21	5. Graphics in C: Some simple graphic commands	04/01/2022 To 06/01/2022
	- Line, Circle, Arc, Ellipse, Bar.,Problems	
22	6. Computational Physics: Errors in Computation: Inherent errors in storing numbers due to finite bit representation to use inComputer, Truncation error, round off errors	07/01/2022 to 12/02/2022
23	Iterative methods: Discussion of algorithm and flowcharts and writing Cprograms for finding	
24	single root of equation using bi-section method, NewtonRaphsonmethod.	
25	Discussion of algorithm and flowcharts and writing C program for trapezoidalrule and Simpson's 1/3rd rule	

Dr. V.D.Kulkarni

T.Y.B.Sc. PH 353 Classical Mechanics (Sem-I)

Sr. No.	Completed Topics	Dates
1	4. Langrangian and Hamiltonian formulation 1 Limitations of Newtonian formulation	12/02/2022 To 02/02/2022
2	Types of constraints, degrees of freedom, generalized coordinates, configuration space	
3	D' Alembert's principle of virtual work	
4	Langrangian equation from D' Alembert's principle, cyclic coordinates, problems	
5	Phase space, Hamiltonian's equations State of Systems, Ensembles	

Prof. V.D.Kulkarni

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Syllabus Completion Report (2021-22)

T.Y.B.Sc. (Sem-VI)

Thermodynamics and Statistical Physics (PH-363)

Sr. No.	Completed Topics	Dates
01	Ch-1 - Kinetic Theory of gases Mean Free Path Theory of gases	30/03/2022
02	Transport Phenomena, Viscosity	31/03/2022
03	Thermal conductivity and diffusion	01/04/2022
04	Thermodynamic functions	04/04/2022
05	Enthalpy, Entropy, Internal Energy, Helmholtz Functions	05/04/2022 06/04/2022
06	Maxwell's relations	07/04/2022
07	First and Second TdS equations Specific and Latent heat equations	08/04/2022
08	Joule – Thomson's effect, Problems	09/04/2022
09	Ch-2- Elementary Concepts of Statistics Probability ,Distributions functions,Problems	11/04/2022
10	Random Walk Problem and Binomial distribution	12/04/2022
11	Simple Random Problem, Calculation of mean Values	13/04/2022
12	Probability distribution for large N	16/04/2022
13	Gaussian Probability distribution and Problems	18/04/2022
14	Ch-3- Statistical distribution of system of particles and Ensembles State of Systems, Statistical Ensembles	19/04/2022
	Completed Topics	Dates
Sr. No.		
15	Basic Postulates, Probability Calculations	21/04/2022
16	Behavior of density of states	22/04/2022

17	Thermal. Mechanical Interactions, Problems	25/04/2022
18	Micro canonical Ensembles, Canonical Ensembles	26/04/2022
19	Applications of Canonical Ensembles	27/04/2022
20	Molecules in ideal gas, Mean Values in Canonical Ensembles, Problems	28/04/2022 29/04/2022
21	Ch-4-Introduction to Quantum States Quantum distribution function	02/05/2022
22	Maxwell – Boltzman Statistics, Bose – Einstein Statistics	04/05/2022 05/05/2022
23	Fermi – Dirac Statistics	09/05/2022
24	Comparisons of B-E,M-B,F-D Statistics , Applications of Quantum Statistics	10/05/2022 12/05/2022
25	Problems	13/05/2022 14/05/2022
26	Internal Test	18/05/2022

PHY-3610 SEC (Z): Calibration Techniques

1	Activity: 1. RTD calibration check 2. Calibration of digital balance 3. Calibration of PH/Conductivity meter 4. Calibration of Volt meter 5. Calibration of Current meter 6. Calibration of Oscilloscopes	19May 2022 – 24 May 2022
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1) T.Y.B.Sc.- Practicals of one batch of Semester -1 and 2 completed in Academic Year 2021-2022.

- 2) Projects of T.Y.B.Sc Students:- Projects of one batch of Semester -1 and 2 completed in Academic Year 2021-2022.
- 3) F.Y.B.Sc:- Practicals of Semester -1 and 2 completed in Academic Year 2021-2022.

Dr. V.D.Kulkarni

Syllabus completion Report

T.Y.B.Sc. Physics (Sem V)

Year: 2021-2022

PHY-351: Mathematical Methods in Physics-II

Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	Nov / Dec 2021	<p>1: Curvilinear Co-ordinates</p> <p>Review of Cartesian, spherical and cylindrical co-ordinate, transformation equation, General Curvilinear co-ordinate system: Co-ordinate surface, co-ordinate lines, length, surfaces and volume elements in curvilinear co-ordinate system.</p> <p>Orthogonal curvilinear co-ordinate system, expressions for gradient, divergence,</p> <p>Laplacian, and curl, special case for gradient, divergence and curl in Cartesian, spherical polar and cylindrical co-ordinate system,</p> <p>Problems.</p>	
2	Dec 2021	<p>2: The Special Theory of Relativity</p> <p>Introduction,</p> <p>Newtonian relativity, Galilean transformation equation,</p>	

		<p>Michelson-Morley experiment,</p> <p>Postulates of special theory of relativity,</p> <p>Lorentz transformations,</p> <p>Lorentz transformations,</p> <p>Kinematic effects of Lorentz transformation,</p> <p>Length contraction,</p> <p>Proper time, Problems.</p>	
3	Dec / Jan 2021	<p>3: Partial Differential Equations</p> <p>Introduction to Partial differential equations (PDE),</p> <p>General methods for solving second order PDE,</p> <p>Method of separation of variables in Cartesian,</p> <p>Spherical polar and cylindrical co-ordinate system (two dimensional Laplace's equation,</p> <p>one dimensional Wave equation),</p> <p>Singular points ($x = x_0$),</p> <p>Solution of differential equation-Statement of Fuch's theorem,</p> <p>Frobenius method of series solution.</p>	
4	Jan / Feb 2021	<p>4: Special Functions</p> <p>Introduction, generating function for Legendre Polynomials: $P_n(x)$,</p> <p>Properties of Legendre Polynomials,</p> <p>Generating function for Hermite Polynomials: $H_n(x)$,</p> <p>Properties of Hermite Polynomials,</p> <p>Bessel function of first kind: $J_n(x)$,</p>	

		Bessel function of first kind: $J_n(x)$, Properties of Bessel function of first kind, Problems.	
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The syllabus of the course has been completed as per the month wise schedule.

Syllabus completion Report

T.Y.B.Sc. Physics (Sem V)

Year: 2021-2022

PHY-3510 SEC (K): Smart Sensors and Transducer Technology, Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	Oct 2021	<p>1) Mechanical and Electromechanical sensor:</p> <p>Definition, principle of sensing & transduction, classification.</p> <p>Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity.</p> <p>Strain gauge: Theory, type, materials, design consideration, sensitivity, gauge factor, variation with temperature, adhesive, rosettes.</p> <p>LVDT: Construction, material, output input relationship, I/O curve, discussion.</p>	
2	Nov 2021	<p>2) Capacitive sensors:</p> <p>Variable distance-parallel plate type, variable area- parallel plate, serrated plate/teeth type and cylindrical type,</p> <p>Variable dielectric constant type, calculation of sensitivity.</p>	

		Stretched diaphragm type: microphone, response characteristics.	
3	Nov / Dec 2021	<p>3) Thermal sensors:</p> <p>Material expansion type: solid, liquid, gas & vapor</p> <p>Resistance change type: RTD materials, tip sensitive & stem sensitive type.</p> <p>Thermo emf sensor: types, thermoelectric power, general consideration,</p> <p>Junction semiconductor type IC and PTAT type.</p>	
4	Dec 2021	<p>4) Magnetic sensors:</p> <p>Sensor based on Villari effect for assessment of force, torque, proximity,</p> <p>Wiedemann effect for yoke coil sensors,</p> <p>Thomson effect, Hall effect, and Hall drive,</p> <p>performance characteristics.</p> <p>Radiation sensors: LDR.</p>	
5	Dec 2021/ Jan 2022 Jan / Feb 2022	<p>Activity:</p> <p>Based on chapter I</p> <p>1) Linear displacement measurement using LVDT.</p> <p>Based on chapter II</p> <p>2) Displacement/pressure measurement using microphone.</p> <p>Based on chapter III</p> <p>3) Measurement of temperature using Thermocouple transducer.</p> <p>4) Silicon diode as temperature sensor</p> <p>Based on chapter IV</p>	

		5) Magnetic sensor/Hall effect/proximity sensor based measurement magnetic susceptibility magnetisation	
		6) LDR based measurement light intensity etc.	

The syllabus of the course has been completed as per the month wise schedule.

Syllabus completion Report

S.Y.B.Sc. Physics (Sem III)
PHY-232(A): Electronics-I

Year: 2021-2022
Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	Oct / Nov 2021	1. Network Theorem: 1.1 Krichhoff's Law 1.2 Voltage and current Divider Circuit 1.3 Thevenin's Theorem 1.4 Norton's Theorem 1.5 Superposition Theorem 1.6 Maximum Power transfer theorem (With proof) 1.7 Problems	
2	Nov / Dec 2021	2. Study of Transistor 2.1 Bijunction Transistor 1. Bipolar Junction Transistor, Types, Symbol and basic action. 2. Configuration (Common Base, Common Emitter and Common Collector) 3. Current Gain Factors (α and β) and their relations	

		<p>4. Input, Output and transfer Characteristic of CE Configuration</p> <p>5. Biasing method and Voltage Divider</p> <p>6. DC Load line (CE), Operating Point (Q-point)</p> <p>7. Transistor as a switch, 8. Problems</p> <p>2.2 Uniunction Transistor:</p> <p>1. Symbol, Types, Construction, Working Principle, I-V characteristics, Specifications and parameters of Unijunction Transistor (UJT)</p> <p>2. UJT as a relaxation Oscillator.</p>	
3	Jan 2022	<p>3.Operational Amplifiers and Application</p> <p>3.1 Operational Amplifiers:</p> <p>1. Introduction</p> <p>2. Ideal and practical Characteristics</p> <p>3. Operational Amplifier: IC741-Block Diagram and Pin diagram</p> <p>4. Concept of Virtual Ground</p> <p>5. Inverting and Non-inverting operational amp with concept of gain</p> <p>6. Operational amplifier as an adder and subtractor</p> <p>7. Problems</p> <p>3.2 Oscillators:</p> <p>1. Concept of Positive and negative feed back</p> <p>2. Barkhausein Criteria for an oscillator</p> <p>3. Construction, working and application of phase shift oscillator using IC741</p> <p>4. Problems</p>	
4	Jan / Feb 2022	<p>4. Number System and Logic Gates</p> <p>1. Number System: Binary, Binary coded Decimal (BCD), Octal, Hexadecimal</p>	

		<p>2. Addition and Subtraction of binary numbers and binary fractions using one's and two's complement</p> <p>3. Basic Logic gates (OR, AND, NOT)</p> <p>4. Derived gates: NOR, NAND, EXOR, EXNOR, with symbols and truth table</p> <p>5. Boolean Algebra</p> <p>6. De Morgan's theorem and its verification, 7. Problems</p>	
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The syllabus of the course has been completed as per the month wise schedule.

Syllabus completion Report

T.Y.B.Sc. Physics (Sem VI)
PHY-361: Solid State Physics

Year: 2021-2022
Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	Mar / Apr 2022	1: The Crystalline Structures (10 L) Lattice, Basis, Translational Vectors, Primitive Unit Cell, Symmetry Operations, Different types of lattices: 2D and 3D (Bravais lattices) Miller indices, Inter Planer Distances, SC, BCC and FCC structures, Packing Fraction, Crystal structures NaCl, diamond, CsCl, ZnS, HCP, Concept of Reciprocal Lattice and its properties, Problems	
2	April 2022	2: X ray Diffraction and Experimental Methods (9 L) Bragg's Diffraction, Bragg's Law, Experimental X-ray diffraction Methods: The Laue Method, Bragg's Spectrometer, The Powder Crystal Method, Analysis of cubic structure by Powder Method, Ewald's Construction, Bragg's Diffraction condition in direct and reciprocal lattice, Problems	
3	May 2022	3: Free Electron and Band Theory of Metals (9L) Assumptions of Classical and Sommerfeld Free Electron model, Energy levels and Density of States (One and Three Dimensions), Nearly free electron model, Fermi energy, Fermi level, Hall Effect, Mobility, Hall Angle	

		Band Theory of Solids: Origin of energy gap, Energy bands in Solids, Distinction between metal, semiconductor and insulator, Problems	
4	May 2022	4: Magnetism (8L) Diamagnetism, Langevin theory of Diamagnetism, Paramagnetism, Langevin theory of Paramagnetism, Ferromagnetism, Antiferromagnetism, Ferromagnetic Domains, Hysteresis, Curie temperature, Neel temperature, Superconductivity, Problems	

The syllabus of the course has been completed as per the month wise schedule.

Syllabus completion Report

T.Y.B.Sc. Physics (Sem VI)
PHY-362: Quantum Mechanics

Year: 2021-2022
Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	April 2022	Origin of Quantum Mechanics: (08 L) 1. Historical Background: Review of Black body radiation, photoelectric effect 2. Matter waves - De Broglie hypothesis. - Davisson and Germer experiment. 3. Wave particle duality 4. Concept of wave function, wave packet, phase velocity, group velocity and relation between them 5. Heisenberg's uncertainty principle with Electron diffraction experiment, different forms of uncertainty. Problems	
2	April 2022	The Schrodinger equation: (10 L) 1. Physical interpretation of Wave function 2. Schrodinger time dependent equation. 3. Schrodinger time independent equation (Steady state equation). 4. Requirements of wave function. 5. Probability current density, equation of continuity and its physical significance. 6. An operator in Quantum mechanics. - Eigen function and Eigen	

		values. 7. Expectation value – Ehrenfest's theorem(omly statements), Problems	
3	May 2022	Applications of Schrodinger Steady state equation: (14 L) 1. Free particle. 2. Step Potential 3. Potential barrier(Qualitative discussion), Barrier potential and tunneling effect. 4. Particle in infinitely deep potential well (one - dimension). 5. Schroedinger equation in spherical polar coordinate system 6. Rigid rotator (Free axis) 7. Problems	
5	May 2022	Operators in Quantum Mechanics: (04 L) 1. Hermitian operator. 2. Position, Momentum operator, angular momentum operator, and total energy operator (Hamiltonian). 3. Commutator brackets- Simultaneous Eigen functions. 4. Commutator algebra. 5. Commutator brackets using position, momentum and angular momentum operator. 6. Concept of parity according to quantum mechanics, parity operator and its Eigen values. 7. Applications of operators in quantum mechanics 8. Problems	

The syllabus of the course has been completed as per the month wise schedule.

Syllabus completion Report

S.Y.B.Sc. Physics (Sem IV)
PHY-242: Optics

Year: 2021-2022
Teacher: A.B.Kanawade

Chapte r No.	Month	Contents	Remarks
1	April 2022	1. Geometrical optics and Lens aberrations: (12L) (a) Geometrical optics: 1.1 Introduction to lenses and sign conventions. 1.2 Thin lenses: Lens equation for single convex lens 1.3 Lens maker equation 1.4 Concept of magnification, deviation and power of a thin lens 1.5 Equivalent focal length of two thin lens system 1.6 Concept of cardinal points 1.7 Problems (b) Lens Aberrations: 1.8 Introduction to Aberration 1.9 Types of aberration: Monochromatic and Chromatic	

		Aberration (Only discussion)	
2	April /May 2022	2. Optical Instruments: (6L) 2.1 Introduction to optical instruments 2.2 Types of optical instruments: Simple Microscope, Compound Microscope and Astronomical telescope (only construction and working) 2.3 Eyepiece: Ramsden's eye piece (Expression), Huygens eye piece and Gauss's eyepiece (only qualitative discussion) 2.4 Problems.	
3	May 2022	3. Interference and Diffraction: (12L) (a) Interference: 3.1 Introduction to interference 3.2 Types of Interference (only discussion) 3.3 Phase change on reflection (Stokes treatment). 3.4 Interference due to reflected light 3.5 Interference due to transmitted light. 3.6 Newton's ring (to calculate wavelength) 3.7 Problems (b) Diffraction: 3.8 Introduction to diffraction 3.9 Types of diffraction (only discussion) 3.10 Fraunhofer's diffraction due to single slit and double slit (only qualitative discussion) 3.11 Plane transmission grating and grating equation (only principal maxima) 3.12 Rayleigh criterion for resolution (only qualitative discussion) , 3.13 Problems	
4	May / June 2022	4. Polarization: (6L) 4.1 Introduction to polarization 4.2 Brewster's law 4.3 Malus's Law 4.4 Polarization by double refraction 4.5 Nicol Prism 4.6 Application of polarization 4.7 Problems	

The syllabus of the course has been completed as per the month wise schedule.

Prof.V.B.Deshmukh

1. FYBSc. Physics II (Physics principles and applications)-41 Lectures

Month	Period	Chapter	Topic
September 2021	6	Physics of Atoms	The concept of atom (Atomic Models: Thompson and Rutherford) Atomic Spectra Bohr Theory Hydrogen atom Spectra Frank Hertz experiment
October 2021	6	LASERS	Absorption, Spontaneous Emission, and Stimulated Emission, Population Inversion and Laser Action, Applications of Lasers Problem solved , Assignment
November 2021	12	Physics of Molecules	Bonding Mechanisms: A Survey Ionic Bonds Covalent Bonds Van der Waals Bonds The Hydrogen Bond Metallic Bond, Variation of potential energy with inter-atomic distance, Concept of Rotational and vibration energy levels of diatomic

			<p>molecule</p> <p>Problem solved.</p> <p>Assignment</p>
December 2021	8	<p>Sources of Electromagnetic Waves</p>	<p>Historical Perspective of Electromagnetic Waves</p> <p>Production of electromagnetic waves : Hertz experiment</p> <p>Electromagnetic spectrum</p> <p>Planck hypothesis of photons (Concept only)</p> <p>Sources of electromagnetic waves: Radio waves, Microwaves,</p> <p>Infrared, Visible light, Ultraviolet, X-rays, Gamma rays</p> <p>Problem solved</p> <p>Assignment</p>
January 2022	10	<p>Applications of Electromagnetic Waves</p>	<p>Microwave oven</p> <p>RADAR</p> <p>Pyro- electric thermometer</p> <p>X-ray radiography and CT Scan, applications in medical field</p> <p>Solar cell</p> <p>Revision</p>

TYBSc Physics IV (Atomic and Molecular Physics)-36 Lectures

Month	Period	Chapter	Topic
September 2021	6	Atomic structure	Revision of various atomic models, Vector atom model, Pauli's Exclusion Principles and electron configurations, Quantum states, and Spectral notations of quantum states
October 2021	12	One and Two valence electron systems	Spin-Orbit Interaction (Single valence electron atom), Energy levels of Na atom, selection rules, spectra of sodium atom, sodium Doublet. Spectral terms of two electron atoms, terms for equivalent electrons, L-S and JJ coupling schemes. Singlet-Triplet separation for interaction energy of L-S coupling. Lande Interval rule, spectra of Helium atom
November 2021	4	Zeeman Effect	Experimental arrangement Normal and anomalous Zeeman Effect, Stark effect(Qualitative Discussion), Applications of Zeeman Effects
December 2021	8	Molecular spectroscopy	Introduction to Molecular Spectra and its types Rotational energy levels, Rotational spectra of diatomic molecule, Vibration

			<p>energy levels</p> <p>Rotational and Vibration spectra</p> <p>Electronic spectra of molecules, Applications of UV-Vis spectroscopy</p> <p>Problems</p>
January 2022	6	Raman spectroscopy	<p>History of Raman effect</p> <p>Classical theory of Raman Effect. Molecular polarizability</p> <p>Quantum theory of Raman Effect</p>
February 2022			<p>Experimental set up for Raman Effect</p> <p>Applications of Raman spectroscopy</p>

TYBSc Skill based course II (Physics Workshop skill)-18 Lectures+ 6 Activity

Month	Period	Chapter	Topic
September 2021	4	Basic of Measurement	<p>Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter.</p> <p>Multimeter</p> <p>Block diagram and working of a digital multimeter.</p> <p>Principles of measurement of dc voltage and dc current, ac voltage, ac current and</p>

			<p>resistance.</p> <p>Specifications of a multimeter and their significance</p>
October 2021	4	Electronic Voltmeter	<p>Principles of voltmeter, Construction (block diagram only).</p> <p>Specifications of an electronic Voltmeter and their significance.</p> <p>AC Voltmeter and its types, Block diagram ac Milli Voltmeter,</p> <p>Specifications and their significance</p>
November 2021	5	Cathode Ray Oscilloscope	<p>Block diagram of basic CRO. Principle and working of CRO</p> <p>Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace oscilloscope.</p> <p>Introduction to digital oscilloscope, Block diagram and principle and working</p>
December 2021	2	Signal Generators and Analysis Instruments	<p>Block diagram, explanation and specifications of low frequency signal generators. Pulse generator, and function generator</p>
January 2022	3	Impedance Bridges and Q-Meters	<p>Block diagram of bridge. Working principles of basic (balancing type) RLC bridge.</p>

			<p>Specifications of RLC bridge. Block diagram & working principles of a Q-Meter.</p> <p>Digital LCR bridges</p>
December 2021- February 2022	12	Activity	<p>Use of Digital multimeter, Measurement of R, L and C by Q-meter</p> <p>To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.</p> <p>To observe the limitations of a multimeter for measuring high frequency voltage and currents.</p> <p>Measurement of voltage, frequency, time period and phase angle using CRO. Measurement of rise, fall and delay times using a CRO</p>

1) S. Y. B. Sc. (PHY-241) Oscillations, Waves and Sound

Month	Topic	Period
30/3/2022-12/4/2022	<p>Undamped Free Oscillations</p> <p>Equilibrium conditions, Equations of linear and angular SHM. Differential equation of linear SHM, Composition of two perpendicular linear SHM for frequency ratio 1:1 and 1:2, Lissajous</p>	6

	figures and their demonstrations	
13/4/2022- 01/5/2022	Damped Oscillations Differential equation of damped harmonic oscillator and its solution, different cases, Logarithmic decrement, Energy of damped harmonic oscillator, Quality factor, LCR series circuit	6
02/5/2022- 12/5/2022	Forced Oscillations Equation of forced oscillations and its solution. Resonance, Velocity resonance, Amplitude resonance, Sharpness resonance and half width. Average energy of forced oscillator, Quality factor, LCR series circuit	7
13/5/2022- 16/5/2022	Wave Motion Equation of longitudinal and transverse wave and its solution, energy density and intensity of a wave, Seismic wave and gravitational waves	5
30/5/2022- 31/5 /2022	Sound and Doppler Effect Characteristics of sound, Doppler effect in sound, Expression for apparent frequency in different cases, Symmetric and Asymmetric nature Doppler effect, Applications	5

PHY-243 Physics Laboratory-2B- eight (8) Practicals were completed on April to May 2022

2) T. Y. B. Sc. PHY-364 Nuclear Physics

Month	Topic	Period
25/3/2022- 8/4/2022	Nuclear Structure, Properties and Radioactivity Composition of nucleus, Characteristics of nucleus, Mass defect and Binding energy,	10

	<p>packing fraction. Classification of nuclei, stability of nuclei.</p> <p>Radioactive disintegration, properties of α, β, γ rays, Law of radioactive decay, half life, mean life, activity and specific activity, successive disintegration and equilibrium of radioisotopes, Application of radioactivity.</p>	
9/4/2022-20/4/2022	<p>Particle Accelerator and Radiation Detectors</p> <p>Linear accelerator (LINAC), Cyclic accelerator (Cyclotron), Accelerators in India.</p> <p>Nuclear detectors, G. M. counter and solid state detector.</p>	4
21/4/2022-29/4/2022	<p>Nuclear forces and Nuclear Models</p> <p>Classification of nuclear forces, Meson theory, properties of nuclear forces, deuteron problem, Elementary particles, Quark models, Shell model, Liquid drop model, Semi-empirical B. E. formula.</p>	8
30/4/2022-16/5/2022	<p>Nuclear Reactions and Reactor Theory</p> <p>Nuclear reaction and conservation laws, Q value equation, Exothermic and endothermic reaction, compound nucleus, Nuclear fission and fusion reaction, stellar energy, chain reaction and critical mass. Nuclear reactor and its basic components, homogeneous and heterogeneous reactors, power reactor. Nuclear reactor in India.</p>	8

2) **T.Y.B.Sc. 3611-SEC(AB) Instrumentation for Agricultural**

Month	Topic	Period
25/3/2022- 8/4/2022	Introduction Necessity of agricultural instrument, sensor used in agricultural	2
9/4/2022- 20/4/2022	Soil Properties & Sensing Properties of soil, Permeability and seepage analysis, Mohr's circle of stress, active and passive earth pressures, stability and slopes. Sensors, sonic anemometers, hygrometers, thermocouples, open and close path gas analyzers.	4
21/4/2022- 29/4/2022	Instrumentation in Continuous & Batch process Sugar plant, flow diagram, sensors and instrumentation setup, flow diagram of fermenter and control process, dairy industry flow chart and instrumentation set up for it. Juice extraction control process and instrumentation set up.	3
30/4/2022- 16/5/2022	Instrumentation in Irrigation Auto drip and sprinkler irrigation system, Upstream and downstream control concept, SCADA for DAM parameters and control	4
25/3/2022- 8/4/2022	Greenhouse Parameters & Instrumentation Concept and construction of green house effect, merits and demerits, ventilation, cooling and heating. wind speed, temperature and humidity, soil moisture, rain gauge, CO ₂ control area and wetness, EM radiation, photosynthesis	4

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16 periods were used for completion of activity.

Prof. N.D.Barne

F.Y.B.Sc. Physics I (Mechanics and Properties of Matter)- 37 Lectures

Month	Period	Chapter	Topic
October 2021	09	Motion	Introduction to motion, Types of motion, Displacement, Velocity, Acceleration, Inertia, Newton's laws of motion with their explanations, Various types of forces in nature, Frames of reference (Inertial and Non inertial), Laws of motion and it's real life applications, Problems
November 2021	07	Work and Energy	Kinetic energy, Work Energy Theorem, Work done with constant force, Work done with varying force (spring force), Conservative and Non conservative forces, Potential energy, Law of energy conservation,

			Gravitational potential energy, Problems
December 2021	08	Fluid Mechanics	<p>Concept of viscous force and viscosity,</p> <p>Coefficient of viscosity, Steady and Turbulent flow, Reynolds number,</p> <p>Equation of continuity,</p> <p>Bernoulli's Principle, Applications of Bernoulli's Principle (Ventury Meter, PitotTube),</p> <p>Applications of viscous fluids, Problems.</p>
January 2022	12	Properties of Matter	<p>Surface tension, Angle of contact, Factors affecting surface tension,</p> <p>Jaeger's method for determination of surface tension, Applications of surface tension.</p> <p>Stress and Strain, Hook's law and Coefficient of elasticity,</p> <p>Young's modulus, Bulk modulus, Modulus of rigidity,</p> <p>Work done during longitudinal strain, Volume strain, Shearing strain,</p> <p>Poisson's ratio, Relation between three elastic moduli, (Y, η, K),</p>

			Applications of elasticity, Problems
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2. T.Y.B.Sc.: PHY 352 Classical Electrodynamics- 39 Lectures

Month	Period	Chapter	Topic
October 2021	12	Electrostatics	<p>1.1. Coulomb's law, Gauss law, Electric field, Electrostatic Potential</p> <p>1.2. Potential energy of system of charges.</p> <p>1.3. Statement of Poisson's equation, Boundary Value problems in electrostatics- solution of Laplace equation in Cartesian system,</p> <p>1.4. Method of image charges: Point charge near an infinite grounded conducting plane, Point charge near grounded conducting sphere.</p> <p>1.5. Polarization P, Electric displacement D, Electric susceptibility and dielectric constant, bound volume and surface charge densities.</p> <p>1.6. Electric field at an exterior and interior point of dielectric.</p>
November 2021 to	12	Magnetostatics	2.1. Concepts of magnetic induction, magnetic flux and

<p>December 2021</p>			<p>magnetic field</p> <p>2.2. Magnetic induction due to straight current carrying conductor, Energy density in magnetic field, magnetization of matter. Relationship between B, H and M.</p> <p>2.3. Boundary conditions at the interface of two magnetic media (Normal and Tangential component)</p> <p>2.4 Biot-Savart's law, Ampere's law for force between two current carrying loops, Ampere's circuital law,</p> <p>2.5. Equation of continuity, Magnetic vector potential A, Magnetic susceptibility and permeability,</p>
<p>January 2022 to February 2022</p>	<p>12</p>	<p>Electrodynamics</p>	<p>3.1. Day to day applications of electrostatics</p> <p>3.2. Concept of electromagnetic induction, Faraday's law of induction, Lenz's law, displacement current, generalization of Ampere's law</p> <p>3.3. Maxwell's equations (Differential and Integral form) and their physical significance</p> <p>3.4. Polarization, reflection</p>

			<p>& refraction of electromagnetic waves through media</p> <p>3.5. Wave equation and plane waves in free space.</p> <p>3.6. Poynting theorem & Poynting vector, Polarizations of plane wave.</p>
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3. T.Y.B.Sc. PHY 353 Classical Mechanics – 30 Lectures

Month	Period	Chapter	Topic
October 2021	10	Motion of Particles	<p>a. Charged Particles: Motion of a charged particle in constant electric, magnetic and electromagnetic field,</p> <p>b. System of particles: Concept of Centre of mass, Conservation of linear momentum, angular momentum, energy of system of particles.(statements only)</p> <p>c. Problems</p>
November 2021 to January 2022	10	Central force Field	<p>a. Central force Field: Definition and Properties of central force field. Reduction of two body problem to an equivalent one body problem</p> <p>b. Motion in central force field,</p> <p>c. Kepler's laws of planetary motion and their proof d. Artificial satellite and its orbit</p>

January 2022 to February 2022	10	Scattering of particles	<p>a. Elastic and inelastic scattering: Definition and properties,</p> <p>b. Elastic scattering - Laboratory and center of mass system.</p> <p>c. Scattering: Scattering angles in laboratory and center of mass system.</p> <p>d. Differential cross-section, impact Parameter, total cross-section in brief. e. Problems</p>
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PHY-121 Heat and Thermodynamics

Months	Topic taken	Periods
18 Apr. 2022-26 Apr. 2022	<p>1. Fundamentals of Thermodynamics</p> <p>Concept of thermodynamic state, Equation of state, Van der Waal's equation of state, Thermal equilibrium, Zeroth law of thermodynamics, Thermodynamic processes: Adiabatic, Isothermal, Isobaric and Isochoric changes, Indicator diagram, Work done during isothermal change, Adiabatic relations, Work done during adiabatic change, Internal energy, Internal energy as state function, First law of thermodynamics, Reversible and Irreversible changes, Problems.</p>	10
27 Apr. 2022-09 May 2022	<p>2. Applied Thermodynamics</p> <p>Conversion of heat into work and its converse, Second law of thermodynamics, Concept of entropy, Temperature - entropy diagram, T-dS equations, Clausius - Clapeyron latent heat equations, Problems.</p>	09
	Unit Test	

<p>10 May 2022- 23 May 2022</p>	<p>3. Heat Transfer Mechanisms</p> <p>Carnot's cycle and Carnot's heat engine and its efficiency, Heat Engines: Otto cycle & its efficiency, Diesel cycle & its efficiency, Refrigerators: General principle and coefficient of performance of refrigerator, Simple structure of Vapor compression refrigerator, Air Conditioning: Principle and it's applications, Problems</p>	<p>09</p>
<p>17 May 2022</p>	<p style="text-align: center;">INTERNAL EXAM</p>	
<p>24 May 2022- 26 May 2022</p>	<p>4. Thermometry</p> <p>Concept of heat & temperature, Principle of thermometry, Temperature scales & inter-conversions, Principle, Construction and Working: (Liquid thermometers, Liquid filled thermometers, Gas filled thermometers, Bimetallic thermometers, Platinum resistance thermometer, Thermocouple), Problems</p>	<p>08</p>

PHY-365 (A): Electronics-II

Months	Topic taken	Periods
<p>26 March2022- 11 Apr. 2022</p>	<p>1: Semiconductor Devices:</p> <p>a. LED and Photodiode, Optocoupler. (Working Principles) Problems. Ref. 1.</p> <p>b. BJT: Transistor amplifier classifications - Class A, B, C and AB (working only), Differential amplifier (transistorized), Problems. Ref. 1.</p> <p>c. Field Effect Transistor: JFET (Introduction,</p>	<p>09</p>

	classification, principle, working and IV characteristics) MOSFETs (DE-MOSFET and E only MOSFET). Problems.	
12Apr.2022- 15 Apr. 2022	<p>2: Applications of Semiconductor Devices:</p> <p>a. Three Pin Regulators: Block diagram of 3-pin IC regulator, study of IC-78XX, 79XX. Dual Power Supply using IC-78XX, 79XX. Ref. 1</p> <p>b. Switching Regulators (SMPS): Introduction, Block diagram, Advantages and Disadvantages. Ref. 4</p> <p>c. Modulation and Demodulation : Concept of Carrier Wave, Need of Modulation and Demodulation, Methods of Modulation like AM, FM, PM (Concepts Only),</p> <p>d. Concept of Modulation Index, Upper and Lower Side Band Frequencies in AM. Problems</p>	09
16 Apr. 2022- 21 Apr.2022	<p>3: Integrated Circuits:</p> <p>a. Integrated Circuits: Introduction, Scale of Integration, Advantages and drawbacks of IC Ref.4</p> <p>b. OP-AMP Applications as Integrator, Differentiator, Comparator. Ref. 1</p> <p>c. Timer IC-555: Block diagram, Astable, monostable multivibrator (working and design). Problems</p>	09
19 May 2022	INTERNAL EXAM	

<p>22 Apr.2022-13 May 2022</p>	<p>4: Combinational and Sequential Circuits:</p> <p>a. Combinational Circuits: Introduction to SOP and POS equation. Concept of Standard SOP and POS equation. Concept of K-map and their use in reduction of Boolean expressions, design of half adder, full adder, half subtract, Study of binary to gray and gray to binary code conversion. Problems. Ref. 2</p> <p>b. Sequential Circuits: RS flip flop using NAND/NOR, clocked RS, D, JK and T-flip flops. Application of flip flops in Sequential Circuits as Counters and Registers. Asynchronous and Synchronous Counters. (3-bit Counter), Shift Registers and their types of operation -SISO, SIPO, PISO, PIPO (Concepts only).</p>	<p>09</p>
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PHY-3610 SEC (Z): Calibration Techniques

Months	Topic taken	Periods
<p>26 March 2022-07 Apr. 2022</p>	<p>Unit-1: Principles of Calibration</p> <ol style="list-style-type: none"> 1. Introduction and Importance of Calibration 2. Traceability in Calibration 3. Calibration Uncertainty 4. Various Calibration Methods 5. Factors Affect Calibration 6. Instrument Classification and Instrument Identification 	<p>04</p>
<p>08 Apr. 2022-13</p>	<p>Unit-2: Pressure Calibration</p> <ol style="list-style-type: none"> 1. Introduction to pressure calibration 2. Pressure unit conversion standards 	<p>06</p>

<p>Apr. 2022</p>	<ol style="list-style-type: none"> 3. Types of Pressure Gauges 4. Calibration of Pressure Gauges <ol style="list-style-type: none"> a. Accuracy b. Pressure Media c. Contamination d. Height Difference e. Leak test of Piping f. Adiabatic Effect g. Torque Force h. Calibration Position i. Generating Pressure j. Pressurizing the Gauge k. Reading the Pressure Value l. Number of Calibration Points m. Hysteresis (deviation of calibration points) n. Number of Calibration cycles 5. Instruments required for calibration: <ol style="list-style-type: none"> a. Pressure comparator b. Master Gauge 6. Pressure Calibration with Example 	
<p>14 Apr.2022- 18 Apr. 2022</p>	<p>Unit-3: Calibration of Electronic Instruments</p> <ol style="list-style-type: none"> 1. Identification of Components 2. Equipment required for calibration 3. Procedure of Calibration <ol style="list-style-type: none"> a. Read operational Specifications b. Sequence of events c. Identification of common Faults 4. Electronic Calibration with Examples (Oscilloscopes, Multimeters, Function Generators, Signal Generators) 	<p>04</p>

23 May 2022	INTERNAL EXAM	
19 Apr. 2022-23 Apr. 2022	<p>Unit-4: Temperature Calibration</p> <ol style="list-style-type: none"> 1. Temperature units and Conversions 2. Temperature Sensors 3. Calibration of temperature sensors <ol style="list-style-type: none"> a. Handling temperature sensor b. Preparations c. Temperature sources d. Reference Temperature Sensor e. Immersion Depth f. Stabilization g. Temperature sensor handle h. Calibrated temperature range i. Calibration Points j. Adjusting/trimming a temperature sensor 4. Examples: 	04

Mrs. Warpe A.R.

Academic Year-2021-22
Syllabus Completion Report of Semester-I

Name:-Prof. Warpe A.R.

Subjects:-

- 1] T.Y.B.Sc. :-Renewable Energy Sources
- 2] S.Y.B.Sc. :-Mathematical Methods In Physics
- 3] F.Y.B.Sc.:-Practical (Batches-B2,B3,A1,A2)

class:- S.Y.B.Sc

Sub –Mathematical Methods In Physics

Month	Topic	No. of lectures conducted
Dec 2021	<p><u>Unit 1 : Complex Numbers:</u></p> <p>1.1 Introduction to complex numbers</p> <p>1.2 Rectangular, polar and exponential forms of complex numbers</p> <p>1.3 Argand diagram</p> <p>1.4 Algebra of complex numbers using Argand diagram</p> <p>1.5 De-Moivre’s Theorem (Statement only)</p> <p>1.6 Power, root and log of complex numbers</p> <p>1.7 Trigonometric, hyperbolic and exponential functions</p> <p>1.8 Applications of complex numbers to determine velocity and acceleration in curved motion.</p> <p>1.9 Problems.</p> <p><u>Unit 2: Partial Differentiation</u></p> <p>2.1 Definition of partial differentiation</p> <p>2.2 Successive differentiation</p> <p>2.3 Total differentiation</p>	15
Jan 2022	<p>2.4 Exact differential</p> <p>2.5 Chain rule</p> <p>2.6 Theorems of differentiation</p> <p>2.7 Change of variables from Cartesian to polar co-ordinates</p> <p>2.8 Conditions for maxima and minima (without proof)</p> <p>2.9 Problems.</p>	15

	<p><u>Unit 3. Vector Algebra and Analysis:</u></p> <p>3.1 Introduction to scalars and vectors, dot product and cross product of two vectors and their physical significance. (Revision)</p> <p>3.2 Scalar triple product and its geometrical interpretation</p> <p>3.3 Vector triple product and its proof</p> <p>3.4 Scalar and vector fields</p> <p>3.5 Differentiation of vectors with respect to scalar</p> <p>3.6 Vector differential operator and Laplacian operator</p>	
Feb 2022	<p>3.7 Gradient of scalar field and its physical significance</p> <p>3.8 Divergence of scalar field and its physical significance</p> <p>3.9 Curl of vector field and its physical significance.</p> <p>3.10 Vector Identities.</p> <p>a. $\nabla \times (\nabla\Phi) = 0$</p> <p>b. $\nabla \cdot (\nabla \times V) = 0$</p> <p>c. $\nabla \cdot (\nabla\Phi) = \nabla^2\Phi$</p> <p>d. $\nabla \cdot (\Phi A) = \nabla\Phi \cdot A + \Phi(\nabla \cdot A)$</p> <p>e. $\nabla \times (\Phi A) = \Phi (\nabla \times A) + (\nabla\Phi) \times A$</p> <p>f. $\nabla \cdot (A \times B) = B \cdot (\nabla \times A) - A \cdot (\nabla \times B)$</p> <p>3.11 Problems.</p> <p><u>Unit 4. Differential Equation:</u></p> <p>4.1 Degree, order, linearity and homogeneity of differential equation.</p> <p>4.2 Concept of Singular points. Example of singular points ($x = 0$, $x = x_0$ and $x = \infty$) of differential equation.</p> <p>4.3 Problems.</p>	6

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Class:-T.Y.B.Sc.

Subject- Renewable Energy Sources

Month	Topic	No. of lectures conducted
Dec 2021	<p><u>Unit 1: An Introduction to Energy Sources:</u></p> <ol style="list-style-type: none"> 1. Energy: Definition, Classifications of energy sources 2. Conventional and non-conventional energy sources. 3. Sun: The source of energy (Structure, Characteristics and Composition) 4. Solar Constant 5. Electromagnetic Energy Spectrum. 6. Solar radiations outside earth atmosphere. 7. Solar radiation at the earth surface. 8. Problems. <p><u>Unit 2: Photothermal Applications:</u></p> <ol style="list-style-type: none"> 1. Photothermal devices: Solar Insolation, Selective Coating, Glass Cover, Heat Conductor and Heat Insulation. 2. Solar water heating systems: Types, construction and working of Liquid Flat Plate Collector (FPC) and Evacuated Tube Collector (ETC) 3. Energy Balance Equation (without thermal Analysis). 4. Concentrating collectors: Flat plate collector with plane reflector, Cylindrical parabolic, Compound parabolic, Collector with fixed circular concentrators and moving receiver, paraboloid concentrator. 	15

Jan2022	<p>5. Comparative study between flat plate collector and solar concentrators.</p> <p>6. Solar distillation, Solar dryer, Solar cooker (box type)</p> <p><u>Unit 3: Photovoltaic systems:</u></p> <p>1. Introduction to Photovoltaic effect and Photovoltaic Conversion.</p> <p>2. Basic photovoltaic system for power generation</p> <p>3. Basics of Solar Cell, PV modules, Arrays,</p> <p>4. Solar Cell: I-V characteristics, Power output and conversion efficiency.</p> <p>5. Factors affecting on photovoltaic efficiency. (Change in amount of input light, solar cell area, Change in angle, Change in operating Temperature etc.)</p> <p>6. Types of solar cells: p-n junction solar cell, p-i-n diode solar cell, cadmium sulphide solar cell, Gallium arsenide solar cell, Indium phosphide solar cell, nano-crystalline solar cell.</p> <p>7. Application of solar photovoltaic systems.</p>	14
Feb 2022	<p><u>Unit 4: Energy Storage:</u></p> <p>1. Importance and Needs of Energy storage in Conventional and Nonconventional Energy Systems.</p> <p>2. Various forms of Energy Storage</p> <p>3. Electrical Energy: Super capacitors</p>	7

Mrs. Warpe A.R.

Academic Year-2021-22

Semester II

Syllabus Completion Report

Name:-Prof. Warpe A.R.

Subjects:-

- 1] T.Y.B.Sc. :-Lasers
- 2] F.Y.B.Sc.:-Electricity and Magnetism.
- 3] F.Y.B.Sc.:-Practical (Batches-B2,B3,A1,A2)

class:- T.Y.B.Sc.

Sub –LASERS

Month	Topic	No. of lectures conducted
April 2022	<u>Chapter 1: Introduction to Lasers:</u> Brief history of Lasers, Interaction of radiation with matter, Energy levels, Population density, Boltzmann distribution, Stimulated Absorption, Spontaneous Emission and Stimulated Emission, Einstein's Coefficients, Einstein's relations. Characteristics of Laser: Directionality, Mono-chromaticity, Coherence,	6
May 2022	<u>Chapter 2: Laser Action:</u> Population inversion, Condition for light amplification, Gain coefficient, Active medium, metastable states. Pumping schemes: three level and four level	20

	<p><u>Chapter 3: Laser Oscillator:</u></p> <p>Optical feedback, round trip gain, critical population inversion, Optical resonator, condition for steady state oscillations, cavity resonance frequencies.</p> <p><u>Chapter 4: Laser Output:</u></p> <p>Line-shape broadening: Lifetime broadening, Collision broadening</p>	
June 2022	<p><u>Chapter 5: Types of Lasers:</u></p> <p>Solid State Lasers – Ruby Laser, Diode Laser, Gas Lasers – HeNe Laser, CO2 Laser</p> <p><u>Chapter 6: Applications of Lasers:</u></p> <p>Industrial: welding, cutting, drilling Nuclear Science: laser isotope separation, laser fusion, Medical: eye surgery</p>	10

Class:-F.Y.B.Sc.

Subject- Electricity and Magnetism

Month	Topic	No. of lectures conducted
April 2022	<p><u>Chapter 1. Electrostatics</u></p> <p>1.1 Revision of Coulomb's law: 1.1.1 Statement 1.1.2 Variation of</p>	4

	<p>forces with distances</p> <p>1.2 Superposition principle: 1.2.1 Statement 1.2.2 Explanation with illustration 1.3 Energy of system of charges</p>	
<p>May</p> <p>2022</p>	<p><u>Chapter 1. Electrostatics</u></p> <p>1.1 Revision of Coulomb’s law: 1.1.1 Statement 1.1.2 Variation of forces with distances</p> <p>1.2 Superposition principle: 1.2.1 Statement 1.2.2 Explanation with illustration 1.3 Energy of system of charges</p> <p>1.4 Concept of electric field 1.4.1 Due to point charge 1.4.2 Due to group charges</p> <p>1.5 Concept of electric flux</p> <p>1.6 Gauss’s law in electrostatics Problems</p> <p><u>Chapter 2. Dielectrics</u></p> <p>2.1 Introduction to dielectric materials</p> <p>2.2 Electric Dipole 2.2.1 Electric dipole 2.2.2 Dipole moment</p> <p>2.3 Electric potential and intensity at any point due to dipole</p> <p>2.4 Torque on a dipole placed in an electric field</p> <p>2.5 Polar and non-polar molecules</p> <p>2.6 Electric polarization of dielectric material</p> <p>2.7 Gauss’ law in dielectric 2.8 Electric vectors and its relation Problems</p> <p><u>3. Magnetization</u></p> <p>3.1 Introduction to Magnetization</p> <p>3.2 Magnetic materials</p> <p>3.3 Types of Magnetic Materials 3.3.1 Diamagnetic materials 3.3.2 Paramagnetic materials 3.3.3 Ferromagnetic materials 3.3.4 Antiferromagnetic materials</p>	<p>20</p>

	3.4 Bohr magnetron Problems	
June 2022	<p><u>4. Magnetostatics</u></p> <p>4.1 Introduction to magnetization,</p> <p>4.2 Magnetic Induction and Intensity of magnetization</p> <p>4.3 Biot-Savart's law: 4.3.1 Statement 4.3.2 Long straight conductor 4.3.3 Circular Coil 4.4 Ampere's circuital law: 4.4.1 Statement 4.4.2 Field of Solenoid 4.4.3 Field of Toroid 4.5 Gauss law for magnetism Problems</p> <p><u>5. Magnetic Properties of Materials</u></p> <p>5.1 Definition 5.1.1 Magnetization (M), 5.1.2 Magnetic Intensity (H), 5.1.3 Magnetic Induction (B), 5.1.4 Magnetic Susceptibility 5.1.5 Magnetic Permeability</p> <p>5.2 Relation between B, M and H</p> <p>5.3 Hysteresis and Hysteresis Curve 5.4 Ferrite materials and its Applications Problem</p>	8

1) F.Y.B.Sc.:- Practicals of Semester -1 and 2 completed in Academic Year 2021-2022.

