

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

Teaching Plan

(2022-23)

PH 333 Classical Mechanics

Sr. No.	Topics	Month
01	1. Motion of system of a particles Introduction –Newton’s laws	July -2022
02	Motion of a charged particle in constant electric, magnetic and electromagnetic field	
03	General features of motion, equation of orbit, Deduction of Kepler’s laws of planetary motion, Orbits of artificial satellite, Problems	
04	System of particles, Centre of mass, Conservation of linear momentum, angular momentum, Energy of system of particles (statements only) Problems	
09	2. Motion in Central Force Field Central force, equivalent one body problem	
10	Motion in central force field	
11	General features of motion, equation of orbit	
12	Deduction of Kepler’s laws of planetary motion Orbits of artificial satellite and Problems	
13	3.Scattering of Particles Elastic and inelastic scattering	Second and Third

14	Properties of Elastic and inelastic scattering	week of August-2022
15	Relation between lab and CM Frame Relation of angles between lab and CM Frame	
16	Inelastic scattering, Differential cross section, impact parameter ,Total differential cross section	
17	Relation of scattering angles between lab and CM Frame, problems	
18	4.Langrangian and Hamiltonian Formulation Introduction	Last week of August-2022
19	Newton's laws,constraints,Holonomic and nonholonomic constraints,Principle of virtual work, D'Alembert's Principle	
20	Langrange's equation from D'Alembert's Principle Simple Pendulum,Linear Harmonic Oscillator	
21	Hamiltonian and Hamilton's equation	
22	Problems of Hamiltonian	
23	Problems of Langrange's method	
24	Problems of Hamiltonian method	

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

Sr. No.	Topics	Month
01	1.Concepts of programming and Introduction to C Programming Definition and Properties of algorithms, Algorithm development,	September-2022
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	Structure of C program, Character set, key words,	
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	2. Arrays, Pointers and user defined functions Arrays: 1-D, 2-D and String	
15	Examples: Arranging numbers in descending and ascending order,	First Week of October-2022
16	Sum of matrices, multiplication of matrices.	
17	Concept of Pointers	
18	User defined functions: Definitions and declaration of function, function prototype.	
19	Passing arguments (Call by value, Call by reference).	
20	Storage Classes: Auto, External, Static, Register variables.	
21	4. Computational Physics:	Second and Third Week of October-2022
	Iterative methods: Discussion of algorithm and flowcharts	

	and writing C programs for finding	
22	single root of equation using bi-section method, Newton Raphson method.	November-2022
23	Discussion of algorithm and flowcharts and writing C program for trapezoidal rule and Simpson's 1/3rd rule	
24	3. Graphics in C: Some simple graphic commands	
25	- Line, Circle, Arc, Ellipse, Bar., Problems	

Thermodynamics and Statistical Physics (PH-363)

Sr. No.	Topics	Month
01	Ch-1 - Kinetic Theory of gases Mean Free Path Theory of gases	Jan- 2023
02	Transport Phenomena, Viscosity	
03	Thermal conductivity and diffusion	
04	Thermodynamic functions	
05	Enthalpy, Entropy, Internal Energy, Helmholtz Functions	
06	Maxwell's relations	
07	First and Second TdS equations Specific and Latent heat equations	
08	Joule – Thomson's effect, Problems	
09	Ch-2- Elementary Concepts of Statistics Probability ,Distributions functions,Problems	First week of Feb.-2023
10	Random Walk Problem and Binomial distribution	
11	Simple Random Problem, Calculation of mean Values	
12	Probability distribution for large N	
13	Gaussian Probability distribution and Problems	
14	Ch-3- Statistical distribution of system of particles and Ensembles State of Systems, Statistical Ensembles	

15	Basic Postulates, Probability Calculations	Feb.-2023
16	Behavior of density of states	
17	Thermal. Mechanical Interactions, Problems	
18	Micro canonical Ensembles, Canonical Ensembles	
19	Applications of Canonical Ensembles	
20	Molecules in ideal gas, Mean Values in Canonical Ensembles, Problems	First week of March -2023
21	Ch-4-Introduction to Quantum States Quantum distribution function	
22	Maxwell – Boltzman Statistics, Bose – Einstein Statistics	
23	Fermi – Dirac Statistics	
24	Comparisons of B-E,M-B,F-D Statistics , Applications of Quantum Statistics	
25	Problems	
26	Internal Test	

LASERS (PH-366)

Sr. No.	Topics	Month
01	<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,	Second and Third week of March -2023
02	<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	Last March -2023
03	<u>Chapter 3: Laser Oscillator:</u> Optical feedback, round trip gain, critical population	April-2023

	inversion, Optical resonator, condition for steady state oscillations, cavity resonance frequencies.	
04	<u>Chapter 4: Laser Output:</u> Line-shape broadening: Lifetime broadening, Collision broadening	April-2023
05	<u>Chapter 5: Types of Lasers:</u> Solid State Lasers – Ruby Laser, Diode Laser, Gas Lasers – HeNe Laser, CO2 Laser	April-2023
06	<u>Chapter 6: Applications of Lasers:</u> Industrial: welding, cutting, drilling Nuclear Science: laser isotope separation, laser fusion, Medical: eye surgery	April-2023
07	Internal Test	

Teaching Plan

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

Year: 2022-2023

PHY-351: Mathematical Methods in Physics-II

Teacher: A.B.Kanawade

Chapter No.	Month	Contents	Remarks
1	Sep 2022	<p>1: Curvilinear Co-ordinates</p> <p>Review of Cartesian, spherical and cylindrical co-ordinate, transformation equations, 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, Laplacian, and curl, special case for gradient, divergence and curl in Cartesian, spherical polar and cylindrical co-ordinate system, Problems.</p>	
2	Sep/Oct 2022	<p>2: The Special Theory of Relativity</p> <p>Introduction, Newtonian relativity, Galilean transformation equation, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Kinematic effects of Lorentz transformation, Length contraction, Proper time, Problems.</p>	
3	Sep/Oct 2022	<p>3: Partial Differential Equations</p> <p>Introduction to Partial differential equations (PDE), General methods for solving second order PDE, Method of separation of variables in Cartesian, Spherical polar and cylindrical co-ordinate system (two dimensional Laplace's equation, one dimensional Wave equation), Singular points ($x = x_0$), Solution of differential equation-Statement of Fuch's theorem, Frobenius method of series solution.</p>	

4	Oct 2022	4: Special Functions Introduction, generating function for Legendre Polynomials: $P_n(x)$, Properties of Legendre Polynomials, Generating function for Hermite Polynomials: $H_n(x)$, Properties of Hermite Polynomials, Bessel function of first kind: $J_n(x)$, Properties of Bessel function of first kind, Problems.	
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Teaching Plan

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

**Year: 2022-2023
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	Apr/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	
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Teaching Plan

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

**Year: 2022-2023
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(only 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	

Teaching Plan

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

Year: 2022-2023
Teacher: A.B.Kanawade

Chapter 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	

		<p>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</p> <p>(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</p>	
4	May / June 2022	<p>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</p>	

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Department of Physics
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Teaching Plan 2022-23

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

Month	Topic	Period
9/3/2023 to 21/3/2023	<p>Undamped Free Oscillations Equilibrium conditions, Equations of linear and angular SHM. Differential equation of linear SHM, Composition of two perpendicular linear</p>	7

	SHM for frequency ratio 1:1 and 1:2, Lissajous figures and their demonstrations	
22/3/2023 to 3/4/2023	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	7
4/4/2023 to 17/4/2023	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	8
18/4/2023 to 26/4/2023	Wave Motion Equation of longitudinal and transverse wave and its solution, energy density and intensity of a wave, Seismic wave and gravitational waves	6
27/4/2023 to 16/5/2023	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	8

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

Month	Topic	Period
14/2/2023 to 26/2/2023	Nuclear Structure, Properties and Radioactivity Composition of nucleus, Characteristics of nucleus, Mass defect and Binding energy,	12

	<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>	
27/2/2023 to 6/3/2023	<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>	6
7/3/2023 to 23/3/2023	<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>	9
24/3/2023 to 15/4/2023	<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 in India.</p>	6
2/5/2023 to 10/5/2023	<p>Nuclear reactor and its basic components, homogeneous and heterogeneous reactors, power reactor</p>	3

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

Month	Topic	Period
24/3/2023 to 25/3/2023	Introduction Necessity of agricultural instrument, sensor used in agricultural	2
26/3/2023 to 31/3/2023	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
1/4/2023 to 8/4/2023	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.	4
9/4/2023 to 21/4/2023	Instrumentation in Irrigation Auto drip and sprinkler irrigation system, Upstream and downstream control concept, SCADA for DAM parameters and control	4
22/4/2022- 29/4/2022	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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DEPARTMENT OF PHYSICS
Teaching Plan
Academic Year-2022-2023
Sem- I
F.Y.B.Sc. CBCS Pattern

Name: Mr. Barne N.D. PHY-111 Mechanics and Properties of Matter

Sr. No.	Months	Topics	Lectures
01	Third week of Aug. 2022 - Second week of Sept. 2022	1. 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	09
02	Third week of Sept.2022 - First week of Oct. 2022	2. 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	07
03	Second week of Oct. 2022 - First week of Nov. 2022	3. Fluid Mechanics: Concept of viscous force and viscosity, Coefficient of viscosity, Steady and Turbulent flow, Reynolds number, Equation of continuity, Bernoulli's Principle, Applications of Bernoulli's Principle (Ventury Meter, PitotTube), Applications of viscous fluids, Problems.	08
04	First week of Nov.2022 - Third week of	4. Properties of Matter: Surface tension, Angle of contact, Factors affecting surface tension, Jaeger's method for determination of surface tension, Applications of surface tension. Stress and Strain, Hook's law and Coefficient of elasticity, Young's modulus, Bulk modulus, Modulus of	12

	Nov. 2022	rigidity, Work done during longitudinal strain, Volume strain, Shearing strain.	
		Internal Exam	

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Teaching Plan
Academic Year-2022-2023
Sem- V
T.Y.B.Sc.

Name: Mr. Barne N.D.

Subject: PH-352 Electrodynamics

Months	Topics	Lectures
Second week of Sept. 2022 - First week of Nov. 2022	1. Electrostatics: 1.1. Coulomb's law, Gauss law, Electric field, Electrostatic Potential 1.2. Potential energy of system of charges. 1.3. Statement of Poisson's equation, Boundary Value problems in electrostatics-solution of Laplace equation in Cartesian system, 1.4. Method of image charges: Point charge near an infinite grounded conducting plane, Point charge near grounded conducting sphere. 1.5. Polarization P, Electric displacement D, Electric susceptibility and dielectric constant, bound volume and surface charge densities. 1.6. Electric field at an exterior and interior point of dielectric.	12
First week of Nov. 2022- Third week of Nov. 2022	2.Magnetostatics: 2.1. Concepts of magnetic induction, magnetic flux and magnetic field 2.2. Magnetic induction due to straight current carrying conductor, Energy density in magnetic field, magnetization of matter. Relationship between B,H and M. 2.3 Biot-Savart's law, Ampere's law for force between two current carrying loops, Ampere's circuital law,	12

	2.4 Equation of continuity, Magnetic vector potential A. 2.5. Magnetic susceptibility and permeability, Hysteresis loss, B-H curve.	
Fourth week of Nov. 2023 – Fourth week of Dec. 2023	3. Electrodynamics: 3.1. Concept of electromagnetic induction, Faradays law of induction, Lenz's law, displacement current, generalization of Amperes' law 3.2. Maxwell's equations (Differential and Integral form) and their physical significance 3.3. Polarization, reflection & refraction of electromagnetic waves through media 3.4. Wave equation and plane waves in free space. 3.5. Poynting theorem & Poynting vector, Polarizations of plane wave. 3.6. Microscopic form of ohm's law ($J = \sigma \cdot E$)	12
	Internal Exam	

Mr. Barne N. D.

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DEPARTMENT OF PHYSICS
Teaching Plan
2022-2023

DEPARTMENT OF PHYSICS

SEM VI

T . Y . B . Sc .

Name: Mr. Barne N.D.

PHY-365 (A): Electronics-II

Months	Topic taken	Periods
Second week of Feb.2023 - Second week of March 2023	1: Semiconductor Devices: a. LED and Photodiode, Optocoupler. (Working Principles) Problems. Ref. 1. b. BJT: Transistor amplifier classifications - Class A, B, C and AB (working only), Differential amplifier (transistorized), Problems. Ref. 1. c. Field Effect Transistor: JFET (Introduction, classification, principle, working and IV characteristics) MOSFETs (DE-MOSFET and E only MOSFET). Problems.	09
Second week of March 2023 - First week of April 2023	2: Applications of Semiconductor Devices: 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 b. Switching Regulators (SMPS): Introduction, Block diagram, Advantages and Disadvantages. Ref. 4 c. Modulation and Demodulation : Concept of Carrier Wave, Need of Modulation and Demodulation, Methods of Modulation like AM, FM, PM (Concepts Only), d. Concept of Modulation Index, Upper and Lower Side Band Frequencies in AM. Problems	09
Second week of	3: Integrated Circuits: a. Integrated Circuits: Introduction, Scale of Integration, Advantages and drawbacks of IC Ref.4	09

Apr. 2023 - Third week of Apr.2023	b. OP-AMP Applications as Integrator, Differentiator, Comparator. Ref. 1 c. Timer IC-555: Block diagram, Astable, monostable multivibrator (working and design). Problems	
	INTERNAL EXAM	
Third week of Apr.2023 - Fourth week of April 2023	4: Combinational and Sequential Circuits: 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 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).	09

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Teaching Plan
2022-2023

DEPARTMENT OF PHYSICS

SEM II

F . Y . B . Sc .

Name: Mr. Barne N.D.

PHY-121 Heat and Thermodynamics

Months	Topic taken	Periods
First week of March 2023 - Third week of March 2023	1. Fundamentals of Thermodynamics 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.	10
Fourth week of Apr. 2023 - First week of May 2023	2. Applied Thermodynamics 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.	09
First week of May 2023 – Second week of	3. Heat Transfer Mechanisms 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	09

May 2023	of Vapor compression refrigerator, Air Conditioning: Principle and it's applications, Problems	
	INTERNAL EXAM	
Second week of May 2023	4. Thermometry 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	08

Mr. Barne N. D.