


Auunal Planning for the Year 2023- 24

T.Y.BSc Physics P -I (CBCS Pattern 2013)

Semister -VI (PHY-361: Solid State Physics)

Sr.No	Month	Total Lectures	Name of the Topic
1	Dec 2023	10	CH-I The Crystalline Structures 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	Jan 2024	09	CH-II X ray Diffraction and Experimental Methods 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	Feb 2024	09	CH-III Free Electron and Band Theory of Metals Assumptions of Classical and Somerfield 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	March 2024	08	CH-IV Magnetism Diamagnetism, Langevin theory of Diamagnetism, Paramagnetism, Langevin theory of Paramagnetism, Ferromagnetism, Antiferromagnetism, Ferromagnetic Domains, Hysteresis, Curie temperature, Neel temperature, Superconductivity , Day to day applications of Magnetism, Problems REVISION

Place : Rajur
Date: 20 th June 2022


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Dept. Of Physics

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T.Y.BSc Physics P-III(CBCS Pattern 2013)

Semister – VI (PHY-363: Thermodynamics and Statistical Physics)

Sr.No	Month	Total Lectures	Name of the Topic
1	Dec 2023	09	CH-I Transport phenomenon and Maxwell's relations: Mean free path, Transport phenomenon, Viscosity, Thermal conductivity and diffusion. Thermodynamic functions: Internal Energy, Enthalpy, Helmholtz function, Gibb's function, Derivation of Maxwell Relations, Specific heat and latent heat equations, Joule Thomson effect (Throttling Process), Problems
2	Jan 2024	09	CH-II Elementary Concepts of Statistics: Probability, distribution functions, Random Walk and Binomial distribution, Simple random walk problem, Calculation of mean values, Probability distribution for large-scale N, Gaussian probability distributions, Problems
3	Feb 2024	12	CH-III Statistical Distribution of System of Particles and Ensembles: Micro canonical Ensemble (Isolated System), Canonical ensembles, simple application of canonical ensemble, Molecules in Ideal gas, Calculation of mean values in canonical ensemble. Problems.
4	March 2023	06	CH- Introduction to Quantum Statistics: Quantum distribution function, Maxwell-Boltzmann's statistics, Bose-Einstein Statistics, Fermi-Dirac Statistics, Comparison of the distributions. Applications of Quantum Statistics, Problems. REVISION

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T.Y.BSc Physics P –XI (CBCS Pattern 2013)

Semister –VI (PHY-3611 SEC (Z): Instrumentation for Agriculture)

Sr.No	Month	Total Lectures	Name of the Topic
1	Dec 2023	02	CH-I Introduction Necessity of instrumentation and control for agriculture, sensor requirement, remote sensing, bio sensors in agriculture.
2	Jan 2024	04	CH-II Soil Properties & Sensing Properties of soil: fundamentals definitions and relationship, index properties of soil, permeability & seepage analysis, shear strength, Mohr's circle of stress, active & passive earth pressures, stability & slopes, Sensors: introduction to sonic anemometers, hygrometers, fine wire thermocouples, open & close path gas analyzers
3	Feb 2024	04	CH-III Instrumentation in Continuous & Batch process Flow diagram of sugar plant, sensors & instrumentation setup, Flow diagram of fermenter & control (batch process), flow diagram of dairy industry & instrumentation setup for it, Juice extraction control process & instrumentation setup
4	Mar 2024	04	CH-IV Instrumentation in Irrigation Water distribution and management control, Auto drip and sprinkler irrigation system, upstream & downstream control concept, SCADA for DAM parameters & control
5	March 2024	04	CH-V Greenhouse Parameters & Instrumentation Greenhouse effect, Concept and construction of greenhouse, merits & demerits, ventilation, cooling & heating, wind speed, temperature & humidity, soil moisture, rain gauge, carbon dioxide enrichment measurement & control, Leaf area length evapotranspiration, temperature, wetness & respiration measurement & data logging, electromagnetic radiations photosynthesis REVISION

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 T.Y.BSc Physics P -I (CBCS Pattern 2019)
Semister – V PHY-351: Mathematical Methods in Physics-II


Sr.No	Month	Total Lectures	Name of the Topic
1	July 2023	10	CH-I Curvilinear Co-ordinates 1) 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. 2) 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.
2	August 2023	10	CH-II The Special Theory of Relativity Introduction and applications, 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.
3	September 2023	08	CH-III Partial Differential Equations Introduction and applications of 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.
4	October 2023	08	CH-IV 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, Applications of Special Functions in Physics, Problems. REVISION

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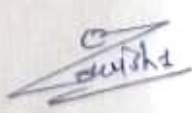
Sr.No	Month	Total Lectures	Name of the Topic
1	July 2023	14	<p>CH-I Concepts of Programming and Introduction to C-programming: Definition and Properties of algorithms, Algorithm development, Flow charts- symbols and simple flowcharts. Introduction and Structure of C-program, 'C' Character set, key words, Constants and variables, Variable names, Data types, qualifiers and their declarations, Symbolic Constants. Input/output functions: scanf(), printf(), getchar(), putchar(), gets(), puts(). Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Conditional Operator. Control statements: if, if else, while, do while, for loop, nested control structures (nested if, nested loops), break, continue, switch- case statement, goto statement. Use of Library functions: e.g. mathematical, trigonometric, graphics</p>
2	August 2023	08	<p>CH-II Arrays, Pointers and user defined function in C-Language Arrays: 1-D, 2-D: Arranging numbers in descending and ascending order, Sum of matrices, multiplication of matrices. Concept of pointers with suitable illustrative examples. User defined functions: Definitions and declaration of function, function prototype, passing arguments (Call by value, Call by reference). Simple illustrative examples.</p>
3	September 2023	03	<p>CH-III Graphics in C-Language: Concepts of graphics in C, Some simple graphic commands- Point, Line, Circle, Arc, Ellipse, Bar with suitable illustrative examples.</p>
4	October 2023	11	<p>CH-IV Computational Physics: Numerical Methods to solve the Physics Problems Iterative methods: Bisection method and Newton-Raphson Method- Algorithm, Flowchart and writing C-program for finding the roots of the equation, problems Integration: Trapezoidal rule, Simpson's 1/3rd rule – Algorithm, Flowchart and C-program, problems REVISION</p>

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1	July 2023	05	CH-I Mechanical and Electromechanical sensor: Definition, principle of sensing & transduction, classification. Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity. Strain gauge: Theory, type, materials, design consideration, sensitivity, gauge factor, variation with temperature, adhesive, rosettes. LVDT: Construction, material, output input relationship, I/O curve, discussion.
2	August 2023	04	CH-II Capacitive sensors: Variable distance-parallel plate type, variable area- parallel plate, serrated plate/teeth type and cylindrical type, variable dielectric constant type, calculation of sensitivity. Stretched diaphragm type: microphone, response characteristics..
3	September 2023	05	CH-III Thermal sensors: Material expansion type: solid, liquid, gas & vapor Resistance change type: RTD materials, tip sensitive & stem sensitive type. Thermo emf sensor: types, thermoelectric power, general consideration, Junction semiconductor type IC and PTAT type.
4	October 2023	04	CH-IV Magnetic sensors: Sensor based on Villari effect for assessment of force, torque, proximity, Wiedemann effect for yoke coil sensors, Thomson effect, Hall effect, and Hall drive, performance characteristics. Radiation sensors: LDR. REVISION

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