


## Lesson Plan: (2023-2024)

Name of Assistant/Associate Professor: **Dr. Preeti Chhokkar**

Class and Section: **B. SC II 3<sup>rd</sup>** semester Subject: **PH-301 Computer Programming and Thermodynamics**

Dates	Lesson Plan
WEEK1	<b>UNIT-3:</b> Thermodynamics-I Thermodynamic system and Zeroth law of thermodynamics. First law of thermodynamics and its limitations, reversible and irreversible process. Second law of thermodynamics and its significance, Carnot theorem, Absolute scale of temperature
WEEK-2	Absolute Zero and magnitude of each division on work scale and perfect gas scale, Joule's free expansion, Joule Thomson effect
WEEK-3	Joule-Thomson (Porous plug) experiment, conclusions and explanation, analytical treatment of Joule Thomson effect. Entropy, calculations of entropy of reversible and irreversible process, T-S diagram, entropy of a perfect gas
WEEK-4	Nernst heat law (third law of thermodynamics), Liquefaction of gases, (oxygen, air, hydrogen and helium), Solidification of He below 4K, Cooling by adiabatic demagnetization.
WEEK -5	<b>UNIT-4:</b> Thermodynamics-II Derivation of Clausius-Clapeyron and Clausius latent heat equation and their significance, specific heat of saturated vapours.
WEEK-6	phase diagram and triple point of a substance, development of Maxwell thermodynamical relations
WEEK -7	Thermodynamical functions: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them
WEEK-8	derivation of Maxwell thermodynamical relations from thermodynamical functions, Application of Maxwell relations: relations between two specific heats of gas, Derivation of Clausius-Clapeyron and Clausius equation,
WEEK- 9	variation of intrinsic energy with volume for (i) perfect gas (ii) Vander wall gas (iii) solids and liquids, derivation of Stefans law, adiabatic compression and expansion of gas & deduction of theory of Joule Thomson effect.
WEEK 10	<b>UNIT-1:</b> Computer Programming Computer organization, Binary representation, Algorithm development.
WEEK-11	Flow charts and their interpretation. FORTRAN Preliminaries: Integer and floating-point arithmetic expression
WEEK-12	built in functions, executable and non-executable statements, input and output statements
WEEK 13	Formats, IF, DO and GO TO statements, Dimension arrays, and statement function and function subprogram.
WEEK-14	<b>UNIT -2:</b> Applications of FORTRAN programming Algorithm, Flow Chart and Programming for Print out of natural numbers,
WEEK-15	Range of the set of given numbers, Ascending and descending order, Mean and standard deviation,
WEEK-16	Least square fitting of curve, Roots of quadratic equation, Product of two matrices, Numerical integration (Trapezoidal rule and Simpson 1/3 rule)
WEEK-17	Revision

  
Dr. Preeti Chhokkar  
Asstt. Prof. in Physics



## Lesson Plan: (2023-2024)

Name of Assistant/Associate Professor: **Dr. Preeti Chhokkar**

Class and Section: **B. SC III 5<sup>th</sup>** semester Subject: **PH-501 Quantum and Laser Physics**

Dates	Lesson Plan
WEEK1	<b>Unit I: Origin quantum physics (Experimental basis)</b> Overview scale of quantum physics, boundary between classical and quantum phenomena
WEEK-2	Photon, Photoelectric effect, Compton effect (theory and result), FrankHertz experiment, de-Broglie hypothesis. Davisson and Germer experiment
WEEK-3	G.P. Thomson experiment. Phase velocity, group velocity and their relation. Heisenberg's uncertainty principle, Time energy and angular momentum, position uncertainty
WEEK-4	. Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope, Electron diffraction from a slit. Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle)
WEEK -5	Time-independent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, concept of observer and operator. Expectation values of dynamical quantities, probability current density
WEEK-6	<b>Unit II: Application of Schrodinger wave equation:</b> (i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti-nodes, zero-point energy).
WEEK -7	(ii) One dimensional step potential $E > V_0$ (Reflection and Transmission coefficient)
WEEK-8	(iii) One dimensional step potential $E < V_0$ (penetration depth calculation). (iv) One dimensional potential barrier, $E > V_0$ (Reflection and Transmission coefficient)
WEEK- 9	(v) One-dimensional potential barrier, $E < V_0$ (penetration or tunneling coefficient). (vi) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, Zero-point energy, wave equation for ground state and excited states).
WEEK 10	<b>Unit III: Laser Physics –I</b> Absorption and emission of radiation, Main features of a laser: Directionality, high intensity, high degree of coherence, spatial and temporal coherence
WEEK-11	Einstein's coefficients and possibility of amplification, momentum transfer, life time of a level, kinetics of optical absorption ((two and three level rate equation
WEEK-12	Fuchbauerlanderburg formula). population inversion: A necessary condition for light amplification, resonance cavity, laser pumping,
WEEK 13	Threshold condition for laser emission, line broadening mechanism, homogeneous and inhomogeneous line broadening (natural, collision and Doppler broadening).
WEEK-14	<b>Unit IV: Laser Physics – II</b> He-Ne laser and Ruby laser (Principle, Construction and working),
WEEK-15	Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working), Applications of lasers in the field of medicine and industry.
WEEK-16	Revision, test
WEEK-17	Revision, test

*Preeti Chhokkar*  
(Dr. Preeti Chhokkar)  
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## Lesson Plan: (2023-2024)

Name of Assistant/Associate Professor: **Dr. Preeti Chhokkar**

Class and Section: **B. A/B.COM**

Subject: **B23-PHY-104 , MDC PHYSICS**

**Max. Marks:75**

**Internal Assessment Marks:20**

**End Term Exam Marks: 55**

Dates	Lesson Plan
WEEK1	Physics-Nature, scope & excitement, Major discoveries in physics, major contribution by Indian Physicists
WEEK-2	Fundamental physical constants, Physics in relation to other sciences, impact of physics on society and on latest development in science & technology
WEEK-3	System of Measuring Units-Need for measurement, measuring process, concept of mass, length, time
WEEK-4	Fundamental and derive units, system of units, concepts of error, types of error (only definition), Accuracy and precision in measurement, least count and applications of measuring instruments -Vernier caliper, Screw Gauge
WEEK -5	Motion of objects in one dimension- position of the object, origin/reference point, frame of reference, definitions and examples of motion in one, two and three dimension.
WEEK-6	Scalar and Vector quantities, description of motion along a straight line- distance and displacement, uniform motion and non-uniform motion
WEEK -7	average and instantaneous speed, average and instantaneous velocity, acceleration; graphical analysis of straight line motion- distance- time graph, velocity-time graph, equation of motions and their applications
WEEK-8	Causes of motion- concept of force, Newton's 1st law of motion, inertia and mass; Newton's 2nd law of motion, momentum and force; 3rd law of motion, daily life applications of Newton's laws of motion.
WEEK- 9	Universal law of gravitation and its importance, acceleration due to gravity and free fall of a body; mass and weight of an object on earth and moon
WEEK 10	concept of thrust and pressure and importance in daily life, buoyancy and Archimedes principle-the physics behind floating of objects on water

WEEK-11	Work, energy, types of energy-Kinetic energy and Potential energy, P.E. of an object at a height; law of conservation of energy and its applications.
WEEK-12	Conservation of linear and angular momentum, collision (elastic and inelastic) and conservation laws in collisions- importance in daily life
WEEK 13	concepts of center of mass-Physics behind cycling, rock climbing and skating.
WEEK 14	Revision

*Shukla*