

(Lesson Plan) ODD

MCM DAV College for Women, Sector – 36A, Chandigarh  
Monthly Teaching Plans (Odd Semester)  
Session – (2023-24)

Name of the Teacher: Dr Renu Bala

Department: Physics

Class: B.Sc (II)

Subject: Statistical Physics(I)

Section (s): Non-Medical, Vocational

S.No	Date (Monthly)		Topics Covered	Academic Activity Undertaken*
	From	To		
1	21 July, 2023	31 August, 2023	Basic ideas of Statistical Physics, Scope of Statistical Physics, basic ideas about probability, distribution of four distinguishable particles in two compartments of equal size. Concept of macrostates, microstates, thermodynamic probability, effects of constraints on the system, distribution of $n$ particles in two compartments, deviation from the state of maximum probability. Equilibrium state of dynamic system, distribution of distinguishable $n$ particles in $k$ compartments of unequal sizes.	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Group Discussions</li><li>✓ Demonstrations</li><li>✓ Assignments</li><li>✓ Class Test</li></ul>
2	1 Sept., 2023	30 Sept., 2023	Phase space and its division into elementary cells, three kinds of statistics. The basic approach in the three statistics. Maxwell-Boltzmann statistics applied to an ideal gas in equilibrium, Experimental verification of Maxwell-Boltzmann's law of distribution of molecular speeds.	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Group Discussions</li><li>✓ Assignments</li><li>✓ Class test</li></ul>
3	1 Oct, 2023	18 Nov, 2023	Need of quantum statistics--B.E. statistics, derivation of Planck's law of radiation, deduction of Wien's displacement law and Stefan's law from Planck's law. F.D. statistics, Comparison of M.B., B.E. and F.D. statistics.	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Group Discussions</li><li>✓ Assignments</li><li>✓ Mid-term test</li><li>✓ Revision</li></ul>

(Lesson Plan) EVEN

MCM DAV College for Women, Sector – 36A, Chandigarh  
Monthly Teaching Plans (Even Semester)  
Session – (2023-24)

**Name of the Teacher:** Dr Renu Bala

**Department:** Physics

**Class:** B.Sc (II)

**Subject:** Statistical Physics (II)

**Section (s):** Non-Medical, Vocational

S.No	Date (Monthly)		Topics Covered	Academic Activity Undertaken*
	From	To		
1	9 January 2024	28 February 2024	Statistical definition of entropy, change of entropy of a system, additive nature of entropy, law of increase of entropy, reversible and irreversible processes with examples. Work done in a reversible process. Examples of increase of entropy in natural processes. Entropy and disorder. Brief review of the terms and Laws of Thermodynamics, Carnot's Cycle. Entropy changes in Carnot's Cycle, Applications of thermodynamics to thermoelectric effect.	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Group Discussions</li><li>✓ Assignments</li><li>✓ Class Test</li></ul>
2	1 <sup>st</sup> March ,2024	31 <sup>th</sup> March,2024	Change of entropy along a reversible path in a P.V. diagram, entropy of a perfect gas. Equation of state of ideal gas from simple statistical consideration. Heat death of the universe. Derivation of Maxwell's thermodynamical relations and applications, cooling produced by adiabatic stretching, adiabatic compression, Change of internal energy with volume. Expression for (Cp-Cv)	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Group Discussions</li><li>✓ Assignments</li><li>✓ Class Test</li></ul>
3	1 <sup>st</sup> April,2024	22 April,2024	Change of state and Clayperon Equation. Thermodynamical treatment of Joule-Thomson effect. Use of Joule-Thomson effect for liquefaction of helium. Production of very low temperature by adiabatic demagnetization.	<ul style="list-style-type: none"><li>✓ Lecture</li><li>✓ Assignments</li><li>✓ Oral Tests</li><li>✓ Revision</li></ul>

**(LessonPlan)**  
**MCM DAV College for Women, Sector – 36A, Chandigarh**  
**Monthly Teaching Plans(Odd Semester)**  
**Session–(2023-2024)**

**Name of the Teacher:**                    **Dr Pallavi Gupta/ Ms Anu Rathi**

**Department:**                                **Physics**

**Class:**                                         **B.Sc (II)**

**Subject:**                                     **Optics and Laser I**

**Section (s):**                                 **Non-Medical, Vocational**

S.No	Date (Monthly)		Topics Covered	Academic Activity Undertaken*
	From	To		
1	21 <sup>st</sup> July 2023	31 <sup>th</sup> August 2023	Concept of coherence, spatial and temporal coherence, coherence time, coherence length, area of coherence. Conditions for observing interference fringes. Interference by wave front division and amplitude division. Young's double slit experiment. Lloyd's mirror and Fresnel's biprism, phase change on reflection. Newton's rings,	<ul style="list-style-type: none"> <li>✓ <b>Lecture</b></li> <li>✓ <b>Group Discussions</b></li> <li>✓ <b>Assignments</b></li> <li>✓ <b>Class Test</b></li> </ul>
2	1 <sup>st</sup> Sept.20 23	30 <sup>th</sup> Sept. 2023	Michelson interferometer—working, principle and nature of rings Interference in thin films, Role of interference in anti-reflection. Multiple beam interference, Fabry-Perot interferometer, nature of fringes, finesse. Huygen-Fresnel theory half period zones, zone plates. Distinction between Fresnel and Fraunhofer diffraction. Fraunhofer diffraction due to Single slit and intensity distribution, double slits & multiple slits (qualitative).	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPt</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> <li>✓ <b>Numerical Problems</b></li> </ul>
3	1 <sup>st</sup> Oct. 2023	31 <sup>th</sup> Oct. 2023	Fraunhofer diffraction at rectangular (qualitative discussion) and circular apertures. Effects of diffraction in optical imaging resolving power of microscope and telescope, diffraction grating, its use as a spectroscopic element, resolving power, Moire's fringes,	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPt</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> </ul>
4	1 Nov. 2023	18 Nov. 2023	Concept and analytical treatment of unpolarised, plane polarized and elliptically polarized light. Double refraction Nicol prism, sheet polarizers, retardation plates. Production and analysis of polarized light (quarter and half waveplates)	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> <li>✓ <b>Numerical Problems</b></li> </ul>

**(LessonPlan)**  
**MCM DAV College for Women, Sector – 36A, Chandigarh**  
**Monthly Teaching Plans (Even Semester)**  
**Session–(2023-2024)**

**Name of the Teacher:**                    **Ms Anu Rathi**

**Department:**                                **Physics**

**Class:**    **B.Sc (II)**

**Subject:**                                        **Optics and Laser II**

**Section (s):**                                    **Non-Medical, Vocational**

S. No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	9 <sup>th</sup> Jan. 2024	31 <sup>st</sup> Jan. 2024	Absorption, spontaneous emission, stimulated emission, Wave mechanical explanation, Properties of Spectral Lines, Temporal and spatial coherence, Characteristics of stimulated emission, Einstein coefficients and relations,	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPT</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> </ul>
2	1 <sup>st</sup> Feb. 2024	28 <sup>th</sup> Feb. 2024	Light amplification and threshold condition, Population inversion, Kinetics of optical absorption (qualitative account only), Qualitative account of Collisional broadening, Doppler broadening & Natural broadening, Mechanism of Luminescence. Lasing action, Components of Laser, Elementary theory of optical cavity, longitudinal and transverse modes, Principal pumping schemes, Three level and four level Laser schemes.	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPT</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> </ul>
3	1 <sup>st</sup> March 2024	31 <sup>st</sup> March 2024	Types of lasers, Ruby and Nd:YA Lasers. He-Ne, Dye and CO <sub>2</sub> lasers–construction, mode of creating population inversion and output characteristics. Applications of lasers— a general outline, Holography. Principle, recording of hologram and Reconstruction of image. <i>Fiber Optics</i> : Photonics, Optical fibre, Construction, Numerical aperture, acceptance angle, skip distance.	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPT</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> <li>✓ <b>Numericals</b></li> </ul>
4	1 April 2024	22 April 2023	Step index fibre–single mode and multimode, Graded index fibre, Losses in optical fibre, Material losses and Rayleigh scattering, bending losses, Inter modal and intra modal dispersion. Splicing techniques, Optical Fibre based communication system, Medical applications	<ul style="list-style-type: none"> <li>✓ <b>Lecture method</b></li> <li>✓ <b>PPT</b></li> <li>✓ <b>Group discussion</b></li> <li>✓ <b>Notes, Practicals</b></li> <li>✓ <b>Numerical Problems</b></li> </ul>

**(Lesson Plan) ODD**  
**MCM DAV College for Women, Sector – 36A, Chandigarh**  
**Monthly Teaching Plans (Odd Semester)**  
**Session–(2023-24)**

**Name of the Teacher:** **Dr. Kulwinder Kaur**

**Department:** **Physics**

**Class:** **B.Sc(II)**

**Subject:** **Quantum Physics(I)**

**Section(s):** **Non-Medical, Vocational**

S.No	Date (Monthly)		Topics Covered	Academic Activity Undertaken*
	From	To		
1	21 <sup>th</sup> July, 2023	31 <sup>th</sup> August, 2023	De Broglie waves, wave packet, Phase velocity and Group velocity, Electron microscope, Particle diffraction Davisson-Germer experiment, Uncertainty principle with illustrations, Principle of complementarity.	<ul style="list-style-type: none"> <li>✓ Lecture and ppt</li> <li>✓ Group Discussion</li> </ul>
2	1 <sup>st</sup> September, 2023	30 <sup>st</sup> September, 2023	Quantum mechanics, Wave equation, Plausible arguments leading to time-dependent, Schrodinger equations, Born's interpretation of Wave function, Complex character, continuity and boundary conditions, probability interpretation, normalization, Probability current, Probability conservation equation, Principle of superposition.	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Oral questions</li> <li>✓ Numerical Problems</li> </ul>
3	1 <sup>st</sup> October, 2023	15 <sup>th</sup> October, 2023	Fundamental postulates of quantum mechanics. Eigen values and Eigen functions. Operator formalism, Position, momentum and energy operators, Expectation values, Ehrenfest theorem, Hermitian operators, Steady-state Schrodinger equation, Application to stationary states for one dimension,	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Assignments</li> <li>✓ Oral Tests</li> </ul>
4	16 <sup>th</sup> October, 2023	18 <sup>th</sup> Nov, 2023	Potential step, potential barrier, Tunnel effect Examples, Scanning Tunneling microscope, Rectangular potential well, linear harmonic oscillator. Schrödinger equation for spherically symmetric potential, Spherical harmonics, Hydrogen atom Energy levels and Eigen functions, Principal, Orbital and Magnetic quantum numbers, Electron probability density	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Group Discussions</li> </ul>

**(Lesson Plan) EVEN**  
**MCM DAV College for Women, Sector – 36A,**  
**Chandigarh Monthly Teaching Plans**  
**(Even Semester)**  
**Session–(2023-2024)**

**Name of the Teacher:**                      **Dr. Kulwinder Kaur**

**Department:**                                      **Physics**

**Class:**    **B.Sc(II)**

**Subject:**    **Quantum Physics (II)**

**Section(s):**    **Non-Medical, Vocational**

S.No	Date (Month ly)		Topics Covered	Academic Activity Undertaken*
	From	To		
1	9 <sup>th</sup> Jan. 2024	31 <sup>st</sup> Jan,202 4	Radiative transitions, selection rules and lifetimes, Spectrum of hydrogen atom. Normal Zeeman effect and experiment, Degeneracy of H-atom energy levels, fine structure, Electron angular; momentum, Larmor's frequency, electron spin angular momentum, Exclusive principle, Stern- Gerlach experiment.	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Group Discussions</li> <li>✓ Quiz</li> </ul>
2	1 <sup>st</sup> Feb,202 4	28 <sup>th</sup> Feb, 2024	Spin-orbit coupling, electron magnetic moment, total angular momentum, Hyper fine structure, examples of one electron systems; Anomalous Zeeman Effect, Lade-gfactor (sodiumD-lines). Paschen-Back Effect, StarkEffect. Symmetric and Antisymmetric wave functions, Exclusion principle, Many electron atoms Slater determinant, Electronic configurations, Hund'srule, Spin-Orbit coupling	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Group Discussions</li> </ul>
3	1 <sup>st</sup> March, 2024	31 <sup>st</sup> March, 2024	L-S coupling, J-J couplings, term symbols. Atomic spectra of H, Na, He and Hg, Selection rules. X-ray spectra, nomenclature ,Selection rules, Mosley law, Auger Effect Molecularbonding,H2+ ion and H2molecules, Complex molecules, molecular spectra, selection rules, Symmetric structures,	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Assignments</li> <li>✓ Oral Tests</li> <li>✓ Group Discussions</li> </ul>
4	1 <sup>st</sup> April,2 024	15 <sup>th</sup> April, 2024	Rotational vibration levels and spectra of diatomic molecules, Vibration-Rotational spectra, Electronic spectra of molecules,	<ul style="list-style-type: none"> <li>✓ Lecture</li> <li>✓ Group Discussions</li> </ul>
5	16 <sup>th</sup> April, 2024	24 <sup>th</sup> April, 2024	Franck Condon principle, fluorescence and phosphorescence, Raman Effect, Magnetic resonance experiments.	<ul style="list-style-type: none"> <li>✓ Lecture method</li> <li>✓ Group discussion</li> <li>✓ Notes</li> <li>✓ Numerical</li> </ul>