

**MCM DAV College for Women, Sector – 36A, Chandigarh**  
**Monthly Teaching Plans (Odd Semester/Even Semester)**  
**Session: (2024-2025)**

**Name of the Teacher/s: Dr. Swati Khatta**

**Department: Physics**

**Class: B.Sc. II (NM &Voc)**

**Subject: Paper-B: OPTICS AND LASERS**

**Section (s) Non-Medical and Computer Applications**

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
Odd semester				
1.	15/07/2024	31/8/2024	Concept of coherence, spatial and temporal coherence, coherence time, coherence length, area of coherence. Conditions for observing interference fringes. Interference by wavefront division and amplitude division. Young’s double slit experiment. Lloyd’s mirror and Fresnel’s biprism, phase change on reflection. Newton’s rings.	i) Lecture method. ii) Group discussion. iii) Notes. iv) Numerical Problems.
2.	01/09/2024	30/09/2024	Michelson interferometer—working, principle and nature of fringes. Interference in thin films, Role of interference in anti-reflection. Multiple beam interference, Fabry-Perot interferometer, nature of fringes, finesse. Huygen-Fresnal 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).	v) PPT vi) Assignments.
3.	01/10/2024	31/10/20 24	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. Concept and analytical treatment of unpolarised, plane polarized and elliptically polarized light.	
4.	01/11/2024	13/11/2024	Double refraction, Nicol prism, sheet polarisers, retardation plates. Production and analysis of polarized light (quarter and half wave plates).	

Even Semester					
1.	10/01/2025	28/02/2025	Interacation of light with matter : Absorption, spontaneous emission, stimulated emission, Wave mechanical explanation, Properties of Spectral Lines, Temporal and spatial coherence, Charatertistics of stimulated emission, Einstein coefficients and their relations, 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.	i) Lecture method. ii) Group discussion. iii) Notes. iv) Numerical Problems. v) PPT vi) Assignments.	
2.	01/03/2025	31/03/2025	Lasing action, Components of Laser, Elementary theory of optical cavity, longitudinal and transverse modes, Principal pumping schemes, Three level and four level laser schemes. Types of lasers, Ruby and Nd : YAG lasers. He–Ne, Dye and CO2 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.		
3.	01/04/2025	26/04/2025	Photonics, Optical fibre, Construction, Numerical aperture, acceptance angle, skip distance, Step index fibre – single mode and multimode, Graded index fibre, Losses in optical fibre, Material losses and Rayleigh scattering, bending losses, Intermodal and intramodal dispersion. Splicing techniques, Optical fibre based communication system, Medical applications.		