

LESSON PLAN- PHYSICS

Name of Asstt. Professor:

Dr. Sanjeev Kumar

Class & Section:

B.Sc. 4th Sem Section (A & B)

Subject:

Waves and Optics

Lesson Plan:

16 Weeks (From Feb, 2025 to May, 2025).

Week-1,2,3,4		
Unit- 4 Lasers and Fibre Optics		
WEEK	DAY	TOPIC
1	1	Basic concept of absorption and emission of radiations, amplification and population inversion
	2	Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator
	3	Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (Spatial & Temporal coherence)
	4	Basic concept of absorption and emission of radiations, amplification and population inversion
	5	Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator
	6	Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (Spatial & Temporal coherence)
2	1	Metastable state, Excitation mechanism
	2	Types of Lasers, He-Ne Laser
	3	Ruby Laser, Applications of Lasers
	4	Metastable state, Excitation mechanism
	5	Types of Lasers, He-Ne Laser
	6	Ruby Laser, Applications of Lasers
3	1	Optical fibres and their properties, Principal of light propagation through a optical fibre
	2	Acceptance angle and numerical aperture
	3	Types of optical fibres: Single mode and multimode fibres
	4	Optical fibres and their properties, Principal of light propagation through a optical fibre
	5	Acceptance angle and numerical aperture
	6	Types of optical fibres: Single mode and multimode fibres
4	1	Advantages and Disadvantages of optical fibres
	2	Applications of optical fibres
	3	Fibre optic sensors: Fibre Bragg Grating
	4	Advantages and Disadvantages of optical fibres
	5	Applications of optical fibres
	6	Fibre optic sensors: Fibre Bragg Grating

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Week- 5,6,7		
Unit– 1 INTERFERENCE		
WEEK	DAY	TOPIC
5	1	Interference by Division of Wave front
	2	Young"s double slit experiment
	3	Coherence, Conditions of interference
	4	Interference by Division of Wave front
	5	Young"s double slit experiment
	6	Coherence, Conditions of interference
6	1	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet
	2	phase change on reflection
	3	Interference by Division of Amplitude: Plane parallel thin film
	4	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet
	5	phase change on reflection
	6	Interference by Division of Amplitude: Plane parallel thin film
7	1	production of colors in thin films, classification of fringes in films
	2	Interference due to transmitted light and reflected light
	3	wedge shaped film, Newton's rings
	4	production of colors in thin films, classification of fringes in films
	5	Interference due to transmitted light and reflected light
	6	wedge shaped film, Newton's rings
Week- 8,9,10,11		
Unit – 2 DIFFRACTION		
WEEK	DAY	TOPIC
8	1	Fresnel's diffraction: Huygens-Fresnel's theory
	2	Fresnel's assumptions
	3	rectilinear propagation of light, diffraction at a straight edge
	4	Fresnel's diffraction: Huygens-Fresnel's theory
	5	Fresnel's assumptions
	6	rectilinear propagation of light, diffraction at a straight edge
9	1	rectangular slit and diffraction at a circular aperature
	2	Diffraction due to a narrow slit, diffraction due to a narrow wire.
	3	Fraunhoffer diffraction
	4	rectangular slit and diffraction at a circular aperature
	5	Diffraction due to a narrow slit, diffraction due to a narrow wire.
	6	Fraunhoffer diffraction
10	1	Single slit diffraction, double slit diffraction
	2	plane transmission grating spectrum
	3	dispersive power of grating
	4	Single slit diffraction, double slit diffraction
	5	plane transmission grating spectrum
	6	dispersive power of grating
11	1	limit of resolution

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	2	Rayleigh's criterion
	3	resolving power of telescope and a grating
	4	limit of resolution
	5	Rayleigh's criterion
	6	resolving power of telescope and a grating
Week-12,13,14,15,16		
Unit-3 POLARIZATION		
WEEK	DAY	TOPIC
12	1	Polarization: Polarisation by reflection, refraction and scattering
	2	Malus Law
	3	Phenomenon of double refraction
	4	Polarization: Polarisation by reflection, refraction and scattering
	5	Malus Law
	6	Phenomenon of double refraction
13	1	Huygens's wave theory of double refraction (Normal and oblique incidence)
	2	Analysis of polarized Light
	3	Nicol prism
	4	Huygens's wave theory of double refraction (Normal and oblique incidence)
	5	Analysis of polarized Light
	6	Nicol prism
14	1	Quarter wave plate and half wave plate
	2	production and detection of (i) Plane polarized light
	3	Circularly polarized light
	4	Quarter wave plate and half wave plate
	5	production and detection of (i) Plane polarized light
	6	Circularly polarized light
15	1	Elliptically polarized light
	2	Optical activity
	3	Fresnel's theory of optical rotation
	4	Elliptically polarized light
	5	Optical activity
	6	Fresnel's theory of optical rotation
16	1	Specific rotation
	2	Polarimeters (half shade and Biquartz)
	3	Revision
	4	Specific rotation
	5	Polarimeters (half shade and Biquartz)
	6	Revision