PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

Course Code		23PHMIP231			
Title of the Course		WAVE OPTICS			
Offered to: (Programme/s)		B.Sc. Hons Chemistry			
L	**0**	**T**	**0**	**P**	**2**	**C**	**1**
Year of Introduction:		2024-25	Semester:		3
Course Category:	MAJOR	Course Relates to:		L, R, N & G	
Year of Revision:	NA	Percentage:		NA	
Type of the Course:		EMPLOYABILITY & SKILL DEVELOPMENT			
Crosscutting Issues of the Course :		NA			
Pre-requisites, if any		BASIC KNOWLEDGE OF OPTICS			

Course Outcomes

At the end of the course, the student will be able to…

	COURSE OUTCOME	B T L	P O	P S O
CO 1	Gain hands-on experience in using various optical instruments like spectrometers, and polarimeters and making finer measurements of wavelength of light using Newton Rings experiment, diffraction grating etc.	K 2	1	1
CO 2	Understand the principle of working of polarimeter and the measurement of the specific rotatory power of sugar solution	K 1	1	1
CO 3	Know the techniques involved in measuring the resolving power of the telescope and the dispersive power of the material of the prism.	K 4	2	1
CO 4	On successful completion of this practical course the student will be able to, Be familiar with the determination of refractive index of liquid by Boy's method and the determination of thickness of a thin wire by wedge method.	K 1	1	1
CO 5	Evaluate the reliability of diffraction grating and prism methods for wavelength determination.	K 5	2	2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	2							3	
CO3		3						3	
CO4	2							2	
CO5		3							3

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Minimum of 7 experiments to be done and recorded
1. Determination of Radius of Curvature of a Given Convex Lens - Newton's Rings
This experiment involves forming interference patterns known as Newton's rings by placing a convex lens on a flat glass plate. The radius of curvature of the lens can be determined by measuring the diameters of the dark rings formed and using an appropriate mathematical relation.
2. Resolving Power of Grating
This experiment measures the resolving power of a diffraction grating, which is the ability of the grating to distinguish between two close spectral lines. It involves using the diffraction formula to calculate the smallest angular separation of two wavelengths that can be resolved.
3. Study of Optical Rotation – Polarimeter
A polarimeter is used to measure the angle of rotation caused by an optically active substance. By analyzing how plane-polarized light rotates as it passes through substances like sugar solutions, the optical rotation can be measured and used to determine concentration.
4. Dispersive Power of a Prism
This experiment measures the dispersive power of a prism, which is its ability to separate light into its constituent colors. By determining the deviation of light for different wavelengths (colors), the dispersive power of the material of the prism is calculated.
5. Determination of Wavelength of Light Using Diffraction Grating - Minimum Deviation Method
This method involves measuring the wavelength of light by passing it through a diffraction grating and adjusting the grating to the angle of minimum deviation. The wavelength is determined from the diffraction angle and the grating equation.
6. Determination of Wavelength of Light Using Diffraction Grating - Normal Incidence Method
In this experiment, light is normally incident on a diffraction grating, and the resulting diffraction pattern is observed. The wavelength of light is determined by measuring the angles of the diffraction maxima and using the grating equation.
7. Resolving Power of a Telescope
This experiment determines the resolving power of a telescope, which is its ability to distinguish between two closely spaced objects. It involves calculating the angular separation that can be resolved based on the telescope's aperture size and the wavelength of the observed light.
8. Refractive Index of a Liquid - Hollow Prism
In this experiment, a hollow prism is filled with a liquid, and the refractive index of the liquid is determined by measuring the angle of deviation of light passing through the prism. The refractive index is calculated using the prism formula.
9. Determination of Thickness of a Thin Wire by Wedge Method

This method uses an optical interference pattern formed between two glass plates with a thin wire placed between them to create a wedge-shaped air gap. The thickness of the wire is determined by measuring the fringe separation in the interference pattern.

10. Determination of Refractive Index of Liquid - Boy's Method

Boy's method involves measuring the refractive index of a liquid by observing the angle of incidence and refraction of light passing through the liquid. Using Snell's law and the observed angles, the refractive index of the liquid is calculated.

Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.

2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.

3. 15 marks = 15 marks for CIA

4. 35 marks for practical exam.

The marks distribution for the Semester End practical examination is as follows:

Formula/ Principle / Statement with explanation of symbols   05

Diagram/Circuit Diagram / Tabular Columns   05

Setting up of the experiment and taking readings/Observations   10

Calculations (explicitly shown) + Graph + Result with Units   05

Procedure and precautions   05

Viva-voce   05

Total Marks: 35