

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**

**Course Schedule: June - November 2023**

**Department** : **Physics**  
**Name/s of the Faculty** : **Dr. Anceila D**  
**Course Title** : **Optics**  
**Course Code** : **19PH/MC/OP34**  
**Shift** : **I**

<b>Week &amp; No. of hours</b>	<b>Units &amp; Topics</b>	<b>Teaching Methodology</b>	<b>Text &amp; References</b>	<b>Method of Evaluation</b>
June 19 – June 26, 2023 (Day Order 1 to 6)	1.1 Fermat’s principle of least time – importance of Fermat’s principle in relation to the main postulates of geometrical optics – rectilinear propagation of light reversibility of the path of the rays of light	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
June 27 – July 04, 2023 (Day Order 1 to 6)	1.1 the laws of reflection and refraction of light. Huygen’s principle of wavefront propagation and its limitations.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
July 05– July 12, 2023 (Day Order 1 to 6)	1.2 Thick lenses – focal length , critical thickness , power and cardinal points of a thick lens. 2.1 Lens aberrations: monochromatic aberrations	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
July 13 – July 20, 2023 (Day Order 1 to 6)	2.1 spherical aberration-coma-astigmatism - curvature of the field – distortion – chromatic aberrations-methods of minimizing aberrations.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	

July 21 – July 28, 2023 (Day Order 1 to 6)	2.2 Eyepieces: advantage of an eyepiece over a simple lens – Huygen’s and Ramsden’s eyepieces – construction and working – relative merits and demerits of the eyepiece.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	Component  Problem Test
July 31 – Aug 03, 2023 (Day Order 1 to 4)	3.1 Division of wave front : Fresnel’s biprism –theory- fringes with white light - Division of amplitude	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
Aug 04 – Aug 09, 2023	<b>C.A. Test – I</b>			
Aug 10 – Aug 11, 2023 (Day Order 5 to 6)	3.1 Interference in thin films due to (i) reflected light (ii) transmitted light – colours of thin films- Newton’s rings – theory.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
Aug 14 – Aug 22, 2023 (Day Order 1 to 6)	3.2 Interferometers : Michelson’s Interferometer- applications ( i) determination of the wavelength of a monochromatic source of light (ii) standardization of the meter.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	
Aug 23 – Aug 31, 2023 (Day Order 1 to 6)	4.1 Fresnel’s assumptions – Zone plate- action of zone plate for an incident spherical wave front- differences between a zone plate and a convex lens.	Lecture	Jenkins A. and White, Fundamentals of Optics Subramaniam N. and Brijlal, Optics	
Sept 01 – Sept 11, 2023 (Day Order 1 to 6)	4.1 Fresnel type of diffraction :- diffraction pattern due to a straight edge – positions of maximum and minimum intensities- diffraction due to a narrow slit.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	

Sept 12 – Sept 19, 2023 (Day Order 1 to 6)	4.1 Fraunhofer type of diffraction : Fraunhofer diffraction at a single slit-plane diffraction grating – theory- experiment to determine wavelengths – width of principal maxima.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	
Sept 20 - Sept 27, 2023 (Day Order 1 to 6)	4.2 Resolving power of optical instruments : Rayleigh’s criterion for resolution – limit of resolution for the eye-resolving power of (i) telescope (ii) grating.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	Component Quiz
Sept 29 – Oct 03, 2023 (Day Order 1 to 3)	Unit 5 Polarisation  5.1 Double Refraction- optic axis principal plane – Huyghen’s explanation of double refraction in uniaxial crystals.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	
Oct 04 – Oct 09, 2023	<b>C.A. Test – II</b>			
Oct 10 – Oct 12, 2023 (Day Order 4 to 6)	5.2 Elliptically and circularly polarized light – quarter wave plate- half wave plate- production and detection of circularly polarized light and elliptically polarized light.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	
Oct 13 – Oct 20, 2023 (Day Order 1 to 6)	Optical activity- Fresnel’s explanation – specific rotation – Laurent half shade polarimeter- experiment to determine specific rotatory power.	Lecture	Jenkins A. Francis and White, Fundamentals of Optics  Subramaniam N. and Brijlal, Optics	
Oct 25 – Oct 27, 2023 (Day Order 1 to 3)	Problem Solving in optics	Lecture	Jenkins A. Francis and White, Fundamentals of	

			Optics Subramaniam N. and Brijlal, Optics	
Oct 28- Nov 04, 2023	<b>REVISION</b>			