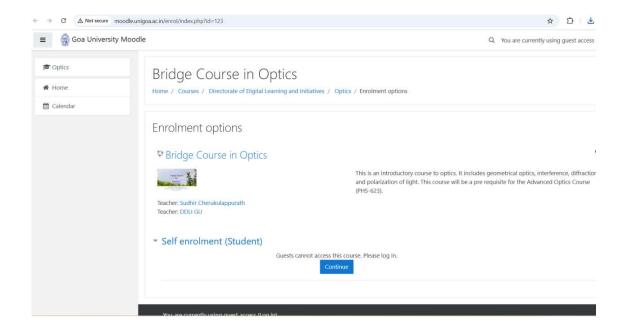


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Programme: M. Sc. (Physics)

Course Code: PHY-003 Title of the Course: Bridge Course in Optics

Number of Credits: 2

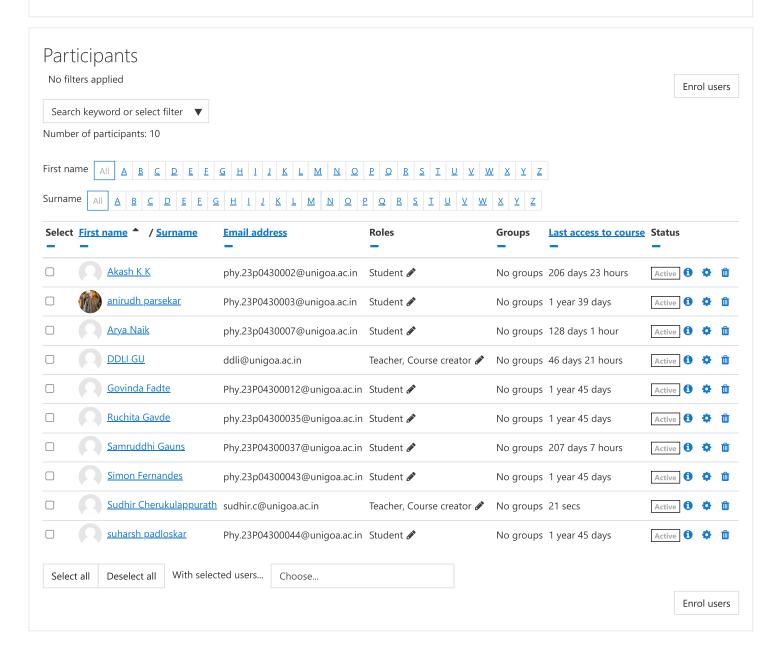
Effective from AY: 2022-2023

Prerequisites for the	B. Sc. Levels courses on mechanics and mathematics	
Course:		
Course Objectives:	This course aims to understand the various concepts of	
Course objectives.	geometric and wave optics	
Content:	1. Geometric Optics	6 hours
<u>content.</u>	<u> </u>	o nours
	Brief history, Propagation of light, Scattering, Reflection	
	and Refraction of light, Fermat's principle, Ray equations,	
	Refraction and reflection by spherical surfaces, Paraxial	
	optics, lenses, mirrors, prisms, optical systems, Total	
	internal reflection, thick lenses, Aberrations.	
	Introduction to eyepieces, Ramsden and Huygens	
	eyepieces.	6 hours
	2. Wave Optics	
	Simple harmonic motion, vibrations, origin of refractive	
	index, sinusoidal waves, one-dimensional wave equation,	
	transverse and longitudinal vibrations, Huygen's	
	principle, plane waves, spherical and cylindrical waves.	6 hours
	3. Interference	
	Superposition of Waves, Division of wavefront & division	
	of amplitude, Formation of colors in thin film- reflected	
	system, transmitted system, wedge shaped film,	
	Newton's Rings and its application to determine	
	refractive index of liquid (Normal Incidence only),	
	Interferometry: Michelson interferometer-its principle,	
	working and its application to determine wavelength and	6 hours
	difference between two wavelengths, Coherence.	
	4. Diffraction	
	Fraunhofer diffraction, Single slit and Double slit	
	patterns, Limit of resolution, Diffraction grating, Fresnel	6 hours
	diffraction, zone-plates, Diffraction by circular discs and	
	apertures, Holography.	
	5. Polarization of light	
	Nature of polarized light, Dichroism, Birefringence,	
	Scattering and Polarization, Polarization by reflection,	
	Brewster angle, Circular polarizers, Wave plates.	
Pedagogy:	Online lectures and assignments	
References/Reading	Ajoy Ghatak, Optics, 7 th Edition, Tata-McGraw-Hill	
<u>s</u>	(2020).	
	(2020).	

	2. Eugene Hecht, Optics, Pearson, 5 th Edition, (2019).
	3. Brij Lal, M N Avadhanulu & N Subrahmanyam, A
	Textbook of Optics, 25 th edition, S. Chand & Company
	(2012).
	4. F.A. Jenkins and H.E. White, Fundamental of Optics,
	Tata McGraw-Hill (1981).
Course Outcomes:	Students will be able to
	Understand geometrical and wave optics
	2. Understand phenomena of interference and
	diffraction
	3. Apply these phenomena to problems in Physics
	4. Understand concept of polarization of light.

Bridge Course in Optics

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