

Subject Description Form

Subject Code	AP30013
Subject Title	Photonics Laboratory
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject will provide the fundamental concepts of optics and photonics and experimental optical alignments and measurements. Data treatment and analyzing skills are also included.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) analyze experimental data by least-squares fit method by using computer software. (b) describe results by a written report containing tabulation of data and graphical illustrations; (c) understand the working principle of some optics and photonics components; (d) use equipment to measure optical properties, refractive index, Brewster's angle etc. of some optical materials; (e) apply knowledge and experimental skills to solve some practical problem in the field of photonics; and (f) use equipment to characterize LED power, emission spectrum, colors.
Subject Synopsis/ Indicative Syllabus	<p>Reflection; refraction and total internal reflection of light; Snell's law.</p> <p>Lens equations; the basic principle of projector and magnifier; skills of handling optics and optical alignments.</p> <p>Understanding the perception of human eyes to size and color.</p> <p>Color and polarization of light; polarization of light; Brewster's angle; polarizer; color filters.</p> <p>Telescope and microscope; double-slit interference and single-slit diffraction; cleaning of the optics; skills of handling optics and optical alignments.</p> <p>Understanding and using the optoelectronic experimental setups to characterize blackbody radiation; incandescent light sources; LED; and white light sources.</p>
Teaching/Learning Methodology	The data process methods and the principles of the lab experiments are introduced in lecture courses in parallel with the lab classes. This would help the students to develop better understandings of the physical principles and to build up their capability to write high-quality experimental reports. The working principles of the lab equipment are presented in the lab manuals and the key points and precautions are highlighted at the beginning of the lab classes. During the laboratory classes, the technician and the tutors assist the students to solve unexpected problems and lead them through the difficult parts. In addition, a presentation session is arranged for students to form groups to

	present on any topics related to the labs. This encourages the students to go for in-depth self study, broadens their knowledge and improves their communication skills in technical discussions.							
Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d	e	f
	(1) Continuous assessment	40	✓	✓	✓	✓	✓	✓
	(2) Practical examination	20	✓	✓	✓	✓	✓	✓
	(3) Written test	40	✓	✓	✓	✓	✓	✓
	Total	100						
Students are expected to excel in physical understanding and practical operation. The continuous assessment includes the lab reports and log books. Written test and practical examination can evaluate the capabilities of the students in problem solving and practical operation.								
Student Study Effort Expected	Class contact:							
	• Lecture		13 h					
	• Laboratory		39 h					
	Other student study effort:							
	• Laboratory report preparation		36 h					
	• Laboratory manual reading, assignment preparation and lecture notes review		32 h					
	Total student study effort		120 h					
Reading List and References	Eugene Hecht, 'Optics', 4 th Edition, Addison Wesley, 2002.							