

City University of Hong Kong
Information on a Course
offered by Department of Electronic Engineering
with effect from Semester B in 2013/14

Part I

Course Title:	Optoelectronic Devices and Applications
Course Code:	EE5605
Course Duration:	One Semester (13 weeks)
No. of credits:	3
Level:	P5
Medium of Instruction:	English
Prerequisites :	Nil
Precursors :	EE2104 Introduction to Electromagnetics, EE2106 Electronic Devices and Circuits, EE2109 Electronic Circuits or equivalent
Equivalent Course :	Nil
Exclusive Courses:	Nil

Part II

Course Aims:

This course aims to provide students with the fundamentals and principles of common optoelectronic devices in the industry, and the knowledge of these devices in optical system applications.

Course Intended Learning Outcomes (CILOs)

Upon successful completion of this course, students should be able to:

No.	CILOs
1.	Explain the characteristics of semiconductor and optoelectronic materials.
2.	Explain the operation principles of a variety of optoelectronic devices.
3.	Apply and design of these devices in optoelectronic systems.

Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

CILO 1-3	Lectures, tutorials, demonstrations, self-study, case studies, assignments, problem solving, tests and exam.
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Timetabling Information

Pattern	Hours
Lecture:	39*
Tutorials:	
Laboratory:	
Other activities:	

* Some of the lectures will be conducted as tutorial sessions for case studies and in the laboratory.

Assessment Tasks/Activities

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

	Type of assessment tasks/	Weighting (if applicable)
Continuous Assessment	Case studies, assignments and tests	40%
Examination	Written exam	60% 2 hours

Remarks: To pass the course, students are required to achieve at least 35% in course work and 35% in the examination.

Grading of Student Achievement:

Letter Grade	Grade Point	Grade Definitions
A+	4.3	Excellent
A	4.0	
A-	3.7	
B+	3.3	Good
B	3.0	
B-	2.7	
C+	2.3	Adequate
C	2.0	
C-	1.7	
D	1.0	Marginal
F	0.0	Failure

Constructive Alignment with Programme Outcomes

PILO	How the course contribute to the specific PILO(s)
1	An ability to apply knowledge of mathematics, science and engineering.
3	An ability to design a system or process that conforms to a given specification within realistic constraints.
5	An ability to identify, formulate and solve engineering problems.

Part III

Keyword Syllabus:

Review - energy band formation in solids, standard notation for energy band diagrams, drift and diffusion current, energy band representation of pn-junction, pn-junction behaviour, nature of light.

Optoelectronic devices – optoelectronic materials, polarization devices, electro-optic devices, liquid crystal display, laser diodes, light emitting diodes, binary III-V semiconductors, quaternary III-V semiconductors, photoconductors, photodiodes, pin photodiodes, avalanche photodiodes.

Applications – Laser cutting, laser welding, laser drilling, laser weapon, laser ranging, compact/video discs, circular polarizer for photographers, electronic displays, Google i-Glass, optical communication system.

Recommended Reading:

Optoelectronic and photonics : principles and practices - SO Kasap

Reference Book:

Semiconductor Device Fundamentals - Robert F. Pierret.

Lasers Principles and Applications – J. Wilson and J.F.B. Hawkes

Fundamentals of Photonics – Bahaa E. Saleh and Malvin Carl Teich

Related Links

[Department of Electronic Engineering](#)