City University of Hong Kong
Course Syllabus

offered by Department of Electrical Engineering
with effect from Semester A 2022/2023

Part I Course Overview

Course Title:	Optical Communications
Course Code:	EE6428
Course Duration:	One Semester (13 weeks)
Credit Units:	3
Level:	P6
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	EE3008 Principles of Communications or equivalent
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	EE4035 Optical Fibre Communications

Part II Course Details

1. Abstract

The course aims to provide students with solid foundation and technical knowledge in fibre optic communication technologies, and to stimulate student's interest in learning and developing the necessary skills for communication engineering profession.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Explain and analyse the transmission characteristics of optical fibres for communication applications.		✓	✓	
2.	Explain the physical principles of a range of optical and optoelectronic components used in optical communication systems and analyse their effects on system performance.		✓	✓	
3.	Analyse and design simple optical fibre communication systems.		✓	✓	
		100%			

A1: *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3				
Lecture	The lecturer delivers the course content and the students are engaged in the discussion of some key concepts.	✓	✓	✓				2 hrs/wk (11 weeks)
Tutorial	Students solve problems and present their solutions to the class to consolidate their understanding of the course content.	✓	✓	✓				1 hr/wk (11 weeks)
Laboratory	Students perform experiments to enhance their understanding of some key concepts and gain some hands-on experience.	✓	✓	✓				3 hrs/wk (2 weeks)

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3					
Continuous Assessment: 50 %								
Tests (min.: 2)	✓	✓	✓				30%	
#Assignments (min.: 3)	✓	✓	✓				12%	
Lab Exercises	✓	✓	✓				8%	
Examination: 50% (duration: 2 hrs , if applicable)								
Examination	✓	✓	✓				50%	
							100%	

Remark:

To pass the course, students are required to achieve at least 30% in course work and 30% in the examination, and complete the laboratory experiments.

may include homework, tutorial exercise, project/mini-project, presentation

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B,)	Marginal (B-, C+, C)	Failure (F)
1. Examination	Achievements in CILOs	High	Medium	Low	Not even reaching marginal level
2. Coursework	Achievements in CILOs	High	Medium	Low	Not even reaching marginal level

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Examination	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal level
2. Coursework	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal level

6. Constructive Alignment with Programme Outcomes

PILO	How the course contribute to the specific PILO(s)
1,2,3,4	The course requires the analysis and the design of components and systems and therefore provides many opportunities for students to solve engineering problems by applying knowledge of mathematics, science, and engineering.
3	Students are required to complete laboratory experiments to gain practical hands-on experience.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

Overview
Historical perspective. Introduction to optical fibre communications.

Optical Fibres
Step-index fibres. Graded-index fibres. Multimode fibres. Single-mode fibres. Attenuation. Dispersion. Birefringence. Fabrication. Characterization.

Optical Components and Devices
Splices. Connectors. Directional couplers. Star couplers. Wavelength (de)multiplexers. Fibre gratings. Polarization controllers. Optical amplifiers. Optical modulators.

Light Sources and Detectors
Laser diodes. Light emitting diodes. Photodiodes.

Optical Fibre Systems
System design considerations. Optical power budgeting. Multiplexing schemes. Emerging technologies.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Nil

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	J M Senior : Optical FIber Communications: Principles and Practice, (Prentice Hall)
2.	J Gowar : Optical Communication Systems, (Prentice Hall)
3.	J Wilson and J F B Hawks : Optoelectronics, (Prentice Hall)