

EE6428: OPTICAL COMMUNICATIONS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Optical Communications

Subject Code

EE - Electrical Engineering

Course Number

6428

Academic Unit

Electrical Engineering (EE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

EE3008 Principles of Communications or equivalent

Equivalent Courses

Nil

Exclusive Courses

EE4035 Optical Fibre Communications

Part II Course Details

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 pursuing a profession in optical communications.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain and analyse the transmission characteristics of optical fibres for communication applications.	x	x	
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.	x	x	
3	Analyse and design simple optical fibre communication systems.	x	x	

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 real-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.

Learning and Teaching Activities (LTAs)

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

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Tests (min.: 2)	1, 2, 3	25	-	No
2	#Assignments (min.: 3)	1, 2, 3	15	-	Yes
3	Lab Exercises	1, 2, 3	10	-	Yes

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

Remark: To pass the course, students are required to achieve at least 30% in course work and 30% in the examination.

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

Assessment Rubrics (AR)**Assessment Task**

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal level

Assessment Task

Coursework (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal level

Assessment Task

Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B) Medium

Marginal

(B-, C+, C) Low

Failure

(F) Not even reaching marginal level

Assessment Task

Coursework (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Achievements in CILOs

Excellent

(A+, A, A-) High

Good

(B+, B) Medium

Marginal

(B-, C+, C) Low

Failure

(F) Not even reaching marginal level

Additional Information for AR**Constructive Alignment with Programme Outcomes**

PILO 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

PILO 3 Students are required to complete laboratory experiments to gain practical hands

Part III Other Information**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; modal birefringence; special fibres; fabrication; characterization

Optical Components and Devices

Coupling light into fibres; fibre connection and splices; directional couplers; star couplers; wavelength (de)multiplexers; polarization controllers; fibre gratings; 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

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	J. M. Senior Optical Fiber Communications: Principles and Practice 3rd edition Prentice Hall 2009.
2	Websites and articles specified in lectures