

EE5412: TELECOMMUNICATION NETWORKS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Telecommunication Networks

Subject Code

EE - Electrical Engineering

Course Number

5412

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

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims to provide students with an understanding of the general fundamental concepts in telecommunication networks and services.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the principles of telecom networks and the Internet.		x	x	
2	Explain the principles of Application Layer.		x	x	
3	Explain the principles of Transport Layer.		x	x	
4	Explain the Inter-networking technologies and protocols.		x	x	x
5	Explain the Link Layer and the LAN protocols.		x	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	General principles of various technologies in telecommunication networking	1, 2, 3, 4, 5	2 hrs/wk
2	Tutorial	Key concepts are worked out based on questions and problem solving	1, 2, 3, 4, 5	1hr/wk
3	Laboratory	Lab sessions with hands-on experience in internetworking	4, 5	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Tests (min.: 2)	1, 2, 3, 4, 5	40	-	No
2	#Assignments (min.: 3)	2, 3	5	-	Yes
3	Lab Exercises/ Reports	4, 5	5	-	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 - Students are able to understand the general principles of various telecommunication networks and services. Students are required to implement a simple network in the lab.

Part III Other Information

Keyword Syllabus

Telecom Networks and the Internet - an Introduction

Packet and Circuit Switching; FDMA/TDMA/CDMA; Delay, Loss and Throughput

Application Layer

Principle of Network Applications; Web and HTTP; Email; DNS; P2PX

Transport Layer

Multiplexing and Demultiplexing; UDP; TCP; TCP Congestion Control

Networking Layer

Forwarding and Routing; IPv4 Datagram Format; Fragmentation; IPv6; Routing Protocols; Intra-AS Routing; Routing among the ISPs

Link Layer and the LANs

Error-detection and correction; Multiple Access; MAC Addresses; inter- and intra-LANs; Ethernet; Switches

Reading List

Compulsory Readings

Title	
1	Kurose and Ross: Computer Networking: A Top-Down Approach, 8th Edition (Pearson, 2020)

Additional Readings

Title	
1	Leon-Garcia and Widjaja: Communication Networks, 2nd Edition, (McGraw-Hill, 2003)
2	Comer: Computer Networks and Internets (Prentice Hall, 2004)
3	Maufer: IP Fundamentals (Prentice Hall, 1999)
4	Tanenbaum A S: Computer Networks (4th Edition, Prentice-Hall, 2002)