

EE5609: COMPUTER NETWORKS: ARCHITECTURE, PROTOCOLS, AND APPLICATIONS

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Computer Networks: Architecture, Protocols, and Applications

Subject Code

EE - Electrical Engineering

Course Number

5609

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

This graduate-level course aims to provide students with an understanding of the general fundamental concepts in computer networks. This course also studies the advanced topics and emerging trends in computer networks.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the principles of Link Layer and LAN.		x	x	
2	Explain the principles of Network Layer.		x	x	
3	Explain the principles of Transport Layer.		x	x	
4	Explain the principles of Application Layer.		x	x	
5	Explain IoT, AIoT, and Cloud/Edge/Fog Computing		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	Students obtain the general principles of various technologies in computer networks.	1, 2, 3, 4, 5	2 hrs/wk
2	Paper Reading and Student Presentation	Students independently select, critically read, and present recent research papers on advanced topics and emerging trends in computer networks. Students engage in group discussions facilitated by peer presentations.	5	

3	Report Writing	Students individually research selected advanced topics or case studies related to computer networks, IoT, or cloud computing and write a comprehensive report.	1, 2, 3, 4, 5	
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Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Tests (min.: 2)	1, 2, 3, 4	25	-	No
2	Paper presentation	5	15	-	Yes
3	Individual Report	1, 2, 3, 4, 5	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

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

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: Students describe and discuss current and anticipated trends in computer networking, including IoT, AIoT, cloud computing, and related technologies, through lectures and research paper reviews.

PILO 2,3: Students develop critical thinking and research skills through independent paper reading, presentation, and report writing, enabling them to apply knowledge to real-world networking challenges.

Part III Other Information**Keyword Syllabus****Computer Networks and the Internet**

Network layers: OSI 7-Layer, Internet 5-Layer; physical layer resilience; packet and circuit switching

Data Link Layer

Flow control, error control; local area network: MAC, Ethernet, wireless LAN

Network Layer: IP Routing Protocols

IP addressing and fragmentation; IPv4; IPv6; IP routing principles and practices; intra-AS and inter-AS routing

Transportation Layer

UDP, TCP: connection management, flow control, error control, congestion control

Application Layer

DHCP, DNS, and HTTP protocols

Advanced Topics in Networking

Internet of Things; cloud/edge/fog computing; Artificial Intelligence of Things

Reading List**Compulsory Readings**

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

Additional Readings

Title	
1	Douglas E. Comer, Computer Networks and Internets
2	Recent Advances in Networking, The ACM SIGCOMM ebook
3	Leon-Garcia and Widjaja: Communication Networks, 2nd Edition, (McGraw-Hill, 2003)
4	Tanenbaum A S: Computer Networks, (4th Edition, Prentice-Hall, 2002)