

EE6413: ADVANCED TOPICS IN NETWORKING TECHNOLOGIES

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Advanced Topics in Networking Technologies

Subject Code

EE - Electrical Engineering

Course Number

6413

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

EE5412 Telecommunication Networks or equivalent

Precursors

EE6412 Signaling, Switching and Routing in Telecommunication Networks; or equivalent

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to provide students with an understanding of the principles, protocols and performance evaluation techniques of various wired and wireless networks.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate the functions of different layers of OSI network model.		x		
2	Describe the latest MAC protocols and their applications in Wi-Fi and cellular networks.		x	x	
3	Describe the latest routing protocols and their applications in Internet and wireless ad-hoc networks.		x	x	
4	Identify the requirements and protocol design methods of practical wired and wireless networks.		x	x	x
5	Apply system management techniques to networks that use different networking technologies.		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	Principles, protocols and performance evaluation techniques of various wired and wireless networks are described and illustrated.	1, 2, 3, 4, 5	3 hrs/wk
2	Case study	A representative network is selected as an example to demonstrate the design principles and performance evaluation techniques described in the lectures.	3, 4, 5	

3	Course project	Students are encouraged to form a team and choose an advanced topic in the area of wired or wireless networking as their course project, and present his/her findings and ideas in class. Comments on their presentations will be provided so that they could better prepare for the final project reports.	3, 4, 5	
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Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	At least 2 assignments (course project etc.)	2, 3, 4, 5	25	
2	One test	1, 2, 3, 4	25	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

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.

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**

PILO 1,2,3 The course provides students with ample opportunities in acquiring knowledge of signal processing as well as applications of mathematics and engineering problem solving skills, which are central to the aims of this program.

PILO 4,5 Students are required to complete assignments designed to apply signal processing techniques for solving real-world problems. The analytical and

Part III Other Information**Keyword Syllabus**Computer Networks

Streaming multimedia, P2P file sharing, TCP and UDP, IPv6, multicast, CSMA/CD, ATM and MPLS.

Cellular Networks

Fading channel, CDMA, OFDMA, scheduling, handoff, mobility management.

Wireless LAN and Wireless Ad-hoc Networks

WiFi, CSMA/CA, QoS provisioning, DSDV, AODV, DSR, mobile IP, energy management.

Networks Management

System configurations, logging, notifications, upgrades with minimum service disruption, system management.

*some of the materials in Networks Management shall be delivered via mini-project, in the laboratory including telecommunications network management, and cloud computing infrastructure management.

Reading List**Compulsory Readings**

Title	
1	James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach (6th Edition), Pearson, 2013.

Additional Readings

Title	
1	C. Siva Ram Murthy and B. S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols Prentice Hall, 2004.