

# EE3315: INTERNET TECHNOLOGY

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## Effective Term

Semester A 2024/25

## Part I Course Overview

### Course Title

Internet Technology

### Subject Code

EE - Electrical Engineering

### Course Number

3315

### Academic Unit

Electrical Engineering (EE)

### College/School

College of Engineering (EG)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

EE3009 Data Communications and Networking

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

The students will learn the knowledge of key technologies and protocols in the TCP/IP protocol suite, network control plane. It will look at technologies which transform the Internet from its data-only roots to a true multi-service network that can handle voice, video and multimedia with comparable quality and reliability.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Recognize the design principles and the implementation issues of IP routing protocols and SDN control plane		x	x	
2	Explain the principles for TCP and apply them to solve problems analytically		x	x	
3	Recognize the design principles for multimedia networking, e.g. audio and video streaming		x	x	
4	Explain the principles for various application protocols		x	x	
5	Demonstrate the understanding of IP routing protocols through hands-on tasks in laboratory exercise		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 will engage in formal two-hour lectures to cover the subject material. Whenever possible, numerical examples and graphical illustrations will be provided to strength the students' learning and understanding.	1, 2, 3, 4	3 hrs/wk

2	Laboratory	Students perform hands-on tasks in laboratory exercise in order to strengthen students' knowledge of IP routing protocols acquired in the lecture.	5	3 hrs/wk(4 wks)
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**Assessment Tasks / Activities (ATs)**

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tests (min.: 2)	1, 2, 3, 4	30	
2	#Assignments (min.: 3)	1, 2, 3, 4	10	
3	Lab Exercises/Reports	5	10	

**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. Also, 75% laboratory attendance rate must be obtained.

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

**Assessment Rubrics (AR)****Assessment Task**

Examination

**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 levels

## Assessment Task

Coursework

### 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 levels

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## Part III Other Information

### Keyword Syllabus

#### Transport Layer

- User Datagram Protocol (UDP)
- Transmission Control Protocol (TCP)
  - TCP Addressing: TCP connection, TCP endpoint, TCP port
  - Retransmission Strategy: positive acknowledgements, retransmission timeout, adaptive retransmission algorithm
  - TCP Flow Control: credit allocation scheme, window advertisement
  - Connection Establishment: problems with two-way handshake, three-way handshake
  - Connection Termination: graceful termination, modified three-way handshake
  - Congestion Control: Slow Start, Congestion Avoidance, Fast Retransmit, Fast Recovery
- Stream Control Transmission Protocol (SCTP)

#### Application Layer

- Internet Services and Protocols: Host Configuration (DHCP), Domain Name System (DNS), Remote Logging (Telnet and SSH), File Transfer (FTP), Electronic Mail (SMTP/POP/IMAP, MIME), WWW (HTTP), Network Management (SNMP), Multimedia.
- Network Programming: Socket API with implementation of DNS, Telnet, FTP, SSH, SMTP/POP/IMAP/MIME or HTTP
- Internet Applications: Client-Server Architecture, P2P, HTML, XML

#### Internet Routing & Software Defined Networking (SDN) Control Plane

- Routing principles: distance vector, link-state, hierarchical routing
- Internet routing protocols: RIP, EIGRP, OSPF, EGP, BGP
- SDN: SDN-controlled switches, SDN controller, network-control applications, OpenFlow protocol

#### Multimedia Networking

- Multimedia networking applications, streaming stored video, voice-over-IP
- Protocols for real-time conversational applications, network support for multimedia

### Laboratory Experiment:

Laboratory will complement the lecture and reinforce students' understanding of the course material.

## Reading List

### Compulsory Readings

Title	
1	Kurose and Ross: Computer Networking – A Top Down Approach , 7th Edition, (Pearson Addison Wesley, 2017)

### Additional Readings

Title	
1	Nil