



## Course Specifications

<b>Course Title:</b>	Network Engineering 1
<b>Course Code:</b>	CEN2351
<b>Program:</b>	Computer and Networks Engineering
<b>Department:</b>	Computer Engineering
<b>College:</b>	Computer and Information System
<b>Institution:</b>	Umm Al Qura University

## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>3</b>
1. Course Description .....	3
2. Course Main Objective.....	3
3. Course Learning Outcomes .....	3
<b>C. Course Content</b> .....	<b>4</b>
<b>D. Teaching and Assessment</b> .....	<b>4</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods .....	4
2. Assessment Tasks for Students .....	5
<b>E. Student Academic Counseling and Support</b> .....	<b>5</b>
<b>F. Learning Resources and Facilities</b> .....	<b>5</b>
1. Learning Resources .....	5
2. Facilities Required.....	5
<b>G. Course Quality Evaluation</b> .....	<b>6</b>
<b>H. Specification Approval Data</b> .....	<b>6</b>

## A. Course Identification

<b>1. Credit hours:</b>	<b>4</b>
<b>2. Course type</b>	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 2 <sup>nd</sup> year – 6 <sup>th</sup> semester	
<b>4. Pre-requisites for this course (if any):</b> Network Fundamentals and Applications	
<b>5. Co-requisites for this course (if any):</b> None	

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	% . . \)
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	<b>Total</b>	60

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course provides students with an introduction to Network Engineering, focusing on Layer-2 switching and Layer-3 routing as key enablers for the Internet. The course is designed for providing fundamental knowledge in switching, IP addressing, and internet routing protocols. The course establishes a solid, base foundation in IP technology and prepares you to advance further in the program with additional courses.

### 2. Course Main Objective

The main objective of this course is to enable students to describe the operation of the Internet in depth and to be able to setup and configure some networking equipment.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	Describe fundamental concepts and mechanisms in network engineering.	K1
1.2		

CLOs		Aligned PLOs
1.3		
1...		
<b>2</b>	<b>Skills :</b>	
2.1	Select, setup and configure state-of-the-art IP networking devices such as routers for optimal operation.	S3
2.2	Select and configure appropriate protocols for networking devices and secure operations.	S3
2.3		
2...		
<b>3</b>	<b>Values:</b>	
3.1	Ability to acquire further knowledge with some guidance or support.	V1
3.2		
3.3		
3...		

### C. Course Content

No	List of Topics	Contact Hours
1	The network layer (Introduction, virtual circuit, and datagram network)	12
2	What's inside a router (Input processing, switching, output processing, queueing, routing control plane)	12
3	The Internet protocol IP (Datagram, IPv4 addressing, ICMP, IPv6)	12
4	Routing algorithm (LS and DV routing, hierarchical routing)	12
5	Routing in the internet (RIP, OSPF, BGP)	6
6	broadcasting and multicasting	6
<b>Total</b>		<b>60</b>

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Describe fundamental concepts and mechanisms in network engineering.	lecture	Written test
1.2			
...			
<b>2.0</b>	<b>Skills</b>		
2.1	Select, setup and configure state-of-the-art IP networking devices such as routers for optimal operation.	Lecture and Lab	Practical test/exam/project
2.2	Select and configure appropriate protocols for networking devices and secure operations.	Lecture and lab	Practical test/exam/project
...			
<b>3.0</b>	<b>Values</b>		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Ability to acquire further knowledge with some guidance or support.	lecture	Assignment
3.2			
...			

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm Exam	7 <sup>th</sup>	25%
2	Labs checkpoints	Throughout semester	10%
3	Practical task	10 <sup>th</sup>	15%
4	Final exam	11 <sup>th</sup> or 12 <sup>th</sup>	50%
5			
6			
7			
8			

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

Arrangements are made for individual student consultations and academic advice for the duration of 6 hours per week. In addition, faculty is available 10 hours per week for student help and consulting.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Computer Networking, a Top-Down Approach; J. F. Kurose, K. W. Ross, 7 <sup>th</sup> edition 2018
<b>Essential References Materials</b>	
<b>Electronic Materials</b>	
<b>Other Learning Materials</b>	

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	TRADITIONAL CALSSROOM

Item	Resources
	COMPUTER LAB
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	PROJECTOR, CISCO PACKET TRACER
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	Survey at end of course
Quality of learning resources	Instructor	Survey at end of course
Course learning achievement	Instructor	Course report

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	Computer engineering council
<b>Reference No.</b>	
<b>Date</b>	