Course Specification

Course Title:	**Network Switching and Routing**
Course Code:	**CS1758**
Program:	**Computer Science**
Department:	**Computer Science and Engineering**
College:	**Computer Science and information technology**
Institution:	**Albaha University**
Version:	**: T104 – V1**
Last Revision Date:	**February 9, 2023**

Table of Contents:

A. General information about the course:

Course Identification	
1. Credit hours:	3

2. Course type

a.	University ☐	College ☐	Department ☒	Track☐	Others☐
b.	Required ☐	Elective☒			

3. Level/year at which this course is offered: 11 / 4th year (**Elective (Networking Track))**

4. Course general Description

Lecture:

This course is for students who elect to go into the networking track of computer science program. In the course, students build on their basic understanding of Computer Networks in previous course to develop extended theoretical and practical knowledge of advanced routing. This module provides coverage of the methods used for routing traffic across both large and small network infrastructures. The techniques examined, range from small scale static routing to the use of dynamic routing protocols (such as EGP, BGP, OSPF and EIGRP) The course emphasizes, function and use of the various protocols.

Lab:

The lab is planned to give students practical experience of routing. Students will be given an introduction to Packet Tracer network simulator. Students will also learn how to:
- Perform basic routing devices configuration, setup and troubleshooting techniques for WANs and enterprise networks.
- Perform basic routing protocols configuration, verification and troubleshooting of Static Routing, RIP, BGP, OSPF and EIGRP routing protocols.

5. Pre-requirements for this course (if any): Computer Networks 2 (CS1257)

6. Co- requirements for this course (if any): none

7. Course Main Objective(s)
The main purpose for this course is to teach students how to:
- Define core switching concepts at network layer
- Define core concepts of routing protocols of static and dynamic routing.
- Define the basic architecture of RIP, BGP, OSPF and EIGRP routing protocols.
- Apply different mathematical and logical principles related to IPv4/IPv 6addressing and subnetting basics.
- Perform basic routing devices and basic routing (connected, static and default) configuration and troubleshooting techniques for WANs and enterprise networks.
- Perform dynamic routing protocols configuration, verification and troubleshooting: RIP, BGP, OSPF and EIGRP routing protocols.
- Work both independently and collaboratively.

1. Teaching mode (**mark all that apply**)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	100%
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning		
4.	Distance learning		

2. Contact Hours (**based on the academic semester**)

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	22
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
	Total	44

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define core switching concepts at network layer	K1	● Lectures ● Homework	● Quiz ● Midterm Exam ● Final Exam ● Rubric (homework)
1.2	Define core concepts of routing protocols of static and dynamic routing.	K2	● Lectures ● Homework	● Quiz ● Midterm Exam ● Final Exam ● Rubric (homework)
1.3	Define the basic architecture of RIP, BGP, OSPF and EIGRP routing protocols.	K2	● Lectures ● Homework	● Quiz ● Midterm Exam ● Final Exam ● Rubric (homework)

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.0	Skills			
2.1	Apply different mathematical and logical principles related to IPv4/IPv6 addressing and subnetting basics.	S1	● Lectures ● Homework	● Quiz ● Midterm Exam ● Final Exam ● Rubric (homework)
2.2	Perform basic routing devices and basic routing (connected, static and default) configuration and troubleshooting techniques for WANs and enterprise networks.	S2	● Lab exercises ● Lab participation and reports	● Lab Exam ● Rubric (for Lab participation and reports)
2.3	Perform dynamic routing protocols configuration, verification and troubleshooting: RIP, BGP, OSPF and EIGRP routing protocols.	S2	● Lab exercises ● Lab participation and reports	● Lab Exam ● Rubric (for Lab participation and reports)
3.0	Values, autonomy, and responsibility			
3.1	Work both independently and collaboratively.	V1	Individual and Group LAB exercises and Troubleshooting Assignments	- Rubric (for report and oral discussion)

C. Course Content

No	List of Topics	Contact Hours
1.	Network layer Principles and Basic Switching at this layer	3
2.	IPV4 vs IPv6	3
3.	Static versus dynamic routing	4
4.	RIP Routing protocol	2
5.	OSPF Routing Protocol	4
6.	EIGRP Routing Protocol	3
7.	BGP Routing protocol	3
Total		22

No	List of Topics (Lab)	Contact Hours
1.	Getting familiar with Packet Tracer (installation and Training)	3

2.	Basic Devices setup	3
3.	Basic IPv4 Serial WAN setup	2
4.	Basic IPv6 Ethernet WAN setup	2
5.	Static Routing configuration and troubleshooting	1
6.	Troubleshooting Routing Problems in Enterprise Network	1
7.	Routing Information Protocol (RIP) configuration and troubleshooting	1
8.	OSPF Single_Area configuration and troubleshooting	3
9.	OSPF MultipleArea configuration and troubleshooting	2
10.	EIGRP configuration and troubleshooting	2
11.	Configuration and verification of External BGP	2
	Total	22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homeworks	Periodically (every two weeks)	10%
2.	Midterm Exam	6	20%
3.	Quiz	10	10%
4.	Lab Exam	12	10%
5.	Lab participation and reports (Continuous Evaluation)	every two weeks	10%
6.	Final Exam	13	40%
	Total		**100%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	● Computer Networks, 5th Edition by Andrew Tanenbaum and David Wetherall, Prentice Hall, 2010. ISBN 978-0132126953
Supportive References	● Teare, Diane.,Vachon, Bob. & Graziani, Rick. Implementing Cisco IP routing (ROUTE), Foundation learning guide, CCNP ROUTE 300-101 ● Ramon Nastase, NicolaeAfrasinei (Ed.), *Computer Networking: Your CCNA Guide in Routing Protocols and Computer Networking for Passing the CCNA*, CISCO Press.
Electronic Materials	• ACM (Association for Computer Machinery) web site - http://www.acm.org/ • IEEE Computer Society web site - http://www.computer.org/portal/web/guest/home

	• Access to the Saudi Digital Library (SDL). Using the learning management system of the university – Rafid System (https://lms.bu.edu.sa/).
Other Learning Materials	• Packet Tracer Software Guide

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• A classroom or lecture hall with whiteboard for 28 students. • Computer network lab (with packet tracer)
Technology equipment (projector, smart board, software)	• A digital image projection system with connection to desktop computer and laptop computer. • High speed Internet connection. • An instructor computer station.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Faculty • Peer Reviewers • Program Leader • Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visit by Program Leader • Comprehensive Course report (where we can find information about teaching difficulties and action plan, …)
Effectiveness of students assessment	• Students • Faculty • Peer Reviewers • Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview

Assessment Areas/Issues	Assessor	Assessment Methods
	● Exam Evaluation Committee ● Course Coordinator	between Program leader and students). ● Assessment results (direct) ● Course evaluation by Peer Reviewers (indirect). ● Comprehensive Course report (where we can find information about assessment difficulties and action plan, …) ● Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	● Students ● Faculty ● Peer Reviewers ● Course Coordinator	● Surveys (indirect) ● Course evaluation by Peer Reviewers (indirect). ● Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan, …)
The extent to which CLOs have been achieved	● Faculty ● Program Leader ● Course Coordinator ●	● Student Results (direct) ● Comprehensive Course report (where we can find the CLO assessment results)
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	