





Course Specifications

Course Title:	Network Administration
Course Code:	41021902
Program:	Computer Science
Department:	Computer Science and Engineering
College: Computer Science and Information Technology	
Institution:	Albaha University



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A. Course Identification

1. Credit hours: 3			
2. Course type			
a. University College Department × Other	s		
b. Required Elective ×			
3. Level/year at which this course is offered: Elective (Networking 7	Track)		
4. Pre-requisites for this course (if any):			
Computer Networks (41011213)			
5. Co-requisites for this course (if any):			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	50	50%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other (Lab)	50	50%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours		
Contac	Contact Hours			
1	Lecture	30		
2	Laboratory/Studio	30		
3	Tutorial			
4	Others (specify)			
	Total	60		
Other Learning Hours*				
1	Study	4		
2	Assignments	1		
3	Library			
4	Projects/Research Essays/Theses	1		
5	Others (specify)			
	Total	6		

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course will focus on the design, installation, configuration, and operation of local area networks. It provides students with the knowledge and skills necessary to install and configure a stand-alone and client computer that are part of a workgroup or domain.

Students will explore topics in network administration in theoretical and practical way, study different software platforms, control, shared resources, administration, security, anti-virus procedures and methodologies.

Lab.

The lab gives students practical experiments on managing a network. Performing measurement of the network is an important challenge, thus the lab will cover the measurement using utility software, including

- Performance measurement
- Defense the network: configuring firewalls, anti-virus, proxy servers, servers.
- Managing users in different operating systems.
- Back up procedure and disaster recovery

2. Course Main Objective

The main purpose for this course is to:

- Describe the concept and roles of network and system administration.
- Demonstrate an understanding of hardware and software configuration basics.
- Demonstrate an understanding of the importance of network security policies in Linux and Windows environment.
- Modify, configure, implement and verify networking services for Intranet and Internet domains.
- Analyze, assess, and troubleshoot network performance, connectivity and security issues.
- Interact in groups collaboratively.
- Communicate concepts and techniques in discussion.

3. Course Learning Outcomes

CLOs		Aligned PLOs	
1	Knowledge:		
1.1	Describe the concept of network and system administration.	K1	
1.2	Describe the roles of network and system administrator.	K1	
2	Skills:		
2.1	Demonstrate an understanding of hardware and software	51	
	configuration basics.		
2.2	2.2 Demonstrate an understanding of the importance of network security		
	policies in Linux and Windows environment.		
2.3	2.3 Modify, configure, implement and verify networking services for		
Intranet and Internet domains.		55	
3	Competence:		
3.1	Communicate concepts and techniques in oral presentations.	C2	

C. Course Content

No	List of Topics	Contact Hours
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1	Introduction and role of system administrators	2
2	Organization of IT systems	4
3	Networking review	4
4	Network connections and management	4
5	Data centers	2
6	Observation and backups	4
7	Performance analysis and tuning	2
8	Security and ethics	2
9	Cross-platform services	2
10	Deployment and IT support management	2
11	User support, maintenance and change	2
	Total	30

Lab

No	List of Topics	
1	Management: system installation consisting of clients and servers.	6
2	Networking: install and configure networking services for intranet and Internet domains.	
3	3 Security: network security policies in Linux and Windows environment.	
4	Capacity Planning: design small and medium sized business IT infrastructure organization.	6
5 Backups: evaluate alternative policies and mechanisms for providing reliability features of computer system services and operations.		6
	Total	30

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods	
1.0	Knowledge			
1.1	Describe the concept of network and system administration.	Lectures Lab	Assignment Quiz Midterm Exam Final Exam	
1.2	Describe the roles of network and system administrator.	Lectures Lab	Assignment Quiz Midterm Exam Final Exam	
2.0	Skills			
2.1	Demonstrate an understanding of hardware and software configuration basics.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam	

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Final Exam
2.2	Demonstrate an understanding of the importance of network security policies in Linux and Windows environment.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam Final Exam
2.3	Modify, configure, implement and verify networking services for Intranet and Internet domains.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam Final Exam
3.0	Competence		
3.1	Communicate concepts and techniques in oral presentations.	Oral Presentations	Presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	Periodically	5%
2	Midterm exam	Week 8	15%
3	Quiz	Week 11	10%
4	Project	Week 13	10%
5	lab Exam	Week 14	20%
6	Final Exam	Week 16	40%

*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:

The faculty offered 3 hours per week for each group of students as office hour. In addition, the students are welcomed to send their enquires via the official email or the LMS (Rafid).

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• T. A. Limoncelli, C. J. Hogan, and S. R. Chalup, <i>The Practice of System and Network Administration</i> (3rd Ed.), Addison-Wesley, 2016.
Essential References Materials	 E. Nemeth, G. Snyder, T. R. Hein, and B. Whaley, UNIX and Linux System Administration Handbook: (4th Ed.), Prentice Hall, 2011. W. Soyinka, Linux Administration A Beginners Guide (6thEd.), McGraw Hill, 2012.

	 C. Hunt, <i>TCP/IP Network Administration</i> (3rd Ed.), O'Reilly, 2002. T. Carpenter, <i>Microsoft Windows Server Administration Essentials</i>, Sybex, 2011.
Electronic Materials	 IEEE Xplore: https://ieeexplore.ieee.org/ IEEE Communications Society (ComSoc): https://www.comsoc.org/ ACM (Association for Computer Machinery) web site - http://www.acm.org/ Open access course material online
Other Learning Materials	

2. Facilities Required

Item	Resources		
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	 A classroom or lecture hall with whiteboard. An instructor computer station with High speed Internet connection A desktop computer with a common database managements system access Power outlets for instructor's laptop plug-in A digital image projection system with connection and switches to desktop computer and laptop computer All laboratories should have computers with access to at least one major database management system 		
Technology Resources (AV, data show, Smart Board, software, etc.)	 Students are supposed to have A laptop or access to a desktop computer with access to a major database management system High speed Internet connection Power outlets for student's laptop plug-in 		
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	A lab with high speed internet connection and installed the last version of Android Studio		

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	StudentFaculty	Surveys (indirect).Direct feedback from students
	Peer ReviewersProgram Leader	 Course evaluation by Peer Reviewers (indirect).
	Course Coordinator	Class visit by Program Leader

Evaluation Areas/Issues	Evaluators	Evaluation Methods	
		 Comprehensive Course report (where we can find information about teaching difficulties and action plan,) 	
Effectiveness of assessment	 Student Faculty Peer Reviewers Examination Committee Course Coordinator 	 Surveys (indirect). Direct feedback from students Assessment results (direct) Course evaluation by Peer Reviewers (indirect). Exam evaluation by the Exam Evaluation Committee (indirect) 	
Extent of achievement of course learning outcomes	FacultyProgram LeaderCourse Coordinator	 Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results) 	
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,) 	

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

Council / Committee	Computer science & Engineering department council
Reference No.	Second meeting 2020-2021 academic year
Date	1-september-2020

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Course Specifications

Course Title:	Advanced Network Routing
Course Code:	41021904
Program:	Computer Science
Department:	Computer Science and Engineering
College:	Computer Science and Information Technology
Institution:	Albaha University



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1.Learning Resources	6
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A. Course Identification

1.	Credit hours: 3		
2.	Course type		
a.	University College Department 🗸 Others		
b.	Required Elective 🗸		
3.	3. Level/year at which this course is offered: Elective (Networking Track)		
4.	4. Pre-requisites for this course (if any): Computer Networks (41011213)		
5.	Co-requisites for this course (if any): none		

6. Mode of Instruction (mark all that apply)

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No	Mode of Instruction	Contact Hours	Percentage		
1	Traditional classroom	30	50%		
2	Blended				
3	E-learning				
	Correspondence				
5	Other (Lab)	30	50%		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours		
Contac	Contact Hours			
1	Lecture	30		
2	Laboratory/Studio	30		
3	Tutorial	-		
4	Others (specify)	-		
	Total	60		
Other Learning Hours*				
1	Study	30		
2	Assignments	10		
3	Library	-		
4	Projects/Research Essays/Theses	6		
5	Others (specify)	-		
	Total	46		

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

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 so as 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. Hot trends and issues of routing in mobile and wireless routing issues are also discussed.

Lab

The lab is planned to give students practical experiments on routing. Students will be given an introduction to Packet Tracer network simulator. Students will also learn how to:

- Configure EIGRP (Enhanced Interior Gateway Routing Protocol)
- Configure BGP (Border Gateway Protocol)
- Configure Network Services
- IPv6 Routing
- Implement different types of OSPF areas

2. Course Main Objective

The main purpose for this course is to teach students how to:

- Define core switching concepts at network layer at IPV4 and IPV6
- Define core concepts of routing protocols of static and dynamic routing.
- Define the basic architecture of BGP, OSPF and EIGRP routing protocols.
- Demonstrate an understanding routing issues for mobile and wireless.
- Apply different mathematical and logical principles related to routing.
- Analyze routing problem and perform troubleshooting techniques.
- Work both independently and collaboratively.
- Communicate concepts and techniques in oral presentations.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge:	
1.1	Define core switching concepts at network layer at IPV4 and IPV6	K1
1.2	Define core concepts of routing protocols of static and dynamic routing.	K1
1.3	Define the basic architecture of BGP, OSPF and EIGRP routing	K2
	protocols.	
1.4	Demonstrate an understanding routing issues for mobile and wireless.	K2
2	Skills :	
2.1	Apply different mathematical and logical principles related to routing	S2
2.2	Analyze routing problem and perform troubleshooting techniques	S1
3	Competence:	
3.1	Work both independently and collaboratively	C1
3.2	Communicate concepts and techniques in oral presentations.	C2

C. Course Content

No	List of Topics	Contact Hours
1	Network layer Principles and Basic Switching at this layer	4
2	IPV4 vs IPv6	2
3	Static versus dynamic routing	4
4	BGP Routing protocol	4
5	EIGRP Routing Protocol	4
6	Advanced OSPF Routing Protocol	6
7	Other routing protocols (e.g EGP)	2
8	Trends in Routing (routing in mobile and wireless issues)	4
	Total	30

No	List of Topics (LAB)	Contact Hours
1	Getting familiar with Packet Tracer	6
2	Configure static routing	4
3	Configure EIGRP (Enhanced Interior Gateway Routing Protocol)	4
4	Configure BGP (Border Gateway Protocol)	4
5	Configure Network Services	4
6	IPv6 Routing	4
7	Implement different types of OSPF areas	4
Total		

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Define core switching concepts at network layer at IPV4 and IPV6	LecturesAssignments	- Midterm Exam - Quiz - Final Exam
1.2	Define core concepts of routing protocols of static and dynamic routing.	Lecturesassignments	HomeworkMidtermFinal exam
1.3	Define the basic architecture of BGP, OSPF and EIGRP routing protocols.	LecturesAssignments	- Homework - Midterm - Final exam
1.4	Demonstrate an understanding routing issues for mobile and wireless.	AssignmentsDiscussions	AssignmentsReportsOral presentations
2.0	Skills		
2.1	Apply different mathematical and logical principles related to routing	Lecturesassignments	AssignmentsMidterm examFinal Exam
2.2	Analyze routing problem and perform troubleshooting techniques	LecturesLab assignments	AssignmentsMidterm exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Lab examFinal Exam
3.0	Competence		
3.1	Work both independently and collaboratively		ReportsClass discussions
3.2	Communicate concepts and techniques in oral presentations.		- Oral presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Bi-weekly homework exercises	Every two Weeks	10%
2	Midterm Exam	8	20%
3	Quiz	14	10%
4	Lab Exam	15	20%
5	Final Exam	16	40%

*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 :

The faculty offered 3 hours per week for each group of students as office hour. In addition, the students are welcomed to send their enquires via the official email or the LMS (Rafid).

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Computer Networks, 5th Edition by Andrew Tanenbaum and David Wetherall, Prentice Hall, 2010. ISBN 978-0132126953
Essential References Materials	 Teare, Diane., Vachon, Bob. & Graziani, Rick. Implementing Cisco IP routing (ROUTE), Foundation learning guide, CCNP ROUTE 300-101 Ramon Nastase, Nicolae Afrasinei (Ed.), <i>Computer Networking:</i> <i>Your CCNA Guide in Routing Protocols and Computer</i> <i>Networking for Passing the CCNA</i>, CISCO Press.
Electronic Materials	 ACM (Association for Computer Machinery) web site - <u>http://www.acm.org/</u> 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 (<u>https://lms.bu.edu.sa/</u>).
Other Learning Materials	Packet Tracer Software Guide

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	 A classroom or lecture hall with whiteboard for 28 students. Computer network lab (with packet tracer)
Technology Resources (AV, data show, Smart Board, software, etc.)	 A digital image projection system with connection to desktop computer and laptop computer. High speed Internet connection. An instructor computer station
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	 Student Faculty Peer Reviewers Program Leader Course Coordinator 	 Surveys (indirect). Direct feedback from 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 assessment	 Student Faculty Peer Reviewers Examination Committee Course Coordinator 	 Surveys (indirect). Direct feedback from students Assessment results (direct) Course evaluation by Peer Reviewers (indirect). Exam evaluation by the Exam Evaluation Committee (indirect)
Extent of achievement of course learning outcomes	FacultyProgram LeaderCourse Coordinator	 Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results)
Quality of learning resources	StudentsFacultyPeer Reviewers	 Surveys (indirect) Course evaluation by Peer Reviewers (indirect). Comprehensive Course report

Evaluation Areas/Issues	Evaluators	Evaluation Methods
	Course Coordinator	(where we can find information about difficulties and challenges about learning resources as well as consequences and action plan,)

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

Council / Committee	Computer science & Engineering department council
Reference No.	Second meeting 2020-2021 academic year
Date	1-september-2020

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Course Specifications

Course Title:	Advanced Switching
Course Code:	41021906
Program:	Computer Science
Department:	Computer Science and Engineering
College:	Computer Science and Information Technology
Institution:	Albaha University



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E. Student Academic Counseling and Support6	
F. Learning Resources and Facilities7	
1.Learning Resources	7
2. Facilities Required	7
G. Course Quality Evaluation8	
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A. Course Identification

1. Credit hours: 3
2. Course type
a. University College Department x Others
b. Required Elective ×
3. Level/year at which this course is offered: Elective (Networking Track)
4. Pre-requisites for this course (if any):
Computer Networks (41011213)
5. Co-requisites for this course (if any):
None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	50%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other (Lab)	30	50%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours	
Contac	Contact Hours		
1	Lecture	30	
2	Laboratory/Studio	30	
3	Tutorial		
4	Others (specify)		
	Total	60	
Other	Learning Hours*		
1	Study	4	
2	Assignments	1	
3	Library		
4	Projects/Research Essays/Theses	1	
5	Others (specify)		
	Total	6	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course sets the students up with the solid background they need on layer 2 switching, how switches perform address learning and make forwarding and filtering decisions. In addition, switch port security with MAC addresses is covered in detail. It will introduce the

Spanning-Tree Protocols (STP) and dive into the fundamentals, covering the modes, as well as the various characteristics of STP. VLANs, trunks, and troubleshooting are covered as well. EtherChannel technologies, configuration, and verification are also covered. Comprehensive labs (hands-on labs, a written lab, and plenty of review questions) emphasize hands-on learning and practice to reinforce configuration skills.

Lab.

The lab is planned to give students practical experiments on computer networks, using Packet Tracer simulator software. Students will also learn how to:

- Configure Initial Switch Settings
- Spanning tree
- VLAN
- SDN
- MPLS

2. Course Main Objective

The main purpose for this course is to:

- Describe the concept of switching.
- Describe and implement VLAN and Spanning Tree technologies in a Campus network.
- Demonstrate an understanding of layer 2 fundamentals including spanning tree, VLAN, trunking, and multicasting.
- Demonstrate an understanding to configure Inter-VLAN routing, DHCP in a Multilayer Switched environment.
- Modify, configure, implement and verify High Availability and First Hop redundancy protocols.
- Analyze, assess, and troubleshoot switch performance, connectivity and security issues
- Communicate concepts and techniques in discussions.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge:	
1.1	Describe the concept of switching.	K1
1.2	Describe and implement VLAN and Spanning Tree technologies in a Campus network.	К2
2	Skills :	
2.1	Demonstrate an understanding of layer 2 fundamentals including spanning tree, VLAN, trunking, and multicasting.	S1
2.2	Demonstrate an understanding to configure Inter-VLAN routing, DHCP in a Multilayer Switched environment.	S2
2.3	Analyze, assess, and troubleshoot switch performance, connectivity and security issues.	S3
3	Competence:	
3.1	Communicate concepts and techniques in oral presentations.	C2

C. Course Content

No	List of Topics	Contact Hours
1	Switching Basics	2
2	VLANs Review	4
3	VLAN Trunking Protocols (VTP)	4
4	4 Spanning-Tree Protocols (STP)	
5	5 Types of Spanning-Tree Protocols	
6 LAN Switching Protocols and Features		4
7	7 EtherChannel technologies	
8	8 Layer 2 Multicast	
9	Security	2
	Total	30

Lab

No	List of Topics	Contact Hours	
1	Network Devices Review	4	
2	Introduction to Packet Tracer	4	
3	Configure Initial Switch Settings	2	
4	Configure, verify, and troubleshoot VLANs (normal range) spanning multiple switches: Access ports (data and voice)	4	
5	Configure, verify, and troubleshoot VLANs (normal range) spanning multiple switches: Default VLAN	4	
	Configure, verify, and troubleshoot interswitch connectivity:• Trunk ports• 802.1Q• Native VLAN• Configure and verify Layer 2 protocols• Cisco Discovery Protocol• LLDP		
	Configure, verify, and troubleshoot port security: • • Static • • Dynamic • • Sticky 6 • Max MAC addresses • • Violation actions •		
	Total	30	

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge	•	•
1.1	Describe the concept of switching.	Lectures Lab	Assignment Quiz Midterm Exam Final Exam
1.2	Describe and implement VLAN and Spanning Tree technologies in a Campus network.	Lectures Lab	Assignment Quiz Midterm Exam Final Exam
2.0	Skills	F	*
2.1	Demonstrate an understanding of layer 2 fundamentals including spanning tree, VLAN, trunking, and multicasting.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam Final Exam
2.2	Demonstrate an understanding to configure Inter-VLAN routing, DHCP in a Multilayer Switched environment.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam Final Exam
2.3	Analyze, assess, and troubleshoot switch performance, connectivity and security issues.	Lectures Lab	Assignment Quiz Lab Exam Midterm Exam Final Exam
3.0	Competence		
3.1	Communicate concepts and techniques in oral presentations.	Oral Presentations	Presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	Periodically	5%
2	Midterm exam	Week 8	15%
3	Quiz	Week 11	10%
4	Project, and report	Week 13	10%
5	lab Exam	Week 14	20%
6	Final Exam	Week 16	40%

*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 :

The faculty offered 3 hours per week for each group of students as office hour. In addition, the students are welcomed to send their enquires via the official email or the LMS (Rafid).

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	 A. Tanenbaum and D.J. Wetherall, <i>Computer Networks</i>, Prentice Hall, 5th edition, 2010
Essential References Materials	 B. A. Forouzan, <i>Data Communications and Networking</i>, McGraw Hill Publishers, 5th edition, 2012. J. S. Beasley and P. Nilkaew, <i>Networking Essentials</i>, Pearson, 3rd edition. D. E. Comer, <i>Computer Networks and the Internet</i>, Prentice- Hall, Global Edition, 2016. T. Lammle, <i>CCNA Routing and Switching Complete Study</i> <i>Guide</i>, Sybex, 2nd Edition.
Electronic Materials	 IEEE <i>Xplore</i>: https://ieeexplore.ieee.org/ IEEE Communications Society (ComSoc): https://www.comsoc.org/ ACM (Association for Computer Machinery) web site - http://www.acm.org/ Open access course material online
Other Learning Materials	

2. Facilities Required

Item	Resources	
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	 A classroom or lecture hall with whiteboard. An instructor computer station with High speed Internet connection A desktop computer with a common database managements system access Power outlets for instructor's laptop plug-in A digital image projection system with connection and switches to desktop computer and laptop computer All laboratories should have computers with access to at least one major database management system 	
Technology Resources (AV, data show, Smart Board, software, etc.)	 Students are supposed to have A laptop or access to a desktop computer with access to a major database 	

Item	Resources
	management system
	 High speed Internet connection
	 Power outlets for student's laptop plug-in
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	A lab with high speed internet connection and installed the last version of Android Studio

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	 Student Faculty Peer Reviewers Program Leader Course Coordinator 	 Surveys (indirect). Direct feedback from 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 assessment	 Student Faculty Peer Reviewers Examination Committee Course Coordinator 	 Surveys (indirect). Direct feedback from students Assessment results (direct) Course evaluation by Peer Reviewers (indirect). Exam evaluation by the Exam Evaluation Committee (indirect)
Extent of achievement of course learning outcomes	FacultyProgram LeaderCourse Coordinator	 Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results)
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,)

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)

II. Specification Approval Data			
Council / Committee	Computer science & Engineering department council		
Reference No.	Second meeting 2020-2021 academic year		
Date	1-september-2020		

H. Specification Approval Data







Course Specifications

Course Title:	Design and Management of Computer Network
Course Code:	41021908
Program:	Computer Science
Department:	Computer Science and Engineering
College:	Computer Science and Information Technology
Institution:	Albaha University



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A. Course Identification

1.	Credit hours: 3		
2.	Course type		
a.	University College Department Others		
b.	Required Elective		
3.	Level/year at which this course is offered: Elective (Networking Track)		
4. Pre-requisites for this course (if any): Computer Network (41011213)			
5. Co-requisites for this course (if any): None			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	50%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other (Lab)	30	50%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours	
Contac	et Hours		
1	Lecture	30	
2	Laboratory/Studio	30	
3	Tutorial		
4	Others (specify)		
	Total	60	
Other Learning Hours*			
1	Study	30	
2	Assignments	10	
3	Library	-	
4	Projects/Research Essays/Theses	6	
5	Others (specify)	-	
	Total	46	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Lect.

This course prepares students to design and manage various aspects of organizational network. Coverages include Business goals and constraints Analysis, Top-Down network design methodology, existing internetwork characterization, network topology design, addressing and numbering model, routing protocols selection, network security strategies design, network management strategies, physical network design, technologies and devices for enterprise networks, network design testing, network design optimization, network design documentation, network management standards & models, SNMP management.

Lab.

The lab covers the logical and physical design of the network using network simulator software such as Packet Tracer and measure the design performance. As for network management, the lab focuses on SNMP architecture.

2. Course Main Objective This course main Objectives are:

- Outline the network design process and network management strategies
- Describe SNMP protocol
- Design different network topologies and physical network.
- Apply network management strategies
- Analyze business goals and constraints using a top-down network design methodology
- Optimize network design
- Work both independently and collaboratively
- Communicate concepts and techniques in oral presentations

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Outline the network design process and network management strategies	K1
1.2	Describe SNMP protocol	K2
2	Skills :	
2.1	Design different network topologies and physical network.	S1
2.2	Apply network management strategies	S3
2.3	Analyze business goals and constraints using a top-down network	S2
	design methodology	
2.4	Optimize network design	S2
3	Competence:	
3.1	Work both independently and collaboratively	C1
3.2	Communicate concepts and techniques in oral presentations	C2

C. Course Content

No	List of Topics	Contact Hours	
× .	Lectures		
1	Business goals and constraints Analysis, Top-Down network design methodology	2	
2	Existing internetwork characterization	2	
3	Network topology design,	4	
4	Addressing and numbering model,	2	
5	Routing protocols selection,	2	
6	Network security strategies design,	2	
7	Network management strategies,	2	
8	Physical network design,	2	
9	Technologies and devices for enterprise networks,	2	
10	Network design testing, network design optimization,	2	
11	Network design documentation,	2	
12	Network management standards & models,	2	
13	SNMP management and review	4	
	Total 30		
List of Topics (Lab)			
1	Designing logical and physical LAN	4	
2	Measuring LAN design performance	4	
3	Designing logical and physical Campus Network/WAN	6	
4	Measuring Campus Network/WAN design performance	4	
5	Configuring SNMP Manager and Agents	8	
6	Converting OID Codes with the Cisco SNMP Object Navigator	4	
	Total 30		

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods	
1.0	Knowledge			
1.1	Outline the network design process and network management strategies	LecturesAssignments	 Home work Quizzes Midterm exam Final Exam 	
1.2	Describe SNMP protocol	LecturesAssignments	 Home work Quizzes Midterm exam Final Exam 	
2.0	Skills			
2.1	Design different network topologies and physical network.	LecturesAssignmentsLab assignmentCourse project	 Home work Quizzes Midterm exam Lab exam Final Exam 	

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Course project report
2.2	Apply network management strategies	LecturesAssignmentsCourse project	 Home work Quizzes Midterm exam Lab exam Final Exam Course project presentation and report
2.3	Analyze business goals and constraints using a top-down network design methodology	LecturesAssignmentsCourse project	 Home work Quizzes Midterm exam Lab exam Final Exam Course project presentation and report
2.4	Optimize network design	 Lectures Assignments Lab assignment Course project 	 Home work Quizzes Midterm exam Lab exam Final Exam Course project presentation and report
3.0	Competence		
3.1	Work both independently and collaboratively	- Small groups Project assignment	Lab Evaluation Course project presentation and report
3.2	Communicate concepts and techniques in oral presentations	- Oral presentation Project assignment	Lab Evaluation Course project presentation and report

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework and Quiz	Weekly	10%
2	Mid-term exam	7	20%
3	Course project presentation and report	14	10%
4	Lab Reports, Continuous Evaluation and/or Exam	Weekly	20%
5	Final Exam	16	40%
6	Total		100%

*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 :

The faculty offered 3 hours per week for each group of students as office hour. In addition, the students are welcomed to send their enquires via the official email or the LMS (Rafid).

F. Learning Resources and Facilities

1.Learning resources		
Required Textbooks	 Priscilla Oppenheimer, Top-Down Network Design, Cisco Press; 3rd Edition (September, 2010). ISBN-10: 1587202832 (TB1) 	
Essential References Materials	 Lee Chao, Networking Systems Design and Development by CRC Press; 1st Edition (December 21, 2009). ISBN-10: 142009159X (TB2) Teresa C. Piliouras and Kornel Terplan, Network Design: Management and Technical Perspectives, CRC Press (August 19, 1998). ISBN-10: 0849334047 Klaus Wehrle, MesutGünes, and James Gross, Modeling and Tools for Network Simulation, Springer (September 23, 2010). ISBN-10: 3642123309 Mani Subramanian; Timothy A. Gonsalves and N. Usha Rani, Network Management: Principles and Practice, Pearson Education India (2010). ISBN-10: 81-3172759-9 	
Electronic Materials	 ACM (Association for Computer Machinery) web site - http://www.acm.org/ ACM SIGARCH (Special Interest Group on Computer Network) - http://www.sigarch.org/ IEEE Computer Society web site - http://www.computer.org/portal/web/guest/home Open access course material online 	
Other Learning Materials	None	

1.Learning Resources

2. Facilities Required

Item	Resources		
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	 A classroom or lecture hall with whiteboard for 25 students. A Communication/Network laboratory. 		
Technology Resources (AV, data show, Smart Board, software, etc.)	 A digital image projection system with connection to desktop computer and laptop computer. High speed Internet connection. An instructor computer station. 		
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None		

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	 Student Faculty Peer Reviewers Program Leader Course Coordinator 	 Surveys (indirect). Direct feedback from 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,) Surveys (indirect). Direct feedback from students Assessment results (direct) Course evaluation by Peer Reviewers (indirect). Exam evaluation by the Exam Evaluation Committee (indirect)
Effectiveness of assessment	 Student Faculty Peer Reviewers Examination Committee Course Coordinator 	
Extent of achievement of course learning outcomes	FacultyProgram LeaderCourse Coordinator	 Student Results (direct) Comprehensive Course report (where we can find the CLO assessment results)
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,)

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

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