Course Specification

T-104
2022

Course Title:	Routing and Switching2
Course Code:	NET 0206
Program:	*Network*
Department	*Applied College*
College:	*Applied College*
Institution:	***Imam Mohammad Bin Saud Islamic University***
Version:	***1st version***
Last Revision Date:	**2024/01/22**

Table of Contents:

A. General information about the course:

Course Identification	
1. Credit hours:	3 hours (2 theoretical, 2 practical)
2. Course type	
a.	University ☐ College ✓☐ Department☐ Others☐
b.	Required ✓ Elective☐
3. Level/year at which this course is offered:	
4. Course general Description This course is the third part of a series aimed at equipping students with fundamental skills in using, operating, and configuring network devices. In this course, students will be trained in operating routers and switches, handling them through theoretical knowledge and hands-on practice, and using them in network design. Upon completion of this course, students will be eligible for the ● Cisco Certified Network Associate (CCNA).	
5. Pre-requirements for this course (if any): Networking 0105	
6. Co- requirements for this course (if any): None	
7. Course Main Objective(s) The main goal of this course is to provide students with essential skills in handling routers and switches, configuring their basic operations, and controlling network access and security. Through the course, students will develop competence in working with these network devices effectively.	

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom		
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning	33	100%
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 (assignments, self-study, projects, researches, tests and teamwork)	120
	Total	164

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	Identifying Local Area Networks (LANs): classifications, segmentation, and technologies	ع1، ع5	- Classroom Lecture - Dialogue and Discussion - Surveying - Discovery Learning - Self-learning - Enhanced Lecture - Brainstorming - Web-Based Inquiry - KWL Chart - Mind Maps - Concept Maps	-Traditional and Electronic Achievement Tests -Classroom Questions -Assignments and Periodic Assessments -Presentations -Debate and Argumentation -Cognitive Performance Tests -Portfolio
1.2	Acquiring a solid understanding of the fundamental concepts of switching: operation, specifications, tasks, and hardware and software components	ع1، ع5		
1.3	Understanding the fundamentals and types of routing protocols	م1، م2، م8		
1.4	Understanding the concept of access lists: classifications, components, and operational methods	ع1، ع5		
2.0	Skills			
2.1	Identifying the required components to meet local area network specification	ع1، ع5	- Practical Demonstration - Enhanced Lecture - Discovery Learning - Peer Learning - Self-learning - Dialogue and Discussion - Web-Based Inquiry - Brainstorming - Cooperative Learning - Problem Solving - Project-Based Learning	-Presentations -Grading Scales -Practical Performance Tests -Productivity Metrics -Observation -Programming Projects -Self-Assessment -Peer Assessment -Portfolio
2.2	Configuring communication on switching devices and verify their functionality.	ع1، ع5		
2.3	Efficiently building wired and wireless local area networks (LANs) with high proficiency	ع1، ع5		
2.4	Proficiency in using routing and switching protocols.	ع1، ع5		
2.5	Ability to identify and troubleshoot issues with routing devices and perform necessary repairs	ع1، ع5		
2.6	Engaging in communication and idea exchange regarding the course while utilizing information and communication technology	ع1، ع5		

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	for scientific research, task performance, and cost analysis		- Online Discussion Forums	
2.7	Practicing critical thinking and creative problem-solving skills to address challenges faced by the learners through the course	ع1، ع5		
3.0	Values, autonomy, and responsibility			
3.1	Collaborating and working effectively as a team, embodying professional ethics	ق1	- Project-Based Learning - Cooperative Learning - Dialogue and Discussion - Hands-on Lecture - Modeling and Mentoring - Web-Based Inquiry	-Note Cards -Discussion and Dialogue -Classroom Questions -Grading Scales -Value Metrics -Self-Assessment -Peer Assessment -Portfolio
3.2	Taking responsibility for continuous learning and committing to personal development	ق2		
3.3	Efficiently managing time while applying acquired knowledge and skills	ق3		

C. Course Content

No	List of Topics	Contact Hours
1.	- Local Area Networks (LAN): ● Concept of Networks ● Types of Networks ● Local Area Networks LANs ○ Components of LANs ○ Types of LANs ❖ Based on Topology, Operation, Features, and Drawbacks): ● Bus Topology ● Star Topology ● Ring Topology ● Mesh Topology ● Tree Topology ● Special Topology ❖ Based on functional Relationships: ● Peer-to-Peer Network: Usage, Components, Pros, and Cons	4

	● Client-Server Network: Usage, Components, Pros, and Cons, Types of servers ❖ Based on Communication Medium: Usage, Pros, and Cons ● Wired Networks ● Wireless Networks ● Differences Between Wired and Wireless Networks ● Criteria for Selecting the Appropriate Network.	
2.	- LAN Segmentation ● Definition of LAN Segmentation ● Features of LAN Segmentation ● LAN Segmentation Types and Practical Application ○ LAN Segmentation using Bridges: ■ Functions of Bridges ■ Types of Bridges ■ Benefits of LAN Segmentation using Bridges ■ Drawbacks of LAN Segmentation using Bridges ○ LAN Segmentation using Routers: ■ Functions of Routers ■ Benefits of LAN Segmentation using Routers ■ Drawbacks of LAN Segmentation using Routers ■ Cisco Router Functions ○ Comparison between LAN Segmentation using Bridges and Routers ○ LAN Segmentation using Switches: ■ Functions of Switches ■ Benefits of LAN Segmentation using Switches ■ Drawbacks of LAN Segmentation using Switches ■ Switch Operation using MAC Addresses ■ Communication Methods using Switches ■ Data Transmission Methods Using Switches: ● Store and Forward Principle: Working Principle, Pros, and Cons, Operation Methods ● Cut Through Principle: Working Principle, Pros, and Cons, Operation Methods ■ Characteristics of Switch Ports ○ Comparison between LAN Segmentation Using Bridges and Routers	8
3.	- Ethernet Technology: ● Concept of Internet	8

	● Types of Internet Networks (Infrastructure, Speed, Cable, Transmission Method): ○ Base T10 ○ Base 210 ○ Base 510 ○ Base F10 ● Communication Media in Ethernet Networks (Types, Characteristics, Pros, and Cons): ○ Coaxial Cable ○ Twisted Pair Cable ○ Fiber Optic ● Transmission Modes in Ethernet Networks (Working Principles): ○ Half Duplex ○ Full Duplex ● Data Framework in Internet Network ● Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Algorithm	
4.	- Congestion Control: ● Concept of Network Congestion ● Causes of Network Congestion ● Emergence of Congestion ● Factors Influencing Congestion ● Solutions for Congestion Problem (Operation Time and Working Method): ○ Opened Loop ○ Closed Loop ● Congestion Problem Solutions Based on Network Type: ○ Congestion in Virtual Networks ○ Data Packets Networks Handling Network	4
5.	- Spanning Tree Protocol (STP): ● Concept of STP ● STP Usage ● STP Working Mechanism ● STP Protocol Elections (Method and Example) ○ Root Switch Election ○ Root Port Election ○ Designated Port Election for Each Switch ● STP Use Cases ○ Blocking ○ Listing ○ Learning ○ Forwarding ○ Disable ● Practical Application of STP Protocol on Network.	8
6.	- Virtual LAN (VLAN) Networks: ● Concept of VLAN ● Features of VLAN ● Challenges of VLAN ● Configuring VLAN	8

	● Difference Between Subnetting and Virtual LAN ● Practical Application of Virtual LAN on Networks	
7.	- Access Control List (ACL): ● Concept of ACL ● Usage of ACL ● Benefits of ACL ● Types of ACL: (Usage - Working Mechanism- Practical Application) ○ Standard Access List ○ Extended Access List ○ Named Access List ● Components of ACL	4
Total		44

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Two Class Tests (Theoretical and Practical)	Week 7&10	30%
2.	Quizzes (2 quizzes)	Week 3&6&9	10%
3.	Practical Application	Week 8	25%
6.	Participation	All Semester	5%
7.	Final Exam	Week 12	30%
8.	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	Cisco Networking Academy. CCNA R&S 6.0 Bridging (Cisco Systems) Retrieved from Cisco Networking Academy: http://www.netacad.com
Supportive References	1. Routing and switching essentials. Indianapolis, IN: Cisco Press, by Boger, P. 2. Routing and Switching Essentials Lab Manual (Lab Companion), Cisco Systems, Inc. Published by: Cisco Press, 800 East 96th Street Indianapolis, IN 46240 USA 3.CCNA Routing and Switching Complete Study Guide: Exam 100-105, Exam 200-105, Exam 200-125, by Todd Lammle. Sybex Publishing.
Electronic Materials	Cisco Networking Academy- blackboard
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom – A computer lab equipped and connected to a shared printer and the internet.
Technology equipment (projector, smart board, software)	Smart board, data projector, Microsoft Visio or Edraw Max and Internet browser.
Other equipment (depending on the nature of the specialty)	N\A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer references – students.	1.Questionnaires and referendums approved by the department. 2.Peer evaluation of faculty members. 3.Review the results of the students' evaluation.
Effectiveness of students assessment	Peer references - program leaders - faculty members – students.	1.Questionnaires and referendums approved by the department. 2.Review course descriptions and course reports periodically. 3.Peer evaluation and periodic exchange of correction and scrutiny

Assessment Areas/Issues	Assessor	Assessment Methods
		among fellow faculty members. 4.Review samples of students' work.
Quality of learning resources	Program leaders - faculty members - students	1.Questionnaires and referendums approved by the department. 2.Write-offs and monitoring.
The extent to which CLOs have been achieved	Program leaders - faculty members.	1.Review the course report. 2. Analysis of exams forms, grades, students' work and records of achievement.
Other		

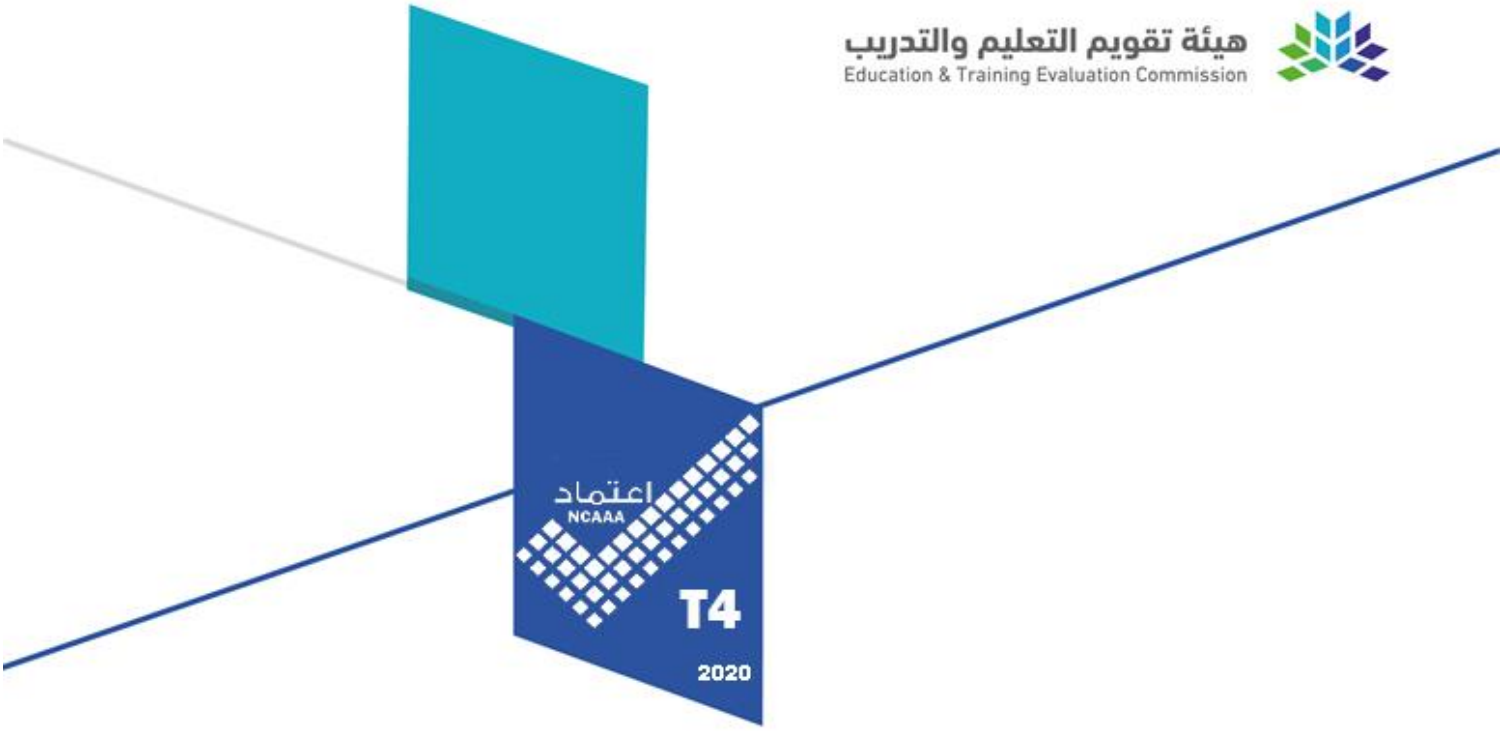
Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Department of Applied Sciences – Applied College
REFERENCE NO.	
DATE	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Network Cabling
Course Code:	205 شبك
Program:	Networks Technology
Department:	Applied Sciences
College:	Applied College
Institution:	Imam Mohammad Bin Saud Islamic University

Table of Contents

A. Course Identification

1. Credit hours:	**3 (2 Theory, 2 lab)**
2. Course type:	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Fourth Level
4. Pre-requisites for this course (if any)**:**	101 شبك, 104 عال
5. Co-requisites for this course (if any)**:**	N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**		
2	**Blended**	48	100%
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	24
2	**Laboratory/Studio**	24
3	**Tutorial**	
4	**Others** (specify)	120
	Total	168

B. Course Objectives and Learning Outcomes

1. Course Description

This course deals with the different types of network media, such as different types of cables, how to prepare them, and network planning, implementation, and documentation. Also, training is given on how to use different cable inspection and repair devices and design rules for standard cable systems.

2. Course Main Objective

This course aims to provide the student with the basic skills to get acquainted with the network connection media and the preparation of cables used in computer networks, as well as the use of some cable testing and repair devices, and knowledge of their standard installations and specifications.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Familiarity with basic knowledge in networking technology.	ع1، ع2، ع3، ع5

CLOs		Aligned-PLOs
2	**Skills:**	
2.1	The use of signal measuring devices and methods of encoding information in them.	م1، م2، م3، م4، م8
2.2	Extending and installing cables and using network testing devices.	م1، م2، م3، م4، م6، م8
2.3	Distinguish between the protocols and technologies used in wireless networks and the use of devices to test and prepare them.	م1، م2، م3، م4، م6، م8
2.4	Proficiency in using networking components.	م1، م2، م3، م4، م8
2.5	Communication and exchange of ideas about the course and the use of information and communication technology in scientific research and the performance of tasks and costs.	م1، م2، م8
2.6	Practicing critical thinking and solving problems that the learner faces in the course in creative ways.	م1، م2، م8
3	**Values:**	
3.1	Collaboration, teamwork, and professional ethics.	ق1
3.2	Take the responsibility for continuous learning, and self-development.	ق2
3.3	Effective and efficient time management when applying acquired knowledge and skills.	ق3

C. Course Content

No	List of Topics	Contact Hours

1	**Introduction to Networking:**
	• Networks and Communications:
	  ○ Communication technology:
	  ○ Define communications.
	  ○ Communication and network components.
	  ○ Communication programs and their main function.
	• The concept of signals:
	  ○ Data types.
	  ○ How data is transmitted in networks.
	  ○ How the computer deals with data.
	  ○ Messaging patterns.
	  ○ Problems with the signals when they are transmitted from the transmitter to the receiver.
		8

2	**Signal measuring devices:** • Nature of electrical and optical signals measuring devices. • Electrical measuring devices. • Digital gauges. • Instruments measuring the intensity and wavelength of light. • Training on types of optical and electrical communications. • Encoding information into electrical signals. • Measuring noise and signal strength.	4

3	**Dealing with and processing wired communication media in networks:**
	• Coaxial cables:
	  ○ Types.
	  ○ Characteristics.
	  ○ How to stretch it.
	  ○ Standards for extension.
	  ○ Advantages and disadvantages.
	  ○ Types of networks used for it.
	  ○ Processing rules.
	• Cables (UTP) and cables (STP):
	  ○ Types.
	  ○ Characteristics.
	  ○ How to stretch it.
	  ○ Standards for extension.
	  ○ Advantages and disadvantages.
	  ○ Types of networks used for it.
	  ○ Processing rules.
	• Optical fiber cables:
	  ○ Types.
	  ○ Characteristics.
	  ○ How to stretch it.
	  ○ Standards for extension.
	  ○ Advantages and disadvantages.
	  ○ Types of networks used for it.
	  ○ Processing rules.
		12

	• Cable testers:
	  o Types.
	  o How it works.
	  o Types of problems that are discovered through them.	

4	**Types of wireless communication media and their characteristics:**
	• Wireless network:
	  o Definition.
	  o Components.
	  o Uses.
	  o Types.
	  o Benefits.
	  o Problems.
	  o Advantages for the wired network.
	• Mobile networks:
	  o Global System for Mobile communication (GSM):
	  - Definition.
	  - How it works.
	  - Advantages and disadvantages.
	  o (CDMA) technology.
	  o The difference between CDMA technology and (GSM).
	• Access Points:
	  o Definition.
	  o Functions.
	  o Uses.
	  o Types:
	  - Characteristics of each type.
	  - Advantages of each type.
	• Protocols and technologies used for communication in wireless networks.
	• Wireless network equipment.
	• Devices for checking wireless networks.
	• Standard specifications for wireless communication media.
		12

5	**Network components:**
	• Number steps before building the network:
	  o Information gathering.
	  o Inspection of the place.
	  o Diagram.
	  o Equipping network construction equipment.
	• Network building steps:
	  o Build gear.
	  o Build or prepare software.
	  o Diagram.
	  o Equipping network construction equipment.
	• Delivery Frames (MDF):
	  o Definition.
	  o How to connect it.
	  o Types.
	  o Advantages.
	• Patch Panels:
	  o Definition.
		12

	○ Uses. ○ Execution steps for installing wires in connection panels. • Distribution cabins: ○ Definition. ○ Uses. • Distribution racks: ○ Definition. ○ Uses. ○ Types. • Basic rules in connecting networks. • Documenting network work.	
Total		48

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 and Understanding**		
1.1	Familiarity with basic knowledge in networking technology.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. KWL learning table. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance tests.
2.0	**Skills**		
2.1	The use of signal measuring devices and methods of encoding information in them.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance tests.
2.2	Extending and installing cables and using network testing devices.		
2.3	Distinguish between the protocols and technologies used in wireless networks and the use of devices to test and prepare them.		
2.4	Proficiency in using networking components.		
2.5	Communication and exchange of ideas about the course and the use of information and communication technology in scientific research and the performance of tasks and costs.		
2.6	Practicing critical thinking and solving problems that the learner faces in the course in creative ways.		
3.0	**Values**		
3.1	Collaboration, teamwork, and professional ethics.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance
3.2	Take the responsibility for continuous learning, and self-development.		
3.3	Effective and efficient time management when applying acquired knowledge and skills.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term	Week 7	20%
2	Quizzes (2 Quizzes)	Week 5, 10	10%
3	Exercises and Practicality	Week 2-11	15%
4	Project	Week 11	20%
5	Participation	All Semester	5%
6	Final	Week12	30%
7	Total Marks		100%

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

E. Student Academic Counseling and Support

- Publishing the guidelines prepared by the Deanship of Admission and Registration Affairs.
- Allocating office hours for faculty members to follow up on students' academic inquiries, respond to e-mail, communicate through electronic systems, and provide feedback.
- Seeking to solve the academic problems for students and all related to the causes of dismissal, academic stumbling, delay and low average.

F. Learning Resources and Facilities

1.Learning Resources

Course reference	1. LAN Wiring, by James Trulove. 2. Cabling: The complete Guide to Network wiring, by David Groth, Jim McBee, Sybex. 3. CNAP: First Semester Companion Guide, Cisco.
Essential References Materials	N/A
Electronic Materials	Online resources will be provided during class lectures on LMS.
Other Learning Materials	N/A

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom – A computer lab equipped and connected to a shared printer and the internet.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board, data projector, Internet browser and Packet Tracer Software.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N\A

G. Course Quality Evaluation

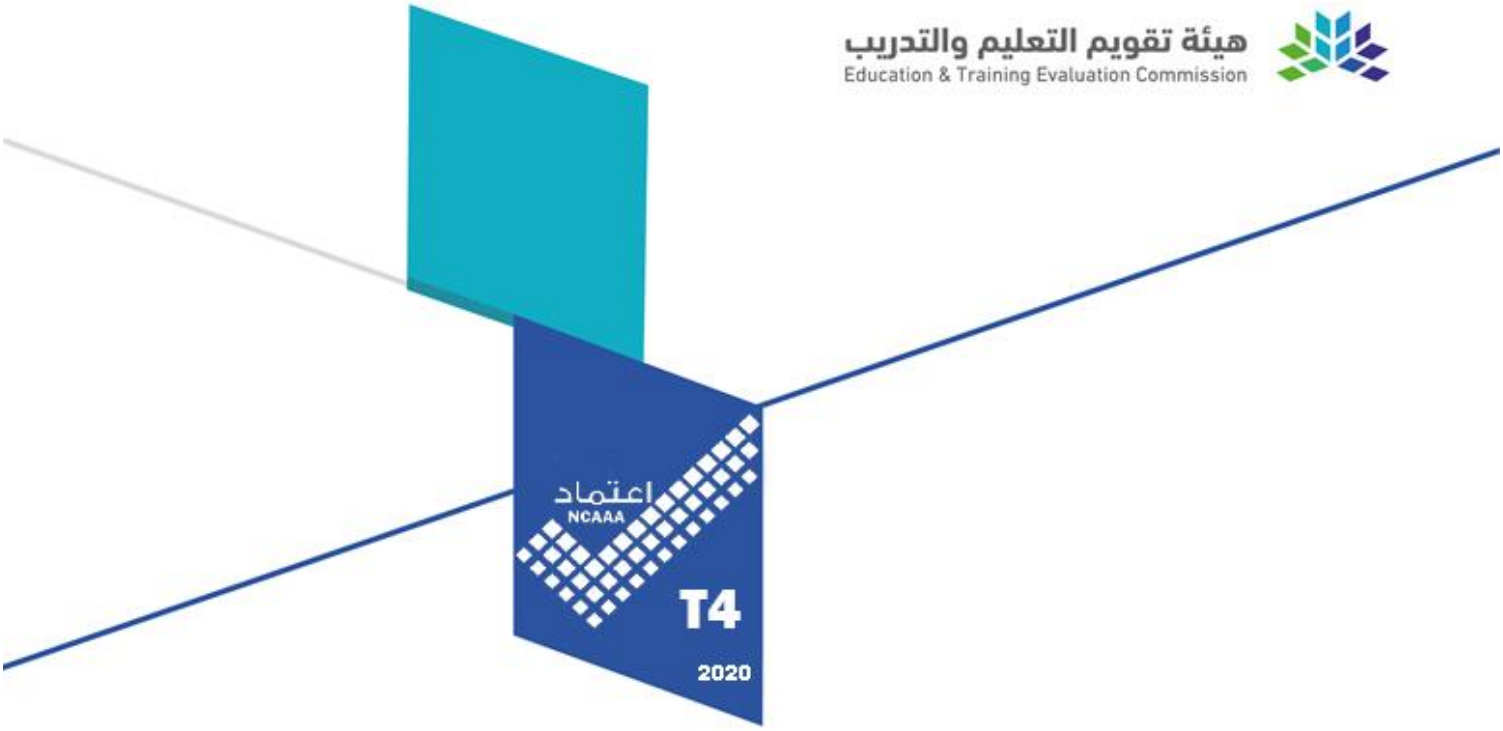
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Peer references – students.	1. Questionnaires and referendums approved by the department. 2. Peer evaluation of faculty members. 3. Review the results of the students' evaluation.
Effectiveness of student assessment methods.	Peer references - program leaders - faculty members – students.	1. Questionnaires and referendums approved by the department. 2. Review course descriptions and course reports periodically. 3. Peer evaluation and periodic exchange of correction and scrutiny among fellow faculty members. 4. Review samples of students' work.
Learning Resources.	Program leaders - faculty members - students	1. Questionnaires and referendums approved by the department. 2. Write-offs and monitoring.
Achieved learning outcomes of the course.	Program leaders - faculty members.	1. Review the course report. 2. Analysis of exams forms, grades, students' work and records of achievement.

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	Department of Applied Sciences – Applied College
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Network Monitoring And Maintenance
Course Code:	207 شبك
Program:	Networks Technology
Department:	Applied Sciences
College:	Applied College
Institution:	Imam Mohammad Bin Saud Islamic University

Table of Contents

A. Course Identification

1. Credit hours:	**3 (2 Theory, 2 lab)**
2. Course type:	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Fourth Level
4. Pre-requisites for this course (if any)**:**	104 عال
5. Co-requisites for this course (if any)**:**	N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**		
2	**Blended**	48	100%
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	24
2	**Laboratory/Studio**	24
3	**Tutorial**	
4	**Others** (specify)	120
	Total	168

B. Course Objectives and Learning Outcomes

1. Course Description

This course deals with the basic concepts of monitoring and troubleshooting the networks. During this course, the students are trained to use various programs to monitor the performance of networks and ensure their continuity.

2. Course Main Objective

This course aims to provide for the student with the basic skills to install and operate the programs necessary to monitor and maintain networks. Therefore, the students deal with emergency problems, as well as to observe network performance and propose solutions to increase its efficiency.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	

CLOs		Aligned-PLOs
1.1	Familiarity with basic and general knowledge in network monitoring and maintenance.	ع1، ع2، ع3، ع4، ع5
2	**Skills:**	
2.1	Being able to improve and monitor network performance and compare it to standard benchmarks.	م1، م2، م3، م4، م6، م8
2.2	Measuring network performance through highly efficient performance measurement software and hardware.	م1، م2، م3، م4، م6، م8
2.3	Configure network performance monitoring protocols on the monitoring station and other devices.	م1، م2، م3، م4، م6، م8
2.4	Discovering network faults, distinguishing between their types, and how to fix and prevent them.	م1، م2، م3، م4، م6، م8
2.5	Communication and exchange of ideas about the course and the use of information and communication technology in scientific research and the performance of tasks and costs.	م1، م2، م8
2.6	Practicing critical thinking and solving problems that the learner faces in the course in creative ways.	م1، م2، م8
3	**Values:**	
3.1	Cooperation, teamwork, and professional ethics.	ق1
3.2	Take responsibility for continuous learning and continuing personal development.	ق2
3.3	Efficient and effective time management when applying acquired knowledge and skills.	ق3

C. Course Content

No	List of Topics	Contact Hours
1	**Fundamentals of network monitoring and maintenance:** • The concept of network performance monitoring • The importance of monitoring network performance. • How to monitor network performance.	8

2	**Network optimization and monitoring:**
	• Improve network performance.
	• Network performance monitoring:
	  ○ Monitoring the internal networks of companies and institutions.
	  ○ Monitoring Internet networks.
	  ○ Private network monitoring.
	• Verify the quality and existence of communication between devices.
	• Define network performance metrics.
		4

3	**Measuring network performance using performance measurement software and hardware:**
	• Basic components of a network performance monitoring system.
	• Equipping the computer to work as a network monitoring station.
	• Network performance monitoring software:
	  ○ Introducing performance monitoring software for networks.
	  ○ Install and run performance monitoring software for networks.
	• Network tools and devices:
	  ○ Method of working cable check devices.
	  ○ How the signal sighting devices work and measure their quality.
	  ○ The modus operandi of signal generation devices and their uses in network scanning.
	• Network Monitoring System (NMS).
		12

4	**Public network monitoring techniques and protocols:**
	• What is meant by network monitoring protocols?
	• Types of protocols.
	• Features of network performance monitoring protocols and their uses.
	• The most important protocols for monitoring networks:
	  ○ Simple Network Management Protocol (SNMP).
	  ○ Remote Network Monitoring (RMON) Protocol.
	  ○ Common Information Management Protocol (CMIP).
	• Configure network performance monitoring protocols on the monitoring station and other devices.
		12

5	**Network malfunctions:**
	• Troubleshooting steps:
	  ○ Determine the error.
	  ○ Determine the affected area of this problem.
	  ○ Determine what has changed.
		8

	○ Determine the most likely cause of the problem. ○ Apply a solution to this problem. ○ Test result. ○ Determine potential impacts of the solution. ○ Documentation of the solution. • Fault finding by analyzing network performance and comparing it to standard measures. • Methods for detecting faults in networks: ○ Wired network faults, ways to detect them and how to treat them. ○ Wireless network malfunctions, ways to detect them and how to treat them. • Introducing software to detect and repair faults in networks. • Install and run network troubleshooting software. • Ways to prevent problems that may be exposed to networks.	
Total		48

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 and Understanding**		
1.1	Familiarity with basic and general knowledge in network monitoring and maintenance.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. KWL learning table. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance tests.
2.0	**Skills**		
2.1	Analyze relational database requirements.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance tests.
2.2	Designing an entity and relationship model (ERM) scheme.		
2.3	Apply the rules of the conversion algorithm for building logical tables (RDB Schema).		
2.4	Apply normalization rules for a clear and error-free database.		
2.5	Using information and communication technology to exchange of the ideas, scientific research, and performance of the tasks and assignments.		
2.6	Practice critical thinking and problem solving facing the learner in the course in creative ways.		
3.0	**Values**		
3.1	Cooperation, teamwork, and professional ethics.	Class lectures. Class discussion. Questions/Answers session in class. Home work. Learning by discovery. Self-education. Brainstorming. Online search. Mind maps. Concept maps.	Quizzes. Homework and Assignments. Written and online exams. Writing reports. Presentations. Discussion and debate. Achievement file. Performance
3.2	Take responsibility for continuous learning and continuing personal development.		
3.3	Efficient and effective time management when applying acquired knowledge and skills.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term	Week 7	20%
2	Quizzes (2 Quizzes)	Week 5, 10	10%
3	Exercises and Practicality	Week 2-11	15%
4	Project	Week 11	20%
5	Participation	All Semester	5%
6	Final	Week12	30%
7	Total Marks		100%

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

E. Student Academic Counseling and Support

- Publishing the guidelines prepared by the Deanship of Admission and Registration Affairs.
- Allocating office hours for faculty members to follow up on students' academic inquiries, respond to e-mail, communicate through electronic systems, and provide feedback.
- Seeking to solve the academic problems for students and all related to the causes of dismissal, academic stumbling, delay and low average.

F. Learning Resources and Facilities

1.Learning Resources

Course reference	1. Troubleshooring Campus Nerworks: pracfical Analysis of Ciscoand LAN profocols, byprscilla Oppenheimer,joseph Bardwell, John Wileyg Sons; lSBN 0471210137 2. Upgrading and Repairing Nefworksby Terry Oglefree, lSBN: 0789725576 3. Fluke Nefwork lnspecfor Sofrware manual. 4. Fluke prorocol lnspecror Sofrware manual. 5. Microsofr MS Network monitor software manual.
Essential References Materials	N/A
Electronic Materials	Online resources will be provided during class lectures on LMS.
Other Learning Materials	N/A

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom – A computer lab equipped and connected to a shared printer and the internet.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board, data projector, Internet browser and Packet Tracer Software.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N\A

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Peer references – students.	1. Questionnaires and referendums approved by the department. 2. Peer evaluation of faculty members. 3. Review the results of the students' evaluation.
Effectiveness of student assessment methods.	Peer references - program leaders - faculty members – students.	1. Questionnaires and referendums approved by the department. 2. Review course descriptions and course reports periodically. 3. Peer evaluation and periodic exchange of correction and scrutiny among fellow faculty members. 4. Review samples of students' work.
Learning Resources.	Program leaders - faculty members - students	1. Questionnaires and referendums approved by the department. 2. Write-offs and monitoring.
Achieved learning outcomes of the course.	Program leaders - faculty members.	1. Review the course report. 2. Analysis of exams forms, grades, students' work and records of achievement.

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	Department of Applied Sciences – Applied College
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

T-104
2022

Course Title:	Creation of local Area Network
Course Code:	NET 0209
Program:	*Network*
Department	*Applied College*
College:	*Applied College*
Institution:	***Imam Mohammad Bin Saud Islamic University***
Version:	***3rd version***
Last Revision Date:	**2023/06/08**

Table of Contents:

A. General information about the course:

Course Identification				
1. Credit hours:	3 hours (2 theoretical, 2 practical)			
2. Course type				
a.	University ☐	College ☐✓	Department☐	Others☐
b.	Required ✓	Elective☐		
3. Level/year at which this course is offered:				
4. Course general Description This course focuses on configuring Local Area Networks (LANs) using client-server technology for a group of Windows-based computer devices. Students will be trained in fundamental network setup and how to properly configure Windows-based computers to integrate into the network seamlessly.				
5. Pre-requirements for this course (if any): Networking 101				
6. Co- requirements for this course (if any): None				
7. Course Main Objective(s) The primary objective of this course is to enable students to acquire the necessary skills to design and implement efficient local networks using client-server architecture, tailored for Windows-based systems.				

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom		
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning	72	100%
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 (assignments, self-study, projects, research, tests, and teamwork)	160
	Total	184

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	Acquiring proficiency in fundamental and general concepts related to constructing local computer networks		- Classroom Lecture - Dialogue and Discussion - Surveying - Discovery Learning - Self-learning - Enhanced Lecture - Brainstorming - Web-Based Inquiry - KWL Chart - Mind Maps - Concept Maps	-Traditional and Electronic Achievement Tests -Classroom Questions -Assignments and Periodic Assessments -Presentations -Debate and Argumentation -Cognitive Performance Tests -Portfolio
2.0	Skills			
2.1	Proficiency in installing and running network operating systems		- Practical Demonstration - Enhanced Lecture - Discovery Learning - Peer Learning - Self-learning - Dialogue and Discussion - Web-Based Inquiry - Brainstorming - Cooperative Learning - Problem Solving - Project-Based Learning - Online Discussion Forums	-Presentations -Grading Scales -Practical Performance Tests -Productivity Metrics -Observation -Programming Projects -Self-Assessment -Peer Assessment -Portfolio
2.2	Configuring the network operating system to integrate in network activities			
2.3	Efficiently building wired and wireless local area networks (LANs) with high proficiency			
2.4	Engaging in communication and idea exchange regarding the course while utilizing information and communication technology for scientific research, task performance, and cost analysis			
2.5	Practicing critical thinking and creative problem-solving skills to address challenges faced by the learner theough the course			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Collaborating and working effectively as a team, embodying professional ethics		- Project-Based Learning - Cooperative Learning - Dialogue and Discussion - Hands-on Lecture - Modeling and Mentoring - Web-Based Inquiry	-Note Cards -Discussion and Dialogue -Classroom Questions -Grading Scales -Value Metrics -Self-Assessment -Peer Assessment -Portfolio
3.2	Taking responsibility for continuous learning and committing to personal development			
3.3	Efficiently managing time while applying acquired knowledge and skills			

C. Course Content

No	List of Topics	Contact Hours
1.	- Introduction to Computer Networks: ● Concept of Networks: ○ Classification of computer networks (components, features, drawbacks, selection criteria, operational methods) ○ Classification based on geographical scope ○ Classification based on access rights to network services ○ Classification based on the physical structure of networks ● General Requirements for Network Operation	4
2.	- Network Operating System: ● Components and prerequisites of the network operating system ● Types of network operating systems ● Characteristics of the network operating system ● Services of the network operating system ● Examples of network operating systems	4
3.	- Installation of Network Operating System (Windows): ● Identifying the required version and features of the network operating system ● Verifying system requirements on the device ● Installing the network operating system ● Upgrading an existing installed operating system	4
4.	- Network Operating System Management Tools:	8

	● Control Panel. ● System Properties Management ● System Devices Management ● Hardware Management (adding and removing hardware components) ● Software Management (installing and uninstalling software) ● Understanding file and directory properties ● Using Windows Explorer to handle files	
5.	- Configuring the Network Operating System for Network Connectivity: ● Network Card Installation Steps ● Network Card Configuration ● Adding Network Protocols and Drivers ● Manual and Automatic Device Addressing for Network Connectivity ● Device recognition in a Workgroup or Domain ● Network Connectivity Testing Tools ● Understanding Network Adapter Configuration	8
6.	- Configuring the Network Operating System for Network Participation: ● Adding New Users to the Device ● Joining a Workgroup or Domain ● Viewing Shared Devices in a Workgroup or Domain ● Configuring Directories for Network Sharing ● Configuring Hard Drives for Network Sharing ● Configuring Printers and Scanners for Network Sharing ● Accessing and Using Shared Printers and Directories from Network Devices ● Adding and Modifying Sharing Properties	8
7.	- Building Local Area Networks: ● Phases of Local Area Network Creation (Software and Hardware Implementation) ○ Direct Connection ○ Router Connection ● Programming a Wired Local Area Network between Two Devices in Windows OS: ○ Planning Phase ○ Design Phase ○ Construction Phase ○ Testing Phase ○ Maintenance Phase ● Programming a Wireless Local Area Network between Two Devices in Windows OS: ○ Planning Phase ○ Design Phase ○ Construction Phase ○ Testing Phase ○ Maintenance Phase	8

Total	44

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Test (Theoretical)	Week 7	15%
2.	Assignments	All Semester	10%
3.	Practical Evaluation	Weeks 4-6-9	15%
4.	Practical Project	Week 10	30%
5.	Final Exam	Week 12	30%
8.	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	1. Data communications and networking by behrouz a.forouzan. 2. Computer networks - A. Tanenbauw. CCNA: CISCO. 3. Basics and Technologies of Data Communication in Computer Networks. 4. Data Communication; from basics to broadband, William j. beyda.
Supportive References	
Electronic Materials	Cisco Networking Academy- blackboard
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom – A computer lab equipped and connected to a shared printer and the internet.
Technology equipment (projector, smart board, software)	Smart board, data projector, Microsoft Visio or Edraw Max and Internet browser.
Other equipment (depending on the nature of the specialty)	N\A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer references – students.	1.Questionnaires and referendums approved by the department. 2.Peer evaluation of faculty members. 3.Review the results of the students' evaluation.
Effectiveness of students assessment	Peer references - program leaders - faculty members – students.	1.Questionnaires and referendums approved by the department. 2.Review course descriptions and course reports periodically. 3.Peer evaluation and periodic exchange of correction and

Assessment Areas/Issues	Assessor	Assessment Methods
		scrutiny among fellow faculty members. 4.Review samples of students' work.
Quality of learning resources	Program leaders - faculty members - students	1.Questionnaires and referendums approved by the department. 2.Write-offs and monitoring.
The extent to which CLOs have been achieved	Program leaders - faculty members.	1.Review the course report. 2. Analysis of exams forms, grades, students' work and records of achievement.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Department of Applied Sciences – Applied College
REFERENCE NO.	
DATE	