Detailed Course Description - Course Plan Development and Updating Procedures/ Computer Science Department	QF01/0408-3.0E

Faculty	Faculty of Science and IT	Department	Network
Course number	0122381	Course title	Network simulation
Number of credit hours	3	Pre-requisite/co-requisite	Wireless Computer Networks

Brief course description.
Introduces the architecture, structure, functions, components, and models of the Internet and computer networks. The principles of IP addressing and fundamentals of Ethernet concepts. Describes the architecture, components, and operations of routers and switches in a small and large complex network. The student should be able to learn doing the following configuration
1- Build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.
2- Configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area of OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.
3- Configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, in both IPv4 and IPv6 networks. Students will also develop the knowledge and skills needed to implement DHCP operations in a network.

	Course goals and learning outcomes
Goal 1	Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments
Learning outcomes	1.1. Identify the appropriate IPv4/IPV6 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment 1.2. calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks 1.3. Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models

Goal 2	Describes the architecture, components, and operations of routers and switches in a small network. Participants learn how to configure a router and a switch for basic functionality
Learning outcomes	2.1. Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations including remote access management 2.2 Understand and describe the purpose, nature, and operations of a router, routing tables, and the route lookup process 2.3. Understand and describe dynamic routing protocols, distance vector routing protocols, and link-state routing protocols 1.4 Configure and troubleshoot static routing and default routing
Goal 3	Describes the architecture, components, and operations of routers and switches in larger and more complex networks. Participants learn how to configure routers and switches for advanced functionality.
Learning outcomes	3.1. Understand, configure, and troubleshoot Dynamic Host Configuration Protocol (DHCP) for IPv4 and IPv6 networks 3.2 Understand, configure and troubleshoot enhanced switching technologies such as VLANs 3.3. Configure and troubleshoot routers in a complex routed IPv4 or IPv6 network using single-area OSPF
Goal 4	Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment.
Learning outcomes	4.1 Describe the technological requirements for running IPv6 in conjunction with IPv4 such as dual stack 4.2 Learn why Do We Need IPv6 4.3. Describe IPv6 addresses Global unicast, Multicast, Link local, Unique local, EUI 64, Auto configuration
Textbook	1. -CCNA Routing and Switching Study guide. By Todd Lammle, copyright 2013 by John Wiley &sons, Inc
Supplementary references	1.- CCNA guide to cisco networking fourth edition , By Kelly Cannon, Kelly Caudle ,Anthony Chiarella 2013 2.-assigned reading and audio-visuals: CISCO Online and offline material and other software such as packet tracer

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Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	1	Introduction to TCP/IP	88 -129	
02	1	Easy Subnetting	140 170	
03	1	VLSMs, Summarization, and Troubleshooting TCP/IP	182 -204	
04	1 1 1	Cisco's Internetworking Operating System (IOS) LAN Switching Technologies Configure and verify initial switch configuration including remote access management Cisco IOS commands to perform basic switch setup	216 -240	
05	1 1 1	IP Routing Technologies Configure and verify utilizing the CLI to set basic Router configuration Cisco IOS commands to perform basic router setup	241-250	
06	1 1 1	IP Routing Technologies(continue) Configure and verify operation status of an Ethernet interface Verify router configuration and network connectivity **First Exam 20%**	251 -265	
07	1 1 1	Configure and verify utilizing the CLI to set basic Router configuration Cisco IOS commands to review basic router information and network connectivity	284 - 291	
08	1 1 1	Configure and verify DHCP (IOS Router) Configuring router interfaces to use DHCP DHCP options Excluded addresses, lease time Configure and verify NTP as a client	291 - 317	
09	1 1 1	IP Routing Technologies Describe basic routing concepts ,Packet forwarding Router lookup process	333 -347	
10	1 1 1	Configure and verify routing configuration for a static or default route given specific routing requirements Differentiate methods of routing and routing protocols	348 -373	

		Static vs. Dynamic, **Link State vs. Distance Vector** **next hop, IP routing table, Passive interfaces**		
11	**1** **1** **1**	**IP Routing Technologies** **Configure and verify OSPF (single area)** **Benefit of single area** **Configure OSPF v2** **Router ID** **Passive interface** **Second Exam**	**386 - 411**	
12	**1** **1** **1**	**LAN Switching Technologies** **Describe how VLANs create logically separate networks and the need for routing between them** **Explain network segmentation and basic traffic management concepts** **Configure and verify VLANs** **Configure and verify trunking on Cisco switches**	**461 - 481**	
13	**1** **1** **1**	**DTP,Auto negotiation** **IP Routing Technologies** **Configure and verify InterVLAN routing (Router on a stick)** **Sub interfaces, Encapsulation, Configure SVI interfaces**		
14	**1** **1** **1**	**IP addressing (IPv4 / IPv6)** **Describe and understand IPv6 addresses** **Global unicast, Multicast, Link local, Unique local** **EUI 64** **Auto configuration**	**571 -592**	
15	**1**	**Project review**		
16	**1**	**Final Exam**		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20%	**Practical (clinical) course evaluation methods**	Semester students' work = 50%

	Second exam 20% Final exam 50%		(Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher		Office Number	
Phone number (extension)		Email	_marzoq@zug.edu.jo
Office hours			