

<b>Detailed Course Description - Course Plan Development and Updating Procedures/ Computer Science/Computer Network Department</b>	<b>QFXX/0408-3.0E</b>
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Faculty	Faculty of Science and IT	Department	Computer Science/Computer Network
Course number	0122383	Course title	Networks Design and Simulation 2
Number of credit hours	3	Pre-requisite/co-requisite	Networks Design and Simulation 1

### Brief course description

This course teaches student how to install, operate, configure, and verify a basic IPv4 and IPv6 network, including configuring an IP router, identifying basic security threats, understanding redundant topologies, troubleshooting common network issues, connecting to a WAN, configuring RIP, EIGRP and OSPF, understanding wide-area network technologies, securing wired and wireless networks, implementing First hop redundancy protocols to improve reliability and load balancing, building virtual lab by GNS3 emulator. The course emphasizes "learning by doing", and requires students to conduct a series of lab exercises. Through these labs, students can enhance their understanding of the principles, and be able to apply those principles to solve real problems.

Course goals and learning outcomes	
<b>Goal 1</b>	An ability to understand and apply Graphical Network Simulator(GNS3) and build virtual lab
Learning outcomes	1.1 Introduce and install GNS3 1.2 Configure GNS3 1.3 Install VMware and configure it 1.4 Design and configure a small network and connect it with VMware
<b>Goal 2</b>	An ability to analyze network attacks and apply countermeasures to overcome attacks
Learning outcomes	2.1 Understand and apply standard and extended access lists 2.2 Understand and apply network address translation and port address translation. 2.3 Understand and implement Virtual Private Network (VPN). 2.4 Describe secure remote access and apply secure shell(SSH)
<b>Goal 3</b>	An ability to analyze, design, and configure a reliable wide area network(WAN)
Learning outcomes	3.1 Understand and configure IP routing protocols (RIP, OSPF, and EIGRP). 3.2 Compare among RIP, OSPF, and EIGRP 3.3 Understand and configure first hop redundancy protocols (HSRP, VRRP, and GLBP) 3.4 Compare among HSRP, VRRP, and GLBP
<b>Goal 4</b>	An ability to design and configure a secure wireless network
Learning outcomes	4.1 Understand wireless network attacks 4.2 Discuss wireless network countermeasures. 4.3 Design and implement wireless network by using packet tracer 4.4 Compare among wireless security protocols.
<b>Textbook</b>	1-Book of GNS3, Jason C. Neumann, 2015, William Pollock. 2-How to mastering CCNA, René Molenaar, 2013, René Molenaar
<b>Supplementary references</b>	1-GNS3 network simulation guide, Chris Welsh,2013, Packt Publishing.

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2- David Hucaby, CCNA Wireless 200-355 Official Cert Guide, 1st edition, Pearson Education, 2016 3-CCNA routing and switching study guide, Todd Lammle, 2013, Sybex 4. LAN Switching and Wireless CCNA Exploration Labs and Study Guide, Allan Johnson, 2008, Cisco press
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Course timeline				
Week	Number of hours	Course topics	Pages (textbook)	Notes
01	1 1 1	Introducing GNS3 Installing a basic GNS3 system	1-6, 7-18, Textbook(1)	Ch1&2
02	1 1 1	GNS3 Configuration	19-30, Textbook(1)	Ch3
03	1 1 1	Creating and managing projects by using GNS3	31-46, Textbook(1)	Ch4
04	1 1 1	Using GNS3 for integrating hosts and using Wireshark	47-62, Textbook (1)	Ch5
05	1 1 1	IP routing Distance routing protocol	208-228, Textbook (2) 249-63 Textbook (2)	Ch12&13
06	1 1 1	OSPF-Link-State routing protocol EIGRP-Cisco's hybrid routing protocol Telnet and Secure Shell protocols	264-294, Textbook (2)	Ch15&17
07	1 1 1	FHRP (First hop redundancy protocols) HSRP, VRRP, and GLBP <b>First exam</b>	229-248, Textbook (2)	Ch14
08	1 1 1	Basic Wireless Concepts and Configuration-Packet tracer	Supplementary ref(2), ch15 Supplementary ref (4), ch7	
09	1 1 1	Wireless LAN configuration WLAN security	Supplementary ref(2), ch14 Supplementary ref (4), ch7	

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10	1 1 1	Security Standard Access list	TextBook(2), ch18 Supplementary ref(3), ch12	
11	1 1 1	Extended Access List <b>Second Exam</b>	TextBook(2), ch18 Supplementary ref(3), ch12	
12	1 1 1	Network and port address translation(NAT&PAT)	Textbook(2), ch19 Supplementary ref(3), ch13	
13	1 1 1	Network and port address translation(NAT&PAT)	Textbook(2), ch19 Supplementary ref(3), ch13	
14	1 1 1	Virtual private network	Textbook(2), ch24	
15	1 1 1	Virtual private network IPv6 Routing	Textbook(2), ch24	
16	1 1 1	IPv6 routing <b>Final exam</b>	Textbook(2), ch23	

<b>Theoretical course evaluation methods and weight</b>	Participation = 10% First exam 20% Second exam 20% Final exam 50%	<b>Practical (clinical) course evaluation methods</b>	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%
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Approved by head of department		Date of approval	
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Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Dr. Zeyad Mohammad	Office Number	314
Phone number		Email	Z.Dosooq@zuj.edu.jo

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(extension)			
Office hours	Sun, Tue, Thu (11:00-1200) Mon, Wed (9:30-10:30, 12:30-13:00)		