



**COURSE DESCRIPTIONS**

<b>Faculty</b>	Faculty of Science and Information Technology				
<b>Department</b>	Software Engineering	<b>NQF level</b>	6		
<b>Course Title</b>	Data Communication and Networks	<b>Code</b>	503473	<b>Prerequisite</b>	Compiler
<b>Credit Hours</b>	3 Hours	<b>Theory</b>	3	<b>Practical</b>	0
<b>Course Leader</b>	Dr. Saleh Alomari	<b>email</b>	omari08@jadara.edu.jo		
<b>Lecturers</b>	Dr. Saleh Alomari	<b>emails</b>	omari08@jadara.edu.jo		
<b>Lecture time</b>	10:00 am - 11:30 am	<b>Classroom</b>	Online		
<b>Semester</b>	1 <sup>st</sup> Semester	<b>Production</b>	2010	<b>Updated</b>	Up to date
<b>Awards</b>	Bachelor Degree		<b>Attendance</b>	Fulltime	

**Short Description**

Topics to be covered in this course include: Communication concepts, Transmission media, Transmission modeS, Digital packet switching and Routing, Networks topology and Architecture, Standard OSI and TCP/IP Protocols and layers, and Network management.

**Course Objectives**

This course provides a clear description of the concepts of the communications architecture. Particular emphasis will be given to the major Communication Models: Circuit and Packet Switching, OSI Model and Layers, TCP/IP Model and Layers, Transmission concepts and Protocols, The aim is to present these concepts and Protocols in general setting that is not tied to one particular Technology. To provide a solid conceptual understanding of the fundamentals of data communications and computer networks. More specifically,

1. To learn the basic concepts of data communications.
2. To learn the layered architecture of communication protocols.
3. To learn digital signal transmission and encoding techniques.
4. To learn multiplexing techniques.
5. To learn the concepts and techniques in error detection and correction.
6. To learn data link control and its related protocols.
7. To learn switching techniques.
8. To learn the main protocols and standards of the Internet.
9. To learn basic concepts of internetworking, addressing, and routing.

**Learning Outcomes**

**A. Knowledge - Theoretical Understanding**

a1. **Defind** of the basic concepts of data communications including the key aspects of networking and their interrelationship, topology, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, cabling and Networking and Internetworking Devices. **(K1)**

<b>B. Knowledge - Practical Application</b>
a2. <b>Illustrate</b> and understand the purpose of network layered models, network communication using the layered concept, and able to compare and contrast Open System Interconnect (OSI) and TCP/IP layered architecture. <b>(K2)</b>
<b>C. Skills - Generic Problem Solving and Analytical Skills</b>
b1. <b>Analyze</b> the services and features of various protocol layers in data networks. <b>(S1)</b>
<b>D. Skills - Communication, ICT, and Numeracy</b>
b2. <b>Compare</b> between Connection-oriented packet switching and Connection-less packet switching Services. <b>(S2)</b>
b3. <b>Build</b> network simulations using OMNET++ to simple network, and create reports in regards to network protocols. Create a video and present it with any topic related to the data communication & networks <b>(C1)</b>
<b>E. Competence: Autonomy, Responsibility, and Context</b>
<b>Teaching and Learning Methods</b>
The course will be based on the following teaching and learning activities: <ul style="list-style-type: none"> <li>• Lectures covering the theoretical part using PowerPoint presentations</li> <li>• Case studies</li> <li>• Review questions</li> <li>• <b>Face to face Learning</b></li> <li>• <b>Asynchronous</b> class using Jadara E learning system.</li> </ul>
<b>Assessment Methods</b>
There are four forms of assessment that a teacher can use to evaluate the effectiveness of e-learning: Initial assessment: It aims to determine the first level of students. Formative evaluation: It aims to improve the educational process, as it is continuous throughout the learning process with electronic educational situations. Summative assessment: It aims to discover the strengths and weaknesses in the student's achievement online or. Final assessment: It takes place at the end of the e-learning program and aims to determine the degree to which students have achieved the main learning outcomes.
Initial assessment: Class disunion with Quiz test using class point
Formative evaluation: Med test, Homework's, assignments
Summative assessment: Minute paper text (Final Exam).Group / Individual Presentation...etc

Week	Hours	CLOs	Topics	Topic Details	Teaching & Learning Methods	Assessment Methods
1	3	a1	<b>Overview</b> <b>Chapter 1</b>	Data Communication ( Definition., Characteristics and Components), Data flow in communication, Network Definition, Personal, Local, Campus, Metropolitan and Wide Area Network Concepts, Circuit VS. Packet Switching, Protocol Layers and Structure OSI.	Face to face Lecture & discussions	

2+3		a2,b1 ,b2	<b>Network Models</b>  Chapter 2	which includes the, layered task, Network Models such as OSI, TCP/IP at the all layers in details. Packet switching, Layer Models and protocols)	Face to face Lecture & discussions	Quizzes 1
4		a1,b1	<b>Networking and Internetworking Devices</b> Chapter 15	This chapter explained the details about the all types of the connection at Networking and Internetworking Devices, which include the , Repeaters, Bridges, Routers, Gateways and Routing Algorithms. With more explanation about the responceplity and the Function for all the devices.	Face to face Lecture & discussions	HW #1
5		a1	<b>Network Cabling</b> Chapter 3 CISCO	<ol style="list-style-type: none"> <li>1. This chapter show the Common network cable types, such as, Coaxial cable, Unshielded twisted pair, and, Fiber optic.</li> <li>2. Fundemantals of Application Layer Functionality and Protocols (Network Fundamentals – Chapter 3 andra Coleman – CCNA, CCAI)</li> </ol>	Face to face Lecture & discussions	
7		a1,a2, b1	<b>Application Layer</b> Chapter 25  Chapter 27	<ol style="list-style-type: none"> <li>1. Application layer concept and structure, processes.  dhcp (domain name system), which include the Name Space, Domain Name Space, Distribution Of Name Space, Dns In The Internet, Resolution, Dns Messages, Types Of Records, Registrars, Dynamic Domain Name System (Ddns) And Encapsulation.</li> <li>2. www and HTTP</li> </ol>	Face to face Lecture & discussions	HW #2  + Quizzes 2
			<b>1<sup>st</sup> Exam</b>	First exam	First Exam	First Exam
8		A2,b 1,b2	<b>Transport Layer Protocols</b> Chapter 23	Transport Layer Concepts & Structure, UDP, UDP Ports and processes.	Face to face Lecture & discussions	students lecture with material and presentations  <a href="#">Padlet link</a>
9		A2,b 1,b2	<b>Transport Layer Protocols</b> Chapter 23	TCP and communication processes, connection establishment, flow and error control	Face to face Lecture & discussions	HW #3
10+11 +12		A2, b2,b3	<b>Network Layer</b>	Protocols, TCP/IP suite  Chapter 8 TCP/IP book, DC&N book	Face to face Lecture & discussions	Practical lab for each students

		A2, b2,	<b>Network Layer</b>	IPv4, IP Addresses, Public and Private IP Addresses Static and Dynamic IP Addresses		
		A2, b2,b3	<b>Network Layer</b>	Network topologies, Subnetting, Routing		HW #4 <a href="#">Padlet Link</a>
		A2, b2,b3	<b>Network Layer</b>	IP Address Resolution, Address Resolution Protocol (ARP), ICMP		Quizzes 3
		A2, b2,c1	<b>Network Layer</b>	Routing techniques.		students lecture + Presentation
<b>Mid exam</b>						
13			<b>Data link Layer</b> Chapter 10	Error Detection and Correction, LAN Topologies, Ethernet, CSMA/CD	Face to face Lecture & discussions	
14		A2, b3,c1	<b>Multiple Access</b> Chapter 12	<ul style="list-style-type: none"> <li>• Multiple access mechanisms</li> <li>• Random access</li> <li>• Controlled access</li> <li>• Channelization</li> </ul>	Face to face Lecture & discussions	Using interactive videos <a href="#">Padket link</a>
		A1,b 2,b3	<b>Physical Layer</b> Chapter 3 Chapter 4 Chapter 7	Analog & Digital Concepts, Transmission concepts and Technologies.	Face to face Lecture & discussions	HW #5 With presentation
			<b>Final Exam</b>	<b>Final Exam</b>	Final Exam	<b>Final Exam</b>

<b>Infrastructure</b>	
<b>Textbook</b>	[1] Data Communication and Networks, 5 <sup>th</sup> Edition, Behrouz Forouzan, McGraw-Hill Science/Engineering/Math, 2013
<b>References</b>	[2] Data Communication and Networks, 4 <sup>th</sup> Edition, Behrouz A. Forouzan, Publisher: McGraw-Hill, 2007. [3] TCP/IP Protocol Suite, 3 <sup>rd</sup> Edition, Behrouz A. Forouzan, Publisher: McGraw Hill, 2006
<b>Learning Activates</b>	<ol style="list-style-type: none"> <li>1. Lectures</li> <li>2. Collaborative learning</li> <li>3. Flipped learning</li> </ol>
<b>Learning Environments</b>	1. Asynchronous class using Jadaara E learning system.
<b>Required reading</b>	
<b>Electronic materials</b>	

<b>Other</b>	<p>[2] Data &amp; Computer communications: W. Stallings, Prentice Hall, Seventh Edition, 2004.</p> <p>[3] Computer Networking A Top down Approach Featuring the Internet, 3<sup>rd</sup> Edt., James H. Kurose and Keith W. Ross, Publisher: Addison Wesley, 2005</p> <p>[4] Internetworking with TCP/IP Vol. I: Principles, Protocols, and Architecture, Douglas Comer, Prentice Hall, 4th edition Vol. 1 (February 22, 2000</p> <p>[5] Computer Networks A Systems Approach, 3<sup>rd</sup> Edit. Larry L. Peterson and Bruce S. Davie, Publisher: Morgan Kaufmann, 2003.</p>
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<b>Course Assessment Plan</b>							
<b>Assessment Method</b>		<b>Grade</b>	<b>CLOs</b>				
			<b>a1</b>	<b>a2</b>	<b>b1</b>	<b>b2</b>	<b>b3</b>
<b>Midterm</b>		30%	15 %	11 %	4%	0%	0%
<b>Second (if applicable)</b>							
<b>Final Exam</b>		50%	12 %	6%	9%	15 %	8%
<b>Coursework</b>							
<b>Coursework assessment methods</b>	Assignments						
	Case study						
	Discussion and interaction						
	Group work activities						
	Lab tests and assignments						
	Presentations						
	Quizzes						
<b>Total</b>							

<b>Plagiarism</b>
<p>Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).</p> <p>Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.</p>