



# **Faculty of Sciences and Information Technology**

**Department: Computer Science**

## **COURSE SYLLABUS**

**Short Description**

**Student's Copy**

One copy of this course syllabus is provided to each student registered in this course. It should be kept secure and retained for future use.

## 1. Course Information

1. Course Title : **Advanced Computer Networks**
2. Course Code : **: 1306721**
3. Credit Hours : **3**
4. Prerequisite : **None**
5. Corequisite : **None**

## 2. Instructor Information

1. Instructor : **Dr. Mohammad al-laham**
2. Office : **215 D**
3. Phone :
4. Email : **mlaham@zu.edu.jo**
5. Office Hours : **12-1 Saturday , 3-4: Sunday, Tuesday , Thursday**

## 3. Class Time and Place

1. Class Days and Time: **Sat 1-4 PM**
2. Class Location : **304 H**
3. Lab Days and Time : **-----**
4. Lab Location : **-----**

## 4. Course Policies

University regulations are applied to this course, regarding Class Attendance; Punctuality, Exam, Makeup Exams; Absence with permission; Penalties for Cheating; and Policies for Assignment and Projects. Students should be aware of all those in addition to other rules and regulations.

## 5. Resources

### Main Reference Text Book:

Kurose J. F. and Ross K. W., "Computer Networking: A Top-Down Approach", 6<sup>th</sup> Edition, Addison-Wesley Longman, 2012. Book Website: [http://www.aw.com/kurose\\_ross](http://www.aw.com/kurose_ross)

### Additional Reference (s):

[R1] Tanenbaum A. S. and Wetherall D. J., "Computer Networks", 5<sup>th</sup> Edition, Prentice- Hall, 2010.

[R2] Stallings W., "Data and Computer Communications", 9<sup>th</sup> Edition, Pearson Prentice-Hall, 2010.

[R3] Peterson L. L. and Davie B. S., "Computer Networks A Systems Approach", 5<sup>th</sup> Edition, Morgan Kaufmann, 2011.

### **Recommended Journals and Magazines :**

**The following are some of the leading communications and networking Journals and Magazines:**

#### **Journals:**

**-IEEE/ACM Transactions on Networking (TON) Computer Communications Review (CCR)**

**-ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP)**

#### **Magazines:**

**-IEEE Communications Magazine (more physical layer) IEEE Network Magazine**

**-IEEE Wireless Communications**

**-IEEE Multimedia**

**-IEEE Pervasive Computing**

## **6. Course Description and Purpose**

This course gives a broad perspective of computer networks and Internet protocols. The course covers the principles and practices of computer communication networks including the design and implementation of the *Internet*, its protocols and applications. Topics to be covered include: Circuit switched and packet switched networks, protocols, protocol layering; layered network architectures, application layer, network programming interfaces (e.g., sockets), transport layer, multiplexing and de multiplexing, UDP, TCP, reliability, flow control, congestion control, network layer, routing protocols, switching technologies, multicast, mobility; link layer, local area networks, error detection and correction; mobile and wireless networks(e.g., WiFi, GSM); network security and management.

#### **The main objectives of this course are:**

- To introduce the underlying concepts and principles of modern computer networks, with emphasis on protocols, architectures, and implementation issues. Students learn how/why these protocols and architectures work while understanding the principles and tradeoffs involved in building such protocols and architectures.
- To cover advance topics including wireless and mobile networks, computer networks security.
- Students will also gain experience in performing research through reading, implementing and evaluating research papers.

## **8. Methods Of Teaching**

**The methods of instruction may include, but are not limited to:**

1. Lectures
2. Discussion and problem solving
3. Brainstorming
4. Individual assignments
5. Case Study
6. Asking students to give a presentation in a specific subject or problem related to the course
7. Lecturing using PowerPoint Presentations, mixed with discussion with students
8. Asking students to prepare a term paper about a subject or a problem related to the course, and discuss it in the class.

## 9. Course Learning Assessment/Evaluation

The following methods of learning assessment will be used in this course:

### (a) Tests

Test	Weight %	CLO	Due Date
Mid	30%	1-5	
Final	40%	1-12	
Total	70%	12	

### (b) Assignments

Assignment	Weight	CLO	Scope & Focus	Due Date
Assignments	10%			

### (c) Presentation

Method	Weight	CLO	Focus & scope	Due Date
Participation & Presentation	20%	**		All weeks
Total				

All CLO's will be addressed in the students' participation, depending on the class and topic under consideration

## 10. Course Schedule/Calendar

Week	Topic	Readings From Text
1, 2	<b>Course Overview: Course Objectives and Syllabus.</b>	Chapter 1
	<b>Computer Networks and the Internet</b> Overview of the Internet, Protocols and Networks, Client /Server and Peer-to-Peer Paradigms, Circuit Switching and Packet Switching, Access Networks and Physical Media, Delay, Loss and Throughput in Packet-Switched Networks, Internet Structure, Protocol Layers and Their Service Models, Networks Under Attack, History.	
3, 4	<b>Application Layer</b>	Chapter 2
	Service Requirements, Web and HTTP, FTP, Electronic Mail, Domain Name System (DNS), Peer-to-Peer (P2P) File sharing, Socket Programming with TCP/UDP	
5, 6, 7	<b>Transport Layer</b>	Chapter 3
	Service Models, Multiplexing / Demultiplexing, Connection-Less Transport (UDP), Principles of Reliable Data Transfer, Connection-Oriented Transport (TCP), TCP Congestion Control.	
8	<b>Midterm Exam</b>	
9, 10, 11	<b>The Network Layer</b>	Chapter 4
	Forwarding and routing, Service Models, Virtual Circuit and Datagram Networks, What's Inside a Router, IP Addressing: IPv4, IPv6, ICMP, Routing algorithms, Routing in the Internet, Broadcast and Multicast Routing.	
12, 13	<b>The Link Layer and Local Area Networks</b>	Chapter 5
	Link layer services, Error detection and correction Techniques, Multiple Access Protocols, Link layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP, ATM, MPLS.	