



## Course Syllabus: Computer Networks - CS 244

<b>Division</b>	Computer, Electrical and Mathematical Sciences & Engineering
<b>Course Number</b>	CS 244
<b>Course Title</b>	Computer Networks
<b>Academic Semester</b>	Fall
<b>Academic Year</b>	2019/2020
<b>Semester Start Date</b>	08/25/2019
<b>Semester End Date</b>	12/10/2019
<b>Class Schedule</b> (Days & Time)	09:00 AM - 10:30 AM   Tue Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Basem Shihada	basem.shihada@kaust.edu.sa	+966128080332	4252, 1, Al-Khawarizmi (bldg. 1)	9:00 AM - 10:30 AM   Sun Mon

Teaching Assistant(s)	
Name	Email
Osama Amin	osama.amin@kaust.edu.sa

Course Information	
<b>Comprehensive Course Description</b>	The course aims to train students in conducting major research in relevant aspects of wireless networks. In particular, green wireless technologies, standards, and protocols for various communication technologies such as cellular networks, packet switched networks, cloud communication, cooperative wireless networks. Also, students will tackle topics on wireless routing, PHY-layer, and MAC-layer.
<b>Course Description from Program Guide</b>	Packet switching, Internet architecture, routing, router architecture, control algorithms, retransmission algorithms, congestion control, TCP/IP, detecting and recovering from errors, switching, Ethernet (wired and wireless) and local area networks, physical layers, clocking and synchronization. Assignments introduce network programming using NS-3, sockets, designing a router and implementing a transport layer. Also, advanced research papers on cloud computing, software define networking, and wireless sensor networks. The course consists of a final implementation project on a novel idea.
<b>Goals and Objectives</b>	Students will become familiar with the field of networking research. For instance, network architecture, protocols and systems. They will also obtain a practical experience in the art of reading research papers and conducting large scale networking systems and simulations.
<b>Required Knowledge</b>	Solid knowledge in computer systems, excellent skills in C/C++, network simulators such as NS-2 and 3, and Linux Kernel programming.
<b>Reference Texts</b>	- Computer Networking: A Top-down approach, J. Kurose and K. Ross, 6th edition, 2013. - Computer Networks, Andrew S. Tanenbaum, 4th edition, Prentice Hall, 2002. - Selected research papers
<b>Method of evaluation</b>	<b>30.00%</b> - Final exam <b>10.00%</b> - Presentation <b>20.00%</b> - Midterm exam <b>30.00%</b> - Homework /Assignments <b>10.00%</b> - Attendance and Participation

<b>Nature of the assignments</b>	Assignments are of a practical coding in nature. Students will be trained to conduct a networking system implementations using wired and wireless systems. The assignments include a major network implementation component that requires performing several paper reviews and system performance evaluations.
<b>Course Policies</b>	All assignments, including contributions to discussion, submitted by students in the course of this class should be work written by themselves specifically for this class. Students must clearly cite and reference each and every source that was used in their development. Where students use the actual words of a source, they must put those words inside quotation marks.
<b>Additional Information</b>	<b>Student must obtain the passing grade (70%) in each task and the final project to pass the course.</b>

### Tentative Course Schedule

*(Time, topic/emphasis & resources)*

Week	Lectures	Topic
1	Tue 08/27/2019 Thu 08/29/2019	Introduction to fundamental concepts in computer networks
2	Tue 09/03/2019 Thu 09/05/2019	Introduction to network & performance measurements
3	Tue 09/10/2019 Thu 09/12/2019	Transport control protocol
4	Tue 09/17/2019 Thu 09/19/2019	Congestion control
5	Tue 09/24/2019 Thu 09/26/2019	Wireless networks
6	Tue 10/01/2019 Thu 10/03/2019	Wireless mesh and sensor networks
7	Tue 10/08/2019 Thu 10/10/2019	TCP and congestion control over heterogeneous Networks
8	Tue 10/15/2019 Thu 10/17/2019	TCP and congestion control over wireless links
9	Tue 10/22/2019 Thu 10/24/2019	Optical networks
10	Tue 10/29/2019 Thu 10/31/2019	Mid-semester break
11	Tue 11/05/2019 Thu 11/07/2019	Optical burst and packet switching
12	Tue 11/12/2019 Thu 11/14/2019	TCP and congestion control over optical networks
13	Tue 11/19/2019 Thu 11/21/2019	Cloud networks infrastructure
14	Tue 11/26/2019 Thu 11/28/2019	Cloud transport and congestion control
15	Tue 12/03/2019 Thu 12/05/2019	Optical datacenter networks
16	Tue 12/10/2019	Exams

#### Note

The instructor reserves the right to make changes to this syllabus as necessary.