



## Course Syllabus: Computer Networks - CS 244

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| <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>               | Spring   |
| <b>Academic Year</b>                   | 2016/2017  |
| <b>Semester Start Date</b>             | 01/22/2017   |
| <b>Semester End Date</b>               | 05/18/2017   |
| <b>Class Schedule</b><br>(Days & Time) | 09:00 AM - 10:30 AM   Sun Tue                                |

| Instructor(s) |                            |       |                 |   |
|---------------|----------------------------|-------|-----------------|---|
| Name          | Email                      | Phone | Office Location | Office Hours                                  |
| Basem Shihada | basem.shihada@kaust.edu.sa |       |                 | Monday 11:00-12:00PM in Building 1, Room 4210 |

| Teaching Assistant(s) |                         |
|-----------------------|-------------------------|
| Name                  | Email                   |
| Enas Ahmad            | enas.ahmad@kaust.edu.sa |

| Course Information                           |  |
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| <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 programming.  |
| <b>Reference Texts</b>                       | <ul style="list-style-type: none"> <li>-Computer Networking: A Top-down approach, J. Kurose and K. Ross, 6th edition, 2013.</li> <li>-Computer Networks, Andrew S. Tanenbaum, 4th edition, Prentice Hall, 2002.</li> <li>-Selected research papers</li> </ul>  |
| <b>Method of evaluation</b>                  | <ul style="list-style-type: none"> <li>20.00% - Midterm exam</li> <li>20.00% - Oral presentation</li> <li>30.00% - Homework /Assignments</li> <li>30.00% - Final exam</li> </ul>   |

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| <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 either MiniNet or NS-2 network simulators. The course will also include a major network implementation project component that requires performing several paper reviews and simulations.   |
| <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><i>Student must obtain the passing grade (70%) in each task and the final project to pass the course.</i></b>  |

### Tentative Course Schedule

*(Time, topic/emphasis & resources)*

| Week | Lectures                         | Topic   |
|------|----------------------------------|---|
| 1    | Sun 01/22/2017<br>Tue 01/24/2017 | Introduction to fundamental concepts in computer networks |
| 2    | Sun 01/29/2017<br>Tue 01/31/2017 | Introduction to network & performance measurements        |
| 3    | Sun 02/05/2017<br>Tue 02/07/2017 | Transport control protocol                                |
| 4    | Sun 02/12/2017<br>Tue 02/14/2017 | Congestion control  |
| 5    | Sun 02/19/2017<br>Tue 02/21/2017 | Wireless networks   |
| 6    | Sun 02/26/2017<br>Tue 02/28/2017 | Wireless mesh and sensor networks                         |
| 7    | Sun 03/05/2017<br>Tue 03/07/2017 | TCP and congestion control over wireless links            |
| 8    | Sun 03/12/2017<br>Tue 03/14/2017 | Optical Networks  |
| 9    | Sun 03/19/2017<br>Tue 03/21/2017 | Optical burst and packet switching                        |
| 10   | Sun 03/26/2017<br>Tue 03/28/2017 | TCP and congestion control over optical networks          |
| 11   | Sun 04/02/2017<br>Tue 04/04/2017 | Spring Break  |
| 12   | Sun 04/09/2017<br>Tue 04/11/2017 | Cloud Infrastructure                                      |
| 13   | Sun 04/16/2017<br>Tue 04/18/2017 | Cloud transport and congestion control                    |
| 14   | Sun 04/23/2017<br>Tue 04/25/2017 | Paper oral presentations                                  |
| 15   | Sun 04/30/2017<br>Tue 05/02/2017 | Paper oral presentations                                  |
| 16   | Sun 05/07/2017<br>Tue 05/09/2017 | Final course review                                       |
| 17   | Sun 05/14/2017<br>Tue 05/16/2017 |   |
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#### Note

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