The University of Jordan
College of Engineering & Technology
Department of Computer Engineering
Fall Term – A.Y. 2017

I. **Course:** Network Systems Design: – 0907721   (3 Cr. – Core Course)

II. **Course Description**

This course gives a broad view of the current state of computer networking research. Topics include: Internet architecture; Internet routing: the Border Gateway Protocol (BGP), routing characterization, routing security, Internet AS relationships, traffic engineering, end host congestion control; quality-of-service, network security: intrusion detection systems, worms, and honeypots; mobile and wireless networking; peer to peer and overlay networking; content distribution networks; sensor networks; critical network infrastructure services: Domain Name Server (DNS), mail servers, etc.; network measurement: distance estimation, bandwidth measurement, trouble shooting tools; network management.

III. **Instructor**

Prof. Dr. Khalid A. Darabkh
Email: k.darabkeh@ju.edu.jo
Office Hours: Sun, Tue, and Thu: 12:00 – 1:00 pm, Mon: 11:30-12:30 pm, or by appointment.

IV. **Course Website**

http://eacademic.ju.edu.jo/k.darabkeh/Material

V. **Required Textbook**
L. L. Peterson and B. S. Davie, *Computer Networks: A System Approach*, Morgan Kaufman Publishers, 5th Edition, March 2011.

VI. **Pre-requisite**
None

VII. **Post-requisites**
None

VIII. References

The books listed below are useful for students who want to explore details on certain concepts. They are not required:

1. Ivan Marsic, *Computer Networks: Performance and Quality of Service*, Rutgers University, December 2010.
2. Olivier Bonaventure, *Computer Networking: Principles, Protocols and Practice*, cnp3book, September 2014.
3. Chwan-Hwa (John) Wu and J. David Irwin, *Introduction to Computer Networks and Cybersecurity*, CRC Press, February 2013.
4. J. F. Kurose and K. W. Ross, *Computer Networking, A top-Down Approach*, Pearson, 6th Edition, March 2012.
5. W. Stallings, *High-speed networks and internets: performance and quality of service*, Prentice Hall, 2nd Edition, 2002.
6. D. P. Bertsekas and R. Gallager, *Data Networks*, Prentice Hall, 2nd Edition, January 1992.
7. A. S. Tanenbaum and D. J. Wetherall, *Computer Networks*, Prentice Hall, 5th Edition, October 2010.
8. D. Gross and C. M. Harris, *Fundamentals of Queuing Theory*, John Wiley & Sons Inc., 3rd Edition, 1998.

IX. Topics

1. Introduction
2. Computer Networks and the Internet
3. The Physical layer
4. The Link Layer and Local Area Networks
5. The Network Layer
6. The Transport Layer
7. The Application Layer
8. Wireless and Mobile Networks
9. Socket Programming and Network Tools
10. Overview of Probability and Stochastic Process
11. Queuing Analysis
12. Self-Similar Traffic

X. Expected Outcomes

A student completing this course should be able to:
1) Master the terminology and concepts of the OSI and TCP-IP reference models.
2) Master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks,
3) Be familiar with wireless networking concepts,
4) Be familiar with contemporary issues in networking technologies,

5) Be familiar with network tools and network programming,
6) Be familiar with TCP flow and congestion controls,
7) Be familiar with queuing theory,
8) Be familiar with self-similarity and self-similar data traffic.

XI. Course Assessment

Survey paper and presentations: 1 survey paper and presentation
Exams: 1 midterm and 1 final examination

XII. Evaluation of Outcomes

Item	Weight
Survey Paper and Presentation	25%
Mid-term Exam	35%
Final Exam	40%

XIII. Schedule

Event	Date
Fall 2017 Term Classes Begin	September 17, 2017 (Sunday)
Survey Paper Topic Due	November 5 , 2017 (Sunday)
Mid-term Exam	November 12, 2017 (Sunday)
Survey Paper Submission Due and Start of Presentations	December 17, 2017 (Sunday)
Fall 2017 Term Classes End	December 27, 2017 (Wednesday)
Final Exam	January 2, 2018 (Tuesday) (Tentative)

XIV. Class distractions

You must turn cell phones, pagers, etc. off during the class!

XV. Academic integrity

You are highly encouraged to consult the instructor if you have any questions related to the survey paper topics, exams, or any other relevant issues. The survey paper and exams are expected to be individual work (have to be done by your own) and completed without any help of your classmates. Handing in work that was jointly prepared and/or copied will be considered plagiarism and will be handled according to the University regulations.