SAMPLE SYLLABUS

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

ABET Course Syllabus EEE459

1. **Course: EEE 459 Communication Networks**
2. **Credits and Contact Hours:** 3 Credit Hours (lecture), Topics: Engineering
3. **Course Coordinator:** Dr. Martin Reisslein, Professor
4. **Textbook:** James F. Kurose and Keith W. Ross, *Computer Networking, A Top-Down Approach*, 5th Edition 2010, Addison-Wesley ISBN: 0-13-607967-9.
   Supplemental materials:
   - Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, McGraw-Hill, 2013.
   - Andrew S. Tanenbaum, Computer Networks, 5th Edition, Prentice Hall, 2010.
   - Dimitri Bertsekas and Robert Gallager, *Data Networks*, 2nd Edition, Prentice Hall, 1992.
5. **Specific course information**
   a. **Catalog description:** Fundamentals of communication networks. Study of Five-Layer Internet model. Focus on functionality and performance of protocols used in communication networks.
   b. **Prerequisites or co-requisites:** EEE 203, pre-/co-requisite EEE 350.
   c. **Required/elective/selected elective:** Elective
6. **Specific goals for the course**
   Students will be able to identify and relate the fundamental components of a communication network
   a. **Outcomes of instruction:**
      1. Students are conversant with the requirements and the protocols employed in the fundamental components in a communication network.
      2. Students can analyze the impact of functional parameters in protocol design.
   b. **Outcomes of Criterion 3 addressed by the course:**
      (1) Engineering and math background and problem solving abilities. Students can define a networking problem with appropriate consideration of context and constraints, and can recognize appropriate solutions. Students can develop models appropriate to a given networking problem using assumptions, estimates, and approximations guided by good engineering judgement. Use of contemporary methods and tools for the design and evaluation of communication networks.
      (2) Analysis of properties of communication systems.
7. **Brief list of topics to be covered**
   1. Overview of Computer Networks and the Internet.
      ISPs and Internet Backbones
      Delay and Loss in Packet Switched Networks
      Protocol Layers and Their Service Models
      Networks under Attack
      Internet History
   2. Application Layer Protocols
      Basic Principles
      The Web and HTTP
      FTP
      SMTP

DNS
Overview of Socket Programming
Content Distribution and Peer-to-Peer Networking

3. Overview of Transport Layer Services
   Multiplexing and Demultiplexing
   Connectionless Transport: UDP
   Principles of Reliable Data Transfer
   Connection-Oriented Transport: TCP
   Principles of Congestion Control
   TCP Congestion Control
4. Overview of Network Layer and Routing
   Routing Principles
   Hierarchical Routing
   IP
   Routing in the Internet
   Router Architecture
5. Overview of Link Layer
   Overview of Error Detection and Correction
   MAC
   LAN Addresses, ARP
   Ethernet
   Hubs, Switches
6. Wireless and Mobile Networks
   Wireless Links and Network Characteristics
   WiFi: 802.11 Wireless LANs

Computer Usage: Students review and practice key course concepts through web-based applets, e.g., the applets provided as supplementary materials with the course texts. Students also engage with online tools to explore Internet behaviors, e.g., with online traceroute interfaces for investigating delays in the Internet.

Laboratory Experiments: None.

Course Contribution to Engineering Science and Design:

This course teaches engineering science and design by providing students with a basic understanding of the building blocks and mechanisms that make the Internet work. Students gain the opportunity to design small components of the networking protocol stack, such as a reliable packet transfer protocol and evaluate its performance through mathematical analysis. This course affords students also the opportunity to practice the modeling of networking mechanisms. For example, students need to make sensible approximations and simplifications to obtain performance results for otherwise mathematically intractable networking configurations and protocols. Students have also the opportunity to design local area networks, for instance the layout of a campus network. This design problem involves choosing the appropriate networking technology subject to user requirements and cost constraints.

Person preparing this description and date of preparation: Martin Reisslein, K.Tsakalis, June, 2021.