Electrical and Computer Engineering 5600  
Introduction to Computer Networks  
Required

Course Description:
Introduction to computer network terminology, network applications, network technologies and internetworking. Protocol stacks are introduced, and each layer is studied. Particular attention is paid to the TCP/IP protocol stack.

Prerequisites:
ECE 3620 and MATH 5710, or graduate standing

Textbook:

Course Outcomes:
1. Knowledge of seven layer network protocols and architecture.
2. Demonstrate the ability to perform fundamental network programming under Linux.
3. Understand the importance of standards and who sets them.
4. Be fluent in the language of communication network, i.e. understand the meaning of networking terms and abbreviations.

Topics Covered:
- Definitions, Network Configurations, LAN, MAN, WAN
- Protocol stack, OSI vs. TCP/IP
- Example networks, Wireless LAN
- Introduction to Ethernet
- Communication Theory, Nyquist, Shannon
- Transmission Media
- Digital Modulation and multiplexing
- IPv4 / IPv6 addresses, ARP
- Modem
- Multiplexing and PSTN
- SONET and Mobile Telephone Network
- Mobile Telephone Network and Cable
- 3G/4G, Cable
- IP and ICMP
- Data link layer: framing and error
- Error detection and correction
- Flow control
- ARQ and Flow Control
- MAC I, MAC II, MAC III, and MAC IV
- UDP, Echo, and PPP
- 802.11, 802.16
• Bluetooth and link layer switching
• Network layer, routing algs
• Routing
• TCP, TCP performance
• Internet routing: BGP and OSPF
• Interworking, Tunneling, CIDR, NAT

Outcome Assessments (Grades):
  Homework  20%
  Research Paper  10%
  Projects  40%
  Class Participation  10%
  Final  20%

Class Schedule:
  Class  Three times a week for fifty minutes.

Contribution of course to meeting the requirements of Criterion 5:
  3 credit hours of Engineering Topics and contains significant engineering design content

Relationship of course to student outcomes:
  a. An ability to apply knowledge of mathematics, science, and engineering.
  b. An ability to design and conduct experiments, as well as to analyze and interpret data.
  c. An ability to design a system, component, or process to meet desired needs.
  e. An ability to identify, formulate, and solve engineering problems.
  g. An ability to communicate effectively.
  h. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
  i. A recognition of the need for, and ability to engage in, life-long learning.
  j. A knowledge of contemporary issues.
  k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Instructor:
  Rose Hu, Associate Professor
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