Fall 2010

CEG 702-01: Advanced Computer Networks

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CEG 702-01 ADVANCED COMPUTER NETWORKS
4 Credits, Fall Quarter 2010

Syllabus

Time/Place: Lecture: 4:10 pm - 5:25 pm, M/W, Russ Engineer Cntr 208

Instructor: Dr. Yong Pei, 489 Joshi Research Center
Tel. 937-775-5111, Email: yong.pei@wright.edu
Office Hours: 2:30-4:30pm, Friday

Prerequisites: CEG 602 and CEG 633 (or equivalent)

Required Textbook:

Please Note: Since this is an advanced graduate course, the textbook is only the starting point for selected topics that we will cover. The slides used will cover ideas from a broader range of sources, including other books, papers, RFCs etc. The WebCT class site will have online links to those resources.

Supplemental Readings:
- Lecture slides will be posted through WebCT.
  WebCT Guide: [http://wisdom.wright.edu/gettingstarted/03_logon.html](http://wisdom.wright.edu/gettingstarted/03_logon.html)

Reference Books:

Website: CEG 702 in WebCT.

Catalog Description:
This course provides an in-depth examination of the fundamental concepts and principles in communications and computer networks. Topics include: queuing analysis, ATM, frame relay, performance analysis of routings, and flow and congestion controls.

Course Description:
The Internet protocols have revolutionized communications. This advanced networking course will equip you with a deep knowledge of network concepts, protocol design, and performance analysis that make the Internet work, help you develop critical insight into their design, and obtain a first hand feel for implementation through homework and
project exercises. Another key goal is to prepare you for doing research in the field of networking. Additional protocols from the OSI and telecommunications/ATM world will also be featured to provide in-depth comparative studies.

Specifically, we will start with a review of basic networking ideas and then review and study topics such as:
- Network layer addressing and forwarding (IP, IPv6, NAT),
- Transport layer (TCP, UDP),
- Congestion control techniques (TCP, Frame-relay)
- IP multicast (IGMP, MBONE, Multicast Routing/Transport/Congestion Control),
- Network management, Auto-configuration (SNMP, DHCP, ICMP, ICMPv6),
- Queueing analysis, network performance evaluations
- Future internet design, comparative critique, deployment issues
- QoS mechanisms, protocols and architectures (scheduling, shaping, RTP, Intserv, Diff-serv, RTP, RSVP),
- Wireless network capacity, routing and optimizations
- Naming (DNS), Overlay & Peer-to-Peer Networks

Optional topics: (time permitting)
- Traffic engineering (IP-over-ATM, MPLS, OSPF-extensions, VPNs)
- Measuring and Instrumenting the Internet
- High-speed router design
- High-speed networks (Metro-area GbE, SONET, Optical Networks)

Grading: Project – 25%  
Homework – 10%  
Midterm Exam – 30%  
Final – 35%