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

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
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%