CS 476/576 – Advanced Computer Networking

Catalog Description: Covers advanced computer networking concepts: congestion control and avoidance, multimedia and QoS, queuing theory, buffer management, scheduling and fairness policies, wireless and mobile networks, service models, network security.

Credits: 4

Prerequisites: (CS 372 or ECE 372)

Courses that require this as a prerequisite: None

Structure: Two 110-minute lectures per week

Instructors: B. Hamdaoui

Course Content:
- Review of packet-switched networks: principles, concepts, and architectures
- Congestion control and avoidance mechanisms
- Multimedia and QoS-aware communications for IP networks
- Buffer management, scheduling policies, fairness, and queuing principles for packet-switched networks
- Services models: integrated services, differentiated services, proportional services, and best-effort services
- Wireless and mobile networks: LANs, WANs, and cellular.
- Network security

Learning Resources:
- *Computer Networking with Internet Protocols & Technology*, by W. Stallings, Prentice Hall, 2004 (optional)
- *Wireless Communications and Networks, 2nd Edition*, by W. Stallings, Prentice Hall, 2005 (optional)
- *Network Security Essentials: Applications and Standards, 3rd Editio*n, by W. Stallings, Prentice Hall, 2007 (optional)
- Several technical papers

Measurable Student Learning Outcomes:
At the completion of the course, students will be able to…
1. **Explain** congestion control and avoidance concepts and mechanisms (ABET Outcomes: A, C, K)
2. **Analyze** resource reservation mechanisms and protocols for multimedia/QoS networking, such as RSVP (ABET Outcomes: A, C, K)
3. **Explain** queuing concepts, buffer management, and scheduling policies and fairness in packet switched-networks (ABET Outcomes: A, C, K)
4. **Compare/contrast** different service models: (IntServ, DiffServ, Proportional, and best-effort), (ABET Outcomes: A, C, K)

5. **Study** wireless and mobile networking, and **explain** some popular wireless networks and protocols, such as IEEE 802.11 wireless LANs (ABET Outcomes: A, E)
6. **Explain** network security and threats: threat models, worm propagation, viruses, etc   (ABET Outcomes: B, C, J, K)
7. **Analyze/criticize** research ideas addressing networking issues and concepts by reading technical papers (CS/ECE 576 only)
8. **Compare/contrast** different solutions to various networking problems (CS/ECE 576 only)
9. **Implement, evaluate, and improve** networking concepts, techniques, and algorithms through projects (CS/ECE 576 only)

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Link to Statement of Expectations for Student Conduct, i.e., cheating policies
http://oregonstate.edu/studentconduct/http:/%252Foregonstate.edu/studentconduct/code/index.php