

CMPE 542 Advanced Networking (Spring 2006/2007)

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| Instructor: | Asst. Prof. Dr. Doğu Arifler |
| Course Web Site: | http://cmpe.emu.edu.tr/cmpe542 |
| Office Hours: | TBA. Please refer to the course Web site. |
| Textbook: | L. L. Peterson and B. S. Davie, <i>Computer Networks: A Systems Approach</i> , 3rd ed., Morgan Kaufmann, 2003. |
| Prerequisite: | No official prerequisite. However, you must have a strong background in stochastic models and networking. |

Catalog Description: Layered network systems, cross-layer design, design trade-offs; modeling network traffic, fluid models of network traffic, models for data, voice, and video traffic; access control: leaky buckets; flow and congestion control and models; broadband wireless, design challenges, recent trends and models; embedded network systems: deployment, data dissemination, coverage, and connectivity.

Related Courses: You may also consider taking *CMPE 547 Queueing Networks for Computer Applications*, *CMPE 548 Analysis of Computer Communication Networks*, and *CMPE 549 Wireless Personal Communications* in conjunction/in the sequel.

Important Dates: Midterms: 9–16 April 2007, Finals: 29–13 May–June 2007.

Grading Policy: Midterm 30%, Final 40%, Presentations 30%

Presentations: Each student will give two brief presentations based on two papers that will be assigned by the instructor from a paper list which will be available from the course Web site. All students are responsible for the material covered in the papers.

Make-Up Policy: Only one **comprehensive** make-up examination will be given to those who miss any of the midterm or the final. The make-up exam will be given to only those who provide a valid excuse in writing within the next three working days following the missed exam. This rule is a University by-law, and I **will** enforce it. Students who miss an exam due to a serious medical condition are required to provide official documentation (doctor's report approved by the Student Health Center). However, eligibility to take the make-up exam will still be **subject to my approval**.

Academic Dishonesty: Any conduct that attempts to gain unfair academic advantage is considered academic dishonesty. Copying assignments, cheating during exams, substituting for another person are some examples of academic dishonesty. Cases of academic dishonesty **will not** be tolerated and will be punished according to EMU's disciplinary policies.

Tentative outline: Below is a tentative outline for this course. I reserve the right to adjust the pace and topics of the class as the semester progresses.

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| Week 1 | Overview of general networking concepts |
| Week 2 | Layered network systems; cross-layer design |
| Week 3 | Modeling data, voice, and video traffic |
| Week 4 | Fluid models for network traffic |
| Week 5 | Flow control; models |
| Week 6 | Congestion control; models; AIMD congestion control |
| Week 7 | Routing and congestion control; network access control; leaky buckets |
| Week 8 | Midterm week |
| Week 9 | Broadband wireless; recent trends and models |
| Week 10 | Cross-layer design revisited for wireless networks; channel-aware scheduling |
| Week 11 | Embedded networking: Overview |
| Week 12 | Embedded networking: Sensor networks: Challenges in topology control, data dissemination, link layer design |
| Week 13 | Embedded networking: Sensor networks: Deployment - Coverage and connectivity |
| Week 14 | Review and concluding remarks |

Additional references:

- J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, 3rd ed., Addison Wesley, 2005.
- M. Schwartz, *Mobile Wireless Communications*, Cambridge University Press, 2005.
- B. Krishnamachari, *Networking Wireless Sensors*, Cambridge University Press, 2006.