

CMPE 474 Performance Analysis of Computer Systems (Fall 2006)

- Instructor:** Asst. Prof. Dr. Doğu Arifler
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- Office Hours:** TBA
- Textbook:** E. D. Lazowska, J. Zahorjan, G. S. Graham, K. C. Sevcik, *Quantitative System Performance : Computer system analysis using queueing network models*, Prentice-Hall, 1984. This book is available online at <http://www.cs.washington.edu/homes/lazowska/qsp/>
- Reference:** R. Jain, *The Art of Computer Systems Performance Analysis*, Wiley, 1991.
- Prerequisite:** MATH 322

This course is a systems-oriented technical elective course in the Department of Computer Engineering. The primary goal is to present mathematical models and methods that are used to analyze computer systems and communication networks at an introductory level.

Course Description: Queueing models of computer systems and applications of queueing theory to computer modelling. Bounds on system performance. Mean-value analysis of computer systems. Modelling specific subsystems. Queueing models for analysis. Limitations of queueing models. Analysis of transaction processors, terminal-oriented systems, and batch processing.

Related Courses: Basic concepts from *CMPE 241 Operating Systems* and *CMPE 344 Computer Networks* will be revisited throughout this course.

Important Dates: Midterm week: 17–25 November 2006, Finals: 9–22 January 2007.

Grading Policy: Midterm 35%, Final 45%, Homework 20%

Recitation Hours: There are no labs for this course. Our “experiments” will be mainly “thought experiments” and/or simple computer assignments that will answer a performance question. “Lab hours” for this course are devoted for recitations.

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 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 homework, 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.

Week 1	Introduction (Ch. 1 & 2)
Weeks 2 & 3	Fundamental laws (Ch. 3)
Week 4	Queueing network models (Ch. 4)
Week 5	Review
Week 6	Asymptotic bounds (Ch. 5)
Weeks 7 & 8	Mean-value analysis (Ch. 6 & 7)
Week 9	Midterm week
Week 10	A brief introduction to stochastic models (Supplementary notes)
Week 11	Introduction to queueing theory (Supplementary notes)
Week 12	Analysis of a single-server queue (Supplementary notes)
Week 13	Modelling communication networks and local area networks (Ch. 15 + supplementary notes)
Week 14	Modelling memory, I/O, database concurrency (Supplementary notes)
