MAP 6264 Queueing Theory

Credits: 3 credits

Text book, title, author, and year: Cooper, R.B. Introduction to Queueing Theory, Second Edition, North Holland, 1981 , ISBN 0-444-01065-3; Solutions Manual (by B. Tilt), ISBN 0-444-00379-7. Both available free from course website.

Reference materials: Full-screen videos of Spring 2006 lectures on whiteboard, available online at http://www.vimeo.com/album/171324. Bertsekas, D. and R.Gallager. Data Networks, 2nd Ed., Prentice Hall,1992,ISBN 0-13-200916-1 paperback. Available at http://web.mit.edu/dimitrib/www/datanets.html Ross, S.M. Introduction to Probability Models, any edition, Academic Press. (10th Ed, ISBN 978-0-12-375686-2). Tijms, H.C. A First Course in Stochastic Models, Wiley, 2003, ISBN 0-471-49881-5 paperback. Myron Hlynka's Queueing Theory Page: http://web2.uwindsor.ca/math/hlynka/queue.html.

Specific course information

Catalog description: Development of mathematical models for performance analysis of computer and telecommunications networks. Review of probability, introduction to stochastic processes, development of classical teletraffic and queueing models, application to modern computer and telecommunications networks.

Prerequisites: STA 4821 (Stochastic Models for Computer Science)

Specific goals for the course: The primary goal is to show how to use the theory of probability to describe and predict the behavior of real systems (computer and telecommunications networks, others) that use fixed resources to handle random demands (thereby enabling engineers to make design tradeoffs between cost and quality of service). In the process, we examine the relationship between mathematical models (precise formulas but limited applicability) and their corresponding simulation models (imprecise experimental data, but greater flexibility and realism). Since the models are simple descriptions of real systems, they are quite intuitive; but since they are driven by random inputs, their performance can be quite counterintuitive. Thus, we will show, this subject is both practically useful and intellectually interesting.

Brief list of topics to be covered: Introduction (historical background, summary of technology and economics)

1. Intuitive analysis of mathematical models, subtleties
2. Review of probability, simulation via inverse transform
3. Introduction to stochastic processes
4. One-dimensional birth-and-death processes, related queueing models
5. PASTA, Little's theorem, insensitivity
6. Erlang B and Erlang C models, finite-source models
7. Multidimensional birth-and-death processes, networks of queues and related models
8. Imbedded Markov chains, M/G/1 queues, vacation and polling models, related models

All homework assignments posted at **www.cse.fau.edu/~bob/courses**