

STOR 890: Design and Control of Queueing Systems with Applications to Manufacturing and Health Care

Fall 2014

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Time: Mondays and Wednesdays, 9:30 – 10:45 AM

Place: Room 125 Hanes Hall

Office Hours: By arrangement

The main objective of this 3-credit advanced course is to familiarize students with the techniques that are commonly used in the design and control of queueing systems and also to demonstrate how these methods are applied to some interesting real-world problems.

The course will start with a discussion of some fundamental concepts and results from queueing theory. We will then discuss techniques that are commonly used in queueing design and control such as stochastic comparisons, sample-path analysis, stochastic dynamic programming, approximations and heuristics. Once we lay the proper foundation, we will study some classical queueing design and control problems observed in manufacturing and health-care systems. We will cover such topics as design of production flow lines (e.g., workload allocation and buffer allocation), control of cross-trained servers in manufacturing systems, scheduling of operating rooms, allocation of organs to donors, and emergency response planning.

Students attending this course are expected to have a knowledge of basic probability and stochastic processes in the level of STOR 641 (and preferably of STOR 642). There is no textbook required for the course but a list of references will be provided. Furthermore, papers and lecture notes will be distributed throughout the semester. Grades will be based on participation in class, homework assignments (2 or 3), paper presentations, and reports on papers.