MTHE/MATH 472/872 **Winter 2017**

Control of Stochastic Systems

Classes held in Stirling Hall 412A at Mon 11:30-12:20, Tue 13:30-14:20, Thu 12:30-13:20.

Course Information

This course is concerned with control and optimization of dynamical systems under probabilistic uncertainty. Such systems are of increasing importance in many application areas such as information systems, control systems, and networks as well as in economics, biology, optimization etc., and applied mathematics at large.

Instructor:	Serdar Yüksel, Jeffrey Hall 415, Phone: 533–2429, e-mail: `yuksel@mast.queensu.ca`
Marker:	Drew Steeves e-mail: `1ds19@queensu.ca`
Office Hours:	Thursdays 11:30-12:20
Recommended Text:	*Discrete-Time Markov Control Processes, by O. Hernandez-Lerma and J. B. Lasserre*,
	Supplemental Notes will be posted on the course web site
References:	*Dynamic Programming and Optimal Control*, by D. P. Bertsekas
	Markov Chains and Stochastic Stability, by S. P. Meyn, R. L. Tweedie
Announcements:	Visit http://www.mast.queensu.ca/˜math472 for announcements, homeworks etc.
Grading:	Homework Assignments 15%, Project and Presentations 20%,
	maximum of(Midterm 30% + Final 35%, Midterm 20% + Final 45%)

Topics

- Introduction to Markov Chains
- Martingales and Stochastic Stability
- Control Problems over Finite and Infinite Time and Dynamic Programming
- Partially Observed Models
- Linear Quadratic Gaussian Problem and Kalman Filtering
- The Average Cost: ACOE and the Linear Programming Approach to Markov Decision Processes
- Numerical Methods and Algorithms (Value/Policy Iteration, Linear Programming, Q-Learning) and Approximations
- Decentralized Stochastic Control
- Continuous-Time Models and Elements of Stochastic Differential Equations