

# Dynamic Programming and Optimal Control

MWF, 1:30pm–2:20pm, Holmes 248

## Class Information

This is a fundamental graduate-level course on optimal sequential decision making. It builds on an introductory undergraduate course in probability, and emphasizes Dynamic Programming to obtain optimal sequence of decision rules. Some familiarity with dynamic systems would enhance appreciation, but the necessary material will be reviewed during the course. The sequential decision making model we consider encompasses a wide range of applications. Inventory control, communication models, scheduling, asset selling, queueing applications, search problems, auction algorithm, Kalman filtering, shortest path problems, resource allocation, finance, routing, sequential hypothesis testing are just to name few.

Instructor: Gurdal Arslan, Holmes 440, Phone: 956-3432, E-mail: [gurdal@hawaii.edu](mailto:gurdal@hawaii.edu)  
Office Hours: anytime  
Text: Dynamic Programming and Optimal Control by Bertsekas, Volume 1  
Webpage: Follow the links from <http://www2.hawaii.edu/~gurdal/>  
Site of announcements, handouts, homeworks, etc.  
Grading: Homework 25% + Mid-term I 25% + Mid-term II 25% + Final Exam 25%, or  
Homework 25% + Final Exam 75%, whichever is higher.  
Exam Dates: Mid-term I: Monday, February 16, 2009, in class.  
Mid-term II: Monday, March 23, 2009, in class.  
Final Exam: Friday, May 15, 2009, 2:15pm-4:15pm, in class.  
Policies: No credit will be given to late homeworks.  
Exams must be taken at the announced times.

## Topics (Tentative)

- The Dynamic Programming Algorithm (Chapter 1)
- Deterministic Systems and Shortest Path Problem (Chapter 2)
- Problems with Perfect State Information (Chapter 4)
- Problems with Imperfect State Information (Chapter 5)
- Suboptimal Control (Chapter 6)
- Infinite Horizon problems (Chapter 7 and selected Chapters from Volume 2)
- Simulation-based methods (Volume 2 and Neuro-Dynamic Programming by Bertsekas)