Winter 2013

Probabilistic Design and Optimization - University of California, Davis

Jay R. Lund
University of California, Davis, jrlund@ucdavis.edu

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ECI 249: **Probabilistic Design and Optimization**   Winter, 2013
MW 10am-noon   Instructor: Jay Lund
1128 Bainer Hall   Office: Watershed Sciences Center
Office Hours: before class, by appt. and usually when I'm in.   E-mail: jrlund@ucdavis.edu

<u>Objective</u>: learn fundamental problems, methods, and applications in probabilistic engineering design.

<u>Date</u>	<u>Topic, Lecture</u>	<u>Readings and Assignments</u>
8 Jan.	Design Philosophy & Objectives w/ uncertainty	Lecture notes 1, 2
10	Expected utility, theory and reality 3, 4	Khanemann and Tversky, 1979
15	Decision-making with uncertainty 5, 6	<u>term project topic due</u>
17	[Jay gone]	
22	Decision theory applications: Levee design 7	Davis, et al. 1972 paper; <u>HW#1 due</u>
24	Probability primer 8	<u>term project outline & bibliography due</u>
29	More probability primer 9	(decision theory application)
31	Probabilistic Evaluation: sensitivity analysis and analytical propagation of uncertainty 10, 11	
5 Feb.	Approx. moments and Monte Carlo propagation of uncertainty 12, 13	
7	Markov processes 14	<u>HW#2 due</u> (decision theory applic.)
12	SDP with Markov chains 15	<u>HW#3 due</u> (probabilistic evaluation), Loucks, et al. reading
14	[Jay gone]	
19	Probabilistic LP: Chance constraints 16	Taha, Section 20.2.4
21	Decisions with Recourse 17, 18	
26	Markov Chain LP 19, LP Examples	<u>HW#4 due</u> (prob. DP), Hollinshead & Lund 2007
28	Probabilistic optimal search; Stochastic EA 20, 21	Gates, EA reading, <u>Draft papers due Friday</u>
5 Mar.	Implicit Stochastic Optimization	Lund & Ferreira, 1996
7	Project presentations	
12	Project presentations; <u>HW#5 due</u> (prob. LP)	
14	Risk Analysis of Risk Analysis 22, Slack and Review	Lund 2008

19 March (Tuesday) 10:30am-12:30pm - Final Exam time may be used for project presentations.
18 March (Monday) <u>Final papers due</u>.

Grading: Homework 80%; Term project 20%. Term project can be solution of a problem or completion of a small term paper in an area of interest to you, relevant to this field. Class notes are available on my web site: http://cee.engr.ucdavis.edu/faculty/lund/