

Modeling and Operations Research, PPD 557

Spring 2012 Course Syllabus

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Basics: Modeling and Operations Research, PPD 557

Dr. Jeffrey H. Smith

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Office Hours: 4-6pm Mondays

Location: RGL Lounge

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Importance of this course:

As the dramatic consequences of policy decisions demonstrate the power to generate wealth while at the same time drive successful organizations into bankruptcy, the role of models for understanding the impacts of decision making on outcomes has become increasingly important. Probability and statistics, risk and uncertainty, resource allocation, and other factors influence policy and decision makers. Specifically, the PPD graduate must know how to collect, organize, analyze, and interpret quantitative information in the policy environment.

This course is designed to help students quantify and organize policy information through modeling of relationships among decision making variables.

Course Prerequisite Knowledge

Prior course in probability and/or statistics; working knowledge of algebra.

Course Goal

Students will learn the tools and techniques of quantitative analysis outlined in the schedule, how and when to apply them, and practice application of those tools with homework exercises. Students completing this goal will be prepared to quantify a variety of policy problems for analysis and decision making.

Text

Taylor, Bernard, Introduction to Management Science, Tenth Edition, 2010.

Course Description

Chapter 1, Introduction	Introduction to Management Science
Chapter 11, Probability and Statistics	Probability, random variables, methods; discrete and continuous probability models, transformations, linear models
Chapter 12, Decision Analysis	Bayesian decision theory, Multiattribute decision analysis
Chapter 13, Queuing Theory	Arrival and service time analysis
Chapter 14, Simulation	Modeling of probabilistic relationships
Chapter 15, Forecasting	Prediction models, time series
Chapters 2, 3, 4, Linear Programming	Resource allocation models
Chapter 5, Integer programming	Resource allocation of non-divisible resources (e.g., vehicles)

In general we will follow the book, but in a different order (see the schedule).

Suggestions (for success)

You should read over the reading assignments before the corresponding lecture.

You should attempt the homework on your own before asking for help.

Make an honest attempt to understand the material before uttering the words, "I don't get this."

Course Requirements and Grades

The course requirements are as follows:

Requirement	Point Total
3 Homework assignments @ 10 points	30
Midterm Exam @ 25 points	25
Mini-Project	20
Final Exam	25
Subtotal	100

The project will be announced after submission of homework assignment 2 and will be graded according to attributes of creativity, relevance, content, organization, and timeliness (4 pts each).

Late papers will be assessed a penalty of 40% per day. All grading issues are closed after 2 weeks from the original due date. Unclaimed papers will be kept 3 weeks before being discarded.

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *Scampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

Here is the class schedule.

PPD 557 Spring 2012 Schedule

(Note: homework due in class on date shown)

Date	Topic	Readings	Notes
Tuesday Jan 10	Introduction to Management Science and Breakeven Analysis	Chapter 1	
Tuesday Jan 17	Probability and Statistics Review	Chapter 11	
Tuesday Jan 24	Probability and Statistics Appcns.	Chapter 11	
Tuesday Jan 31	Decision Analysis-Bayes Single Attribute	Chapter 12	
Tuesday Feb 7	Decision Analysis-Multiple Attributes	Chapter 12 and notes	
Tuesday Feb 14	Queuing Theory	Chapter 13	Hw 1 due
Tuesday Feb 21	Midterm Review	Chapter 11-13	
Tuesday Feb 28	Midterm		
Tuesday Mar 6	Simulation	Chapter 14	
Tuesday Mar 13	Spring Recess – No Class		
Tuesday Mar 20	Forecasting	Chapter 15	
Tuesday Mar 27	Linear Programming	Chapters 2-3	Hw 2 due
Tuesday Apr 3	Linear Programming, Project Requirements	Chapters 2-3	
Tuesday Apr 10	Linear Programming	Chapters 3-4	
Tuesday Apr 17	Integer Programming	Chapter 5	
Tuesday Apr 24	Review	Course overview; final exam notes	Last day of class; Project due (paper copy). Hw3 due
Tuesday May 8	Final Exam, 7-9 pm		