# Modeling and Operations Research, PPD 557
## Tuesdays 6-9:20pm, RGL 100; Course ID: 51251R
## Website: www.blackboard.usc.edu
## Fall 2017 Course Syllabus

Contents

Contact Information
Dr. Jeffrey H. Smith

Office Hours: Tuesday 5-6pm; after class or by appointment
Location: VKC 250; Email: jeffs@usc.edu

Importance of this course:

As the dramatic consequences of analytics on policy decisions demonstrate the power to generate change while at the same time drive successful organizations into obsolescence, the role of models for understanding the impacts of decision making on outcomes has become increasingly important for dealing with complex, interdependent problems.  Probability and statistics, risk and uncertainty, resource allocation, and timing have enormous quantitative impact to 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 statistics; working knowledge of algebra.  Familiarity with Microsoft Excel.

Course Goal

Students will learn the tools and techniques of quantitative analytics outlined in the schedule, how and when to apply them, and practice application of the 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, 12th Edition, 2016.

Course Description

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|---|---|
| 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, Multi-attribute 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 requirements are defined after submission of homework assignment 2. The project is graded using the 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.

Here is the class schedule.

PPD 557 Fall 2017 Schedule

**(Note: homework due in class on date shown)**

| Date | Topic | Readings | Assignments/Notes |
|------|-------|----------|-------------------|
| Tuesday Aug 22 | Introduction to Management Science | Chapter 1 | |
| Tuesday Aug 29 | Probability and Statistics: Review | Chapter 11 | |
| Tuesday Sep 5 | Probability and Statistics: Applications | Chapter 11 | |
| Tuesday Sep 12 | Decision Analysis-Bayes | Chapter 12 | |
| Tuesday Sep 19 | Decision Analysis-Multiattribute Decision Theory | Chapter 12 and notes | |
| Tuesday Sep 26 | Queuing Theory | Chapter 13 | Hw 1 due |
| Tuesday Oct 3 | Midterm Review | Chapter 11-13 | |
| Tuesday Oct 10 | Midterm | | |
| Tuesday Oct 17 | Simulation | Chapter 14 | |
| Tuesday Oct 24 | Forecasting | Chapter 15 | |
| Tuesday Oct 31 | Linear Programming Intro, Project Requirements | Chapters 2, 3, 4 | Hw 2 due |
| Tuesday Nov 7 | Linear Programming | Chapters 3-4 | |
| Tuesday Nov 14 | Linear Programming 2 | Chapters 3-4 | |
| Tuesday Nov 21 | Integer Programming | Chapter 5 | |
| Tuesday Nov 28 | Review | Chapter 5; Course overview, final prep | Hw 3 due, Projects due (hard copy) |
| Tuesday Dec 12 | Final Exam, 7-9 pm | | |

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 is from DSP. Please be sure I receive the letter 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. Website and contact information for DSP: http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html, (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu.

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. Each student is expected to understand and abide by these principles. SCampus, the Student Guidebook, (www.usc.edu/scampus or http://scampus.usc.edu) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.  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/. Information on intellectual property at USC is available at: http://usc.edu/academe/acsen/issues/ipr/index.html.

Emergency Preparedness/Course Continuity in a Crisis

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.  Please activate your course in Blackboard with access to the course syllabus. Whether or not you use Blackboard regularly, these preparations will be crucial in an emergency. USC's Blackboard learning management system and support information is available at blackboard.usc.edu.

# APPENDIX

## ACADEMIC RESPONSIBILITY

Students, faculty, and administrative officials at the University of Southern California, as members of the academic community fulfill a purpose and a responsibility.

The University must, therefore, provide an optimal learning environment, and all members of the University community have a responsibility to provide and maintain an atmosphere of free inquiry and expression. The relationship of the individual to this community involves these principles: <u>Each member has an obligation to respect</u>:

1. THE FUNDAMENTAL HUMAN RIGHTS OF OTHERS
2. THE RIGHTS OF OTHERS BASED UPON THE NATURE OF THE EDUCATIONAL PROCESS
3. THE RIGHTS OF THE INSTITUTION

## <u>ACADEMIC DISHONESTY</u>

The following statements and examples explain specific acts of academic dishonesty.

1. <u>Examination Behavior</u>: Any use of external assistance during an exam is considered academically dishonest unless expressly permitted.

    a. Communicating in any way with another student during the examination.
    b. Copying material from another student's exam.
    c. Using unauthorized notes, calculators or other devices.

2. <u>Fabrication</u>: Any intentional falsification or invention of data or citation in an academic exercise will be considered a violation of academic integrity.

    a. Inventing of altering data for a laboratory experiment or field project.
    b. Resubmitting returned and corrected academic work under the pretense of grader evaluation error, when, in fact, the work has been altered from its original state.

3. <u>Plagiarism</u>: Plagiarism is the theft and subsequent passing off of another's ideas or words as one's own. If the words or ideas of another are used, acknowledgement of the original source must be made through recognized referencing practice.

    a. <u>Direct Quotation</u>: Any use of a direct quotation should be acknowledged by footnote citation and by either quotation marks or appropriate indentation and spacing.
    b. <u>Paraphrase</u>: If another's ideas are borrowed in whole or in part and are merely recast in the student's own words, proper acknowledgement must, nonetheless, be made. A footnote or proper internal citation must follow the paraphrase material.

4.  Other Types of Academic Dishonesty:

   a. Submitting a paper written by another;
   b. Using a paper or essay in more than one class without the instructor's express permission;
   c. Obtaining an advance exam copy without the knowledge or consent of the instructor;
   d.  Changing academic records outside of normal procedures;
   d. Using another person to complete homework assignment or take-home exam without the knowledge and consent of the instructor.

The above information is taken directly from *SCampus* and the Academic Affairs Unit of the Student Senate in conjunction with the Academic Standards Committee.

## ACADEMIC DISHONESTY
## SANCTION GUIDELINES

| VIOLATION | RECOMMENDED SANCTION (assuming first offense) |
| --- | --- |
| Copying answers from other students on exam. | F for course. |
| One person allowing another to cheat from his/her exam or assignment. | F for course for both persons. |
| Possessing or using extra material during exam (crib sheets, notes, books, etc.) | F for course. |
| Continuing to write after exam has ended. | F or zero on exam. |
| Taking exam from room and later claiming that the instructor lost it. | F for course and recommendation for further disciplinary action (possible suspension). |
| Changing answers after exam has been returned. | F for course and recommendation for disciplinary action (possible suspension). |
| Fraudulent possession of exam prior to administration. | F for course and recommendation for suspension. |
| Obtaining a copy of an exam or answer key prior to administration. | Suspension or expulsion from the university; F for course. |
| Having someone else take an exam for oneself. | Suspension or expulsion from the University for both students; F for course. |
| Plagiarism. | F for the course. |

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|---|---|
| Submission of purchased term papers or papers done by others. | F for the course and recommendation for further disciplinary action. (possible suspension) |
| Submission of the same term papers to more than one instructor where no previous approval has been given. | F for both courses. |
| Unauthorized collaboration on an assignment. | F for the course for both students. |
| Falsification of information in admission application (including supporting documentation). | Revocation of university admission without opportunity to apply. |
| Documentary falsification (e.g., petitions and supporting materials medical documentation). | Suspension or expulsion from the university; F for course when related to a specific course. |
| Plagiarism in a graduate thesis or dissertation. | Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation. |

Please refer to *Trojan Integrity: A Faculty Desk Reference*, for more information on assessing sanctions.  You may also consult with members of the Office of Student Judicial Affairs and Community Standards at any point in the process, (213) 740-6666

**Note:** The Student Conduct Code provides that graduate students who are found responsible for academic integrity violations may be sanctioned more severely than Appendix A suggests.