**Advanced Empirical Methods for Policy Analysis**

**Quantitative Methods for Management**

**Faculty Contact Information**

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Office hours: Wednesdays 12-2pm; Fridays 12-2pm; or by appointment

**Overview**

This course surveys a variety of management science methods useful to managers and analysts that were not covered in your IEM course. The emphases will be on (a) *formulating* mathematical models of messy problems found in the public and non-profit sectors, (b) *solving* the formulations using Excel, and (c) *presenting* the results in a way that decision makers can understand.

**Learning Outcomes**

By the end of the semester, students should have a firm *understanding of…*

* the structure underlying a wide variety of mathematical models, including the assumptions and limitations of each model;
* the importance of judgment in building, analyzing, and interpreting the results of mathematical models; and
* the “ins and outs” of Excel.

By the end of the semester, students should *be able to…*

* interpret the results of mathematical models used in public policy research done by others;
* use appropriate mathematical models in their own work; and
* present the results of mathematical models effectively.

**Pre-requisites**

* Successful completion of PA397 – Introduction to Empirical Methods for Policy Analysis, or equivalent course.
* Familiarity with Excel.

**Grading**

Grades will be based on four problem sets (40%), a mid-term exam (30%), and a final group project (30%).

Students are encouraged to form regular study groups to work together on problem sets. Groups of two to four students work best. With more participants, some members invariably do a lot more listening and following than thinking and contributing.

Problem sets should reflect each student’s own work and understanding of the material. Students working in groups are expected to submit their own assignments and acknowledge with whom they have worked. In other words, although you are encouraged to work together in determining the approach to a problem, your final analysis and the presentation of results must be your own work.

No collaboration of any kind is permitted on the exams - the exams are individual work only.

**Class Meetings**

PA397C is conducted using a “flipped” format. Students are to complete all required readings and assigned exercises **prior** to class. Relatively little class time will be spent lecturing. Rather, class time will be devoted to demonstrating, discussing, and practicing the concepts covered in the assigned readings and assigned exercises. In-class attendance is expected.

**Class Preparation**

PA397C is a challenging course that moves rapidly. **Preparation for each class is essential.**  Given the flipped format, class meetings will be most productive if everyone has done the required reading and worked through the assigned exercises (either alone or as part of a study group) **before** class.

**Course Materials**

1. Quantitative Decision Making with Spreadsheet Applications (7th ed.), Lapin, Lawrence and Whisler, William, Duxbury Press, Thompson Learning, Inc., Belmont, CA. 2002. ISBN-10: 0534380247. The text is **required** and is available from a variety of online booksellers. The CD that accompanies the text is **NOT** required, so used copies of the text are fine.
2. MS-Excel spreadsheet software with Solver add-in.

The text and software will be supplemented as needed by a variety of materials available on Canvas.

**University Policies**

*Students with Disabilities:* Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>.

*Academic Dishonesty:* The UT Honor Code (or statement of ethics) and an explanation or example of what constitutes plagiarism can be found at: <http://catalog.utexas.edu/general-information/the-university/#universitycodeofconduct>.

*Religious Holidays:* By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day.  If you must miss a class, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

*Emergency Evacuations:* Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside. Familiarize yourself with all exit doors of each classroom and building you may occupy.  Remember that the nearest exit door may not be the one you used when entering the building. Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class. In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office. Link to information regarding emergency evacuation routes and emergency procedures can be found at [www.utexas.edu/emergency](http://www.utexas.edu/emergency).

**TENTATIVE SCHEDULE**

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| **Class** | **Date** |  **Subject/*Reading*** | **Assignment** |
| 1 | 1/18 | Introductions, course overview, modeling*PPA: Chapters 1-2**QDM: Chapters 1-2* |  |
| 2 | 1/25 | Mathematical programming: the basics, linear programming, Excel’s Solver*SMDA: Chapter 2.0-2.8**QDM: Chapter 9.1 – 9.10* *Excel Solver tutorial* |  |
| 3 | 2/1 | Mathematical programming: integer linear programming, binary variables*QDM: Chapter 11 (pp. 407-409; pp. 418-422)**QDM: Chapter 12 (pp. 458-460)**IMS: Chapter 7.3-7.4* |  |
| 4 | 2/8 | Mathematical programming: distribution and network models*IMS: Chapter 6.1-6.4, appendix 6.1* | **PS1 due** |
| 5 | 2/15 | Mathematical programming: goal programming (basics)*QDM: Chapter 11 (pp. 422-432)* |  |
| 6 | 2/22 | Mathematical programming: goal programming (advanced) and multiple objective linear programming*SMDA: Chapter 7* |  |
| 7 | 3/1 | Mathematical programming: more GP and MOLP examples | **PS2 due** |
| 8 | 3/8 | **Mid-term** |  |
| \*\*\* | 3/15 | No Class – Spring Break |  |
| 9 | 3/22 | Project scheduling: CPM (basics), Gantt charts*SMDA: Chapter 15.0 – 15.8* |  |
| 10 |  3/29 | Project scheduling: CPM (project crashing); PERT*SMDA: Chapter 15.9 – 15.10* |  |
| 11 | 4/5 | Monte Carlo simulation: project networks*SMDA: Chapter 15.11* | **PS3 due** |
| 12 | 4/12 | Monte Carlo simulation: public financial management*Reading: TBD* |  |
| 13 | 4/19 | Monte Carlo simulation: more PFM examples*Reading: TBD* |  |
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| 14 | 4/26 | Final group project presentations |  |
| 15 | 5/3 | Final group project presentations  | **PS4 due** |