Yale School of Management – Fall 2016
MGT 611/ENAS 649 - Policy Modeling

Instructor: Prof. Ed Kaplan, Evans Hall, Room 3550, x2-6031
TA: Cheng Hua (SOM PhD student), Olga Morozova (YSPH PhD student)

1. Class Meetings:

Tuesdays and Thursdays, 10:10-11:30 in Evans Hall Room 4200, with Rosh Hashanah makeup on Friday October 7. First class meeting is on Thursday September 1.

2. Readings:

All materials will be posted on the course web site’s “coursepack.”

3. Prerequisites:

Data analysis and statistics; decision analysis and game theory; or equivalent preparation plus permission of instructor.

4. Overview:

Welcome to MGT 611/ENAS 649, Policy Modeling, the class that introduces you to a variety of quantitative modeling methods that have proven useful in public policy analysis and program evaluation. The philosophy behind policy modeling is really pretty simple: the idea is to make better decisions regarding policy choices when data are uncertain or unavailable, when the time frame available for analysis is very short relative to the “natural” time scale of the problem under study, or when other resources seemingly necessary for analysis are constrained in other ways. Worded differently, public officials routinely make decisions in the
absence of detailed analysis and supporting data. With policy modeling, we hope to do somewhat better! Recognizing that analyses of all sorts generally exhibit decreasing returns to scale in effort, we hope to capture the key features of policy problems in such areas as public health, housing, criminal justice, drug policy, homeland security and counterterrorism, and urban services with relatively simple models.

The course begins with some motivating examples to illustrate the power (and surprise value) of simple models. Next is a simplified yet pragmatic discussion of cost benefit and cost effectiveness analysis, with the thought of using these concepts throughout the course. We will then begin a tour of modeling methods, including “back of the envelope” probabilistic models (such as the Bernoulli process, random incidence, and the Poisson process), hazard models, Markov chains, and queues. Applications to various policy problems will feature throughout.

5. Expectations, Grading and Homework Policy:

Students are expected to complete assigned readings before class meetings, attend all class sessions, submit weekly group homework assignments on time, and complete a take-home exam in November. Your grade depends heavily on this exam as well as the assignments. Though there is no numerical formula, students headed for nonproficiency (if they exist based on the take home and assignments) will be offered an optional in class exam during the final exam period.

Regarding homework: all group members are expected to contribute to the completion of group assignments. Signing a submitted assignment indicates contribution to the work; if you do not contribute to a group homework assignment, do not sign the submission. While it is permissible to informally consult other class members about aspects of assignments, it is not acceptable to collaborate across groups. All groups must submit original work.
6. Syllabus:

6.1. Thursday September 1:
Introduction and motivating examples.

6.2. Tuesday September 6:

6.3. Thursday September 8:
Allocating HIV Prevention Resources. Read excerpts from the Institute of Medicine report *No Time To Lose: Getting More From HIV Prevention* (Chapter 3 on Allocating Resources, and Appendix D which describe the model used), and “Balancing efficiency and equity” article in coursepack.

6.4. Tuesday September 13:
Probability review. Read probability review notes in the coursepack.

6.5. Thursday September 15:
Bernoulli models I. Read summary of the Bernoulli process and EEOCC case in coursepack.

6.6. Tuesday September 20:
Bernoulli models II. Read “A quantitative look at the two-suspect scenario” in the coursepack.

6.7. Thursday September 22:
Modeling a presidential prediction market (read the paper in the coursepack).
6.8. Tuesday September 27:
Hazard models and durations data. Read excerpts from “The dynamics of dependence” and “To be or not to be?” in coursepack.

6.9. Thursday September 29:
Poisson process. Read Poisson process quick and dirty and “medical malpractice” contained in coursepack.

6.10. Tuesday October 4:
NO CLASS (Rosh Hashanah).

6.11. Thursday October 6:
Models for managing secrets (coursepack).

6.12. Friday October 7: (Rosh Hashanah makeup)
Random incidence. Read summary of random incidence processes in coursepack.

6.13. Tuesday October 11:
Markov models I. Read “Markov Models” in coursepack.

6.14. Thursday October 13:
Markov models II. Continue the discussion.

6.15. Tuesday October 18 and Thursday October 20:
No classes: SOM core midterm exam period/global network week

6.16. Tuesday October 25:
Queues I. Read “Queueing theory’s greatest hits” in coursepack.

6.17. Thursday October 27:
Queues II. Read “Optimizing admissions to an intensive care unit” in coursepack.
6.18. Tuesday November 1:
Fluid models for queues with reneging. Read “Tenant assignment policies with
time dependent priorities” in coursepack.

6.19. Thursday November 3:
Terror queues. Skim article of same name in coursepack.

6.20. Tuesday November 8:
Epidemic Models: Basic insights. Read “Transmission dynamics of HIV infec-
tion” contained in coursepack.

6.21. Thursday November 10:
Review and distribute take-home exam.

6.22. Tuesday November 15:
No class: work on take-home exam.

6.23. Thursday November 17: (Submit take-home exam at start of
class)
Models for estimating the size of a hidden population.

6.24. Tuesday November 22 and Thursday November 24:
No class, Thanksgiving break.

6.25. Tuesday November 29:
Smallpox. Skim “Emergency response to a smallpox attack” in coursepack.

6.26. Thursday December 1:
Geometrical probability applied to urban services. Read “Geometric models of
urban services.”
6.27. Tuesday December 6:
Spatial Poisson model, applications. Read “Operational effectiveness of suicide-bomber-detector schemes” in coursepack.

6.28. Thursday December 8:
Needle exchange. Read “Probability models of needle exchange” in coursepack.

6.29. Tuesday December 13:
Wrap up.