IEOR E4505: Operations Research in Public Policy

IEOR Department, SEAS, Columbia University

Information Sheet

Objective: This course aims to give the student a broad overview of the role of Operations Research in public policy. The specific areas covered include voting theory; apportionment; deployment of emergency units; location of hazardous facilities; health care; organ allocation; management of natural resources; energy policy; and aviation security. The course will draw on a variety techniques such as linear and integer programming, statistical and probabilistic methods, decision analysis, risk analysis, and analysis & control of dynamic systems.

Units: 3.0

Duration in Weeks: 14

Instructor: Jay Sethuraman

Prerequisites: The student needs to have a good background in the foundations of operations research at the level of the courses below:

- IEOR E3608/E4004 (Deterministic Models)
- IEOR E3106/E4106 (Stochastic Models)

Course Material:

There is no required textbook for the course. We will rely on class notes, copies of survey articles, and research papers.

Required Texts: None
Recommended Texts:


Assignments: For each lecture, each student is expected to critically read the assigned article(s), and prepare a 2 page summary. The summary should briefly describe the important questions addressed in the paper, the key assumptions made, and the conclusions of the author(s). Moreover, the summary should include a critique of the model, and comment on the relevant aspects of the problem that the model ignores, and discuss whether the authors’ conclusions are justified.

In addition, each student must write a term paper that explores one topic more thoroughly.

Exams: None

Grading:
Assignments: 40%
Project and Presentation: 40%
Class Participation: 20%

Tentative Course Outline: (14 lectures of 2 hours and 30 minutes, each)

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<td>Course Introduction</td>
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<td>Voting Theory, Apportionment, and related topics</td>
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4, 5, 6  Organ Allocation, Health Policy

6   Locating Hazardous Facilities

7   Management of Natural Resources

8   Energy Policy

9   Deployment of Emergency Units

10  Public Housing

11  Criminal Justice Applications

12  Bioterror logistics

13, 14  Aviation Security and related topics