INTERNATIONAL UNIVERSITY OF JAPAN
Public Management and Policy Analysis Program
Graduate School of International Relations

DCC5350
Public Policy Modeling and Management Science
(2 Credits)
Winter 2012

Classroom: C-205
Time: Wed/Fri 10:30-12:00
http://www.sonsoo.org/policy/modeling/
TA: Raden Ariyo Bisawarno
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Instructor: Hun Myoung Park
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Office Hour: W 13:00-14:00 / by appointment
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Prerequisites: Students are expected to have knowledge of college level statistics (statistical inferences and probability theory), (matrix) algebra, and some calculus, which are addressed in *Mathematics for Economics and Management* (DCC5310) and *Statistics for Economics and Management* (DCC5220).

INTRODUCTION

Public managers should be able to analyze pending issues logically and systematically and be equipped with tools (methods) and skills to support such scientific reasoning. This course introduces policy analysis issues, and mathematical and statistical methods that are used to deal with a variety of policy problems. The emphasis is given to "modeling" or a *scientific way of thinking* about managerial and policy problems rather than specific methods, techniques, and skills.

Students are trained to improve their abilities to identify and analyze policy problems correctly; formulate policy problems properly; and interpret results professionally. Students are also asked to present results professionally in order to successfully communicate with audience (senior managers and citizens) who do not know modeling and mathematics. As future policy analysts, students should recognize the "client oriented" nature of policy analysis

Like management science or operations research, this course includes linear programming (LP), decision analysis, systems thinking, Markov process, and queueing that are commonly used for policy analysis and management in the public and private sectors. But it excludes not only nonlinear programming, regression, and forecasting that can be covered in applied econometrics or time series analysis, but also variants of LP and inventory management models that are more often used in the business sector. This course also excludes burdensome technical details like simplex method of LP and instead focuses on understanding and application of the models.

In fact, it is unlikely, due to nature of "publicness," that all aspects of individual models are directly applied to actual policy problems precisely. However, their core concepts and logics contain important implications for policy analysis and management in both public and private sectors. Therefore, this modeling course is to grasp such concepts and logics and thus improve students' ways of thinking in order to prepare for successful public managers.

Related courses include *Public Finance and Budgeting* (DCC5370) by Dr. Kim that discuses forecasting techniques*, Applied Econometrics* (DCC5260) by Dr. Kato (regression), *Quantitative Methods for Decision Making* (ADC6510) by Dr. Akita (linear programming) that provides in-depth discussion on various forms of linear programming, and *Cost Benefit Analysis* (ADC6765) of the Graduate School of International Relations, and *Management Science and Computer Based Modeling* (QIS1070) of the Graduate School of International Management.

At the end of semester, students should be able to:

- Understand basics of policy analysis,
- Understand ideas and natures of policy modeling,
- Understand key concepts and techniques of individual modeling methods,
- Able to formulate policy problems properly given their specific situations,
- Able to solve policy problems using computer software packages like Excel,
- Able to interpret results correctly,
- Present results professionally,
- Recognize strengths and limitations of policy modeling approaches.

CLASS ORGANIZATION

This course is primarily based on a series of lectures and labs, but students are encouraged to participate in class and group project actively. Homework assignments provide students with chances to formulate and solve policy problems. Students are recommended to take advantage of discussing with the instructor during office hours or by setting up appointments.

ASSESSMENT

Attendance and Participation: Students should attend ALL classes and labs, and actively participate in class and group project. Each unexcused absence results in THREE POINT deduction from the final score. Extra credits may be given to students who make an outstanding contribution to class and/or group project and who show great performance in assignments.

Exams: There will be mid-term and final exams. These exams will respectively cover the topics and materials of the first 5 weeks and later 5 weeks. The format is similar to homework assignment to be explained below. Both exams are open-book and open notebook format. Decision on take-home or in-class exam will be made on the basis of students' performance in homework assignment. Students MAY NOT communicate each other during exams.

Homework assignment: There will be 5-6 homework assignments given to individual students. Students should HANDWRITE, unless otherwise instructed, except for computer output (e.g., Excel output) and essay type answers. For instance, you need to submit a handwritten answers (e.g., calculation and drawing diagram), a print out of a wordprocessor (e.g., interpretation and essay answers), and computer output (if applied). Write down your student ID and name first. Arrange your answers in ascending order (1.1, 1.2, 1.3 …). DO NOT use double or triple columns; use only single column.

Group Project and Peer Evaluation: Each student must take part in a group and complete a group project. The topic is to formulate and solve a policy problem. Specific topics will be announced later.

Each of you has an opportunity to evaluate participation and effort level of your group members when performing the group project and this assignment. You should have high professional standards and ethics. Critically evaluate the efforts and performance that your members have shown. Public managers' job in general is to figure out collective action problems. Free riding is the most common and serious problem that destroy "public good." Your honest critical evaluation will contribute to minimizing free riding and eventually collective action problem. Even in Asian culture, friendship should be distinguished from evaluation. That is what the professional is for! Use six-point-Likert scale: 1 (poor), 2, 3 (fair), 4 (good), 5, and 6 (excellent). DO NOT use letter grade (e.g., A, B-, and C) or score (e.g., 100, 90, and 76). You may not give the same score to all group members; it is "score fixing" and against profession. Also report one group member (excluding yourself) who made the largest contribution to your group. Peer evaluation, due to its confidentiality, should be submitted to the instructor by email.

Late Penalties: All weekly memos and other assignments should be handed in to the instructor at the start of the class on the due date, unless instructed specifically. Late assignments will be accepted with penalty of 20% if submitted within a day after the time due. Under no circumstances will late assignments be accepted after one day of the due date without prior authorization from the instructor.

Format and Styles: Project papers should be written in electronic forms (Microsoft Word, OpenOffice Writer, …). Use the default format and styles (A4, default margin, Time and Roman font, 12 point, single-spaced, etc.). If you are not sure, please download the template file from the course Web page.

Organize contents clearly and logically; hit the highlights and avoid redundancy; and use proper public management jargons and grammatically correct English.

GRADING

The final grade is based on a composite of course requirements mentioned above. Notice that homework assignment accounts for the largest portion. Their weights are:

- (1) Midterm exam 15%
- (2) Final exam 20%
- (3) Homework assignment 35%
- (4) Group project (including peer evaluation) 15%
- (5) Class attendance 15%
- (6) Extra credit for outstanding participation and performance (up to 10%)

That is, your final score is (1)*.15 + (2)*.20 + (3)*.35 + (4)*.15 + (5)*.15 + (6)

Grading for this course is as follows:

96 - 100: A (4.0)	66 - 69: B- (2.5)
90 - 95: A- (3.75)	60 - 65: C (2.0)
80 - 89: B+ (3.5)	< 60 : F

    70 - 79: B (3.0)   Incomplete (I), withdrawal (W)
* Students who missed 30 percent (or more) of class MAY NOT pass this course.

If you object to any grading decisions, you may appeal the grade to the instructor. The appeal must be given along with original papers, memos, and/or exams to the instructor no later than 24 hours after receiving the grade.

CLASS POLICY

Attendance and Lateness: Students should attend each class and be present when each class begins. Being 15 minutes late is considered absent from the class. Excused absences for special circumstances (e.g., sickness) may be arranged in advance and will not influence the attendance grade. There is no any formal seating chart.

Academic Dishonesty and Misconduct: Students should not only gain knowledge and skills, but also build their character. Particularly, public managers should equip themselves with high and strict professional standards and ethics. All students should complete their own work and be evaluated based upon that work.

They should avoid academic dishonesty and misconduct including *plagiarism*, *fabrication* (falsification), and *collaboration* (cheating). A student must not reproduce ideas, phrases, or sentences of another person without appropriate acknowledgment (plagiarism). Students must give credit to the originality of others and acknowledge an indebtedness whenever they quotes/paraphrases another person's actual words, either oral or written; employs another person's idea, opinion, or theory; or borrows facts, statistics, or other illustrative materials.

Copying and pasting some parts of textbooks, journal articles, and/or Internet resources without citation involves both plagiarism and fabrication. Be honest with yourself and the instructor; *simply say that you know what you know and you don't know what you don't know* by clearly distinguishing your idea from others' ideas. Asking for other students' work or showing your work to other students is cheating. Since this course involves many calculation jobs, students should be pay special attention to this type of cheating. Free riding and/or irrelevant peer-evaluation in a group project are misconduct for the group and class. The penalties for violation include sanctions up to and including expulsion from the university.

All aspects of IUJ' student code of conduct (see students' curriculum handbook) apply to this class. It is students' responsibility to be aware IUJ's policy on academic dishonesty and misconduct including sexual harassments (http://www.iuj.ac.jp/web/iuj_section.cfm?item=090506). If you need clarification regarding this issue, contact the instructor or OAA (ofcgsir@iuj.ac.jp) immediately.

Course Feedback: Given diversity in their backgrounds, students are always encouraged to make comments and suggestions on this class (e.g., reading load, lecturing, presentation, and class discussion) in order to improve this course. Any form of communication (e.g., walk-in, phone, email, facebook, etc.) will do. No feedback will influence your grade negatively in any case.

Use of Electronic Devices: Before each class begins, students MUST turn off their cellular phones, CD/MP3/DMB players, and other electronic devices that may distract the instructor

and their classmates. However, laptops or netbooks (mini laptops) are allowed for use in class unless they disturb others.

Computer Literacy: Students should be able to access computers in IUJ computer clusters and use Web browser (e.g., Firefox) to navigate Web sites and download materials This course uses Solver of Microsoft Excel (version 2003 through 2010) and Stata (version 10 or 11) or R (release 2.1x) although there are professional software packages for operations research, such as LINDO, SAS/OR, STORM, and QSB+, which are not installed in computer clusters at IUJ. Students are expected to write papers and memos in an electronic form (e.g., Microsoft Word, OpenOffice Writer, or PDF for LaTeX). If you are not feeling comfortable in this computing requirement, please talk to the instructor IMMEDIATELY.

IUJ Electronic mail: All students must use the university electronic mail to communicate with the instructor and other classmates. Students SHOULD peruse emails that the instructor sends in order for additional explanation and comments. Also, students may contact the instructor using google chat (text, audio, or video) or facebook.

Course Web Page: http://www.sonsoo.org/policy/modeling/ provides the latest course schedule, announcements, and various course materials including lecture notes. Students MUST visit this Web page time to time to check announcements and materials available.

READING MATERIALS

You MUST have the following required textbook that can be purchased online bookstores like amazon.co.jp. You are also asked to read some book chapters and journal articles listed in the course schedule below. Some students prefer electronic forms of textbooks and articles due to their cost saving and convenience, but these electronic forms may not provide as much learning and information as hardcopies. Students should read all required readings (e.g., journal articles and book chapters) before class.

Hillier, Frederick S., and Mark S. Hillier. 2010. *Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets*, 4th ed. McGraw-Hill. ISBN 978-0071289313.

In order to get the electronic copy of a journal article, 1) visit IUJ's E-journal portal, 2) provide a journal name (e.g., *Public Administration Review*), 3) choose a source (e.g., JSTOR and EBSCO) of the journal, and then 4) find out the paper using its title, author name, year of publication, volume, and number. You need to visit the course Web page to download book chapters and journal articles that are NOT available at the library.

This course has following recommended readings that are available at the MLIC Library reserve for 3 hour checkout. If you have difficulty reading Hillier & Hillier (2010), try Albright & Winston (2005) or Stevenson & Ozgur (2007). Winston (2004) is a commonly used textbook that covers various methods comprehensively.

Albright, S. Christian, and Wayne L. Winston. 2005. *Spreadsheet Modeling and Applications: Essential of Practical Management Science*. Belmont, CA: Thomson. ISBN 978-0534380328.

Anderson, David R., Dennis J. Sweeney, Thomas A. Williams, Jeffrey D. Camm, and R. Kipp Martin. 2010. *An Introduction to Management Science: Quantitative Approaches to Decision Making, 13th ed*. South-Western. ISBN 978-1111532222.

Anderson, Virginia, and Lauren Johnson. 1997. *Systems Thinking Basics: From Concepts to Causal Loops*. Waltham, MA: Pegasus Communications. ISBN 978-1883823122.

Daellenbach, Hans, Donald McNickle, and Shane Dye. 2012. *Management Science: Decision-Making Through Systems Thinking*. Palgrave Macmillan. ISBN 978-0230316478

Hillier, Frederick, and Gerald Lieberman. 2010. *Introduction to Operations Research*, 9th ed. McGraw-Hill.

Stevenson, William J., and Ceyhun Ozgur. 2007. *Introduction to Management Science with Spreadsheets*. McGraw-Hill. ISBN 978-0073252902.

Virginia, Anderson, and Lauren Johnson. *Systems Thinking Basics: From Concepts to Causal Loops*. Pegasus Communications ISBN 978-1883823122.

Weick, Karl E. 1979. *The Social Psychology of Organizing*. 2d *ed*. Reading, Mass.: Addison-Wesley Pub. Co. ISBN 978-0075548089.

Weimer, David L., and Aidan R. Vining. 2010. *Policy Analysis: Concepts and Practices*. 5th ed. Boston, MA: Longman. ISBN 978-0205781300.

Winston, Wayne L. 2004. *Operations Research: Applications and Algorithm*, 4th ed. Duxbury Press. ISBN 978-0534380588.

WEEKLY SCHEDULE

* This schedule is tentative and subject to change. Students should check the latest schedule on the course Web site from time to time. All class notes and required readings other than Hillier & Hillier (H&H) are available on the course Web site.

1st Week: Policy Analysis and Modeling

Required: H&H (2011) chapter 1; class note; Weimer & Vining (2010) Chapter 2.
Optional: Albright & Winston (2005) Chapter 1, 2; Weimer & Vining (2010) Chapter 14, 15.

2nd Week: Linear Programming 1

Required: H&H (2011) chapter 2; class note.
Optional: Albright & Winston (2005) Chapter 3; Stevenson and Ozgur (2007) Chapter 3.
Lab: Using Solver in Excel 1 (H&H (2011) chapter 4)

3rd Week: Linear Programming 2

Required: H&H (2011) chapter 3; class note.
Optional: Albright & Winston (2005) Chapter 4; Stevenson and Ozgur (2007) Chapter 4.
Lab: Using Solver in Excel 2

4th Week: Decision Analysis 1

Required: H&H (2011) chapter 9; Stevenson and Ozgur (2007) Chapter 11.
Optional: Albright & Winston (2005) Chapter 8

5th Week: Decision Analysis 2

Required: H&H (2011) chapter 9; Stevenson and Ozgur (2007) Chapter 11.
Optional: Albright & Winston (2005) Chapter 8

Midterm exam

6th Week: Systems Thinking

Required: Class note; Virginia & Johnson (1997); Weick, Karl E. 1979. *The Social Psychology of Organizing*. 2d *ed*. Reading, Mass.: Addison-Wesley Pub. Co.; Anderson, Virginia, and Lauren Johnson. 1997. *Systems Thinking Basics: From Concepts to Causal Loops*. Waltham, MA: Pegasus Communications.
Optional: Maruyama, Magoroh. 1963. "The Second Cybernetics: Deviation-amplifying Mutual Causal Processes." *American Scientist*, 51(2): 164-179.

7th Week: Markov Model 1

Required: Stevenson and Ozgur (2007) Chapter 12; class note;
Optional: Hillier & Lieberman (2010) chapter 16 (pp.723-758).

8th Week: Markov Model 2

Required: Stevenson and Ozgur (2007) Chapter 12; class note.
Optional: Hillier & Lieberman (2010) chapter 16 (pp.723-758).

9th Week: Queueing Model 1

Required: H&H (2011) chapter 11.
Optional: Albright & Winston (2005) Chapter 11.

10th Week: Queueing Model 2

Required: Stevenson and Ozgur (2007) Chapter 13
Optional: Hillier & Lieberman (2010) chapter 17.

Final exam (11th week)