IM2010 – Operations Research, Spring 2013

Instructor:

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> Office: Room 413, Management Building II Office hour: 10-12pm, Wednesday or by appointment

Teaching assistants: 彭懷德 (r01725017@ntu.edu.tw), 李永裕 (r01725019@ntu.edu.tw)

Classroom: Lectures: Room 201, Management Building II.

> Labs: The large computing room, Management Building I.

Meeting time: Lectures: 2:20-5:20pm, Tuesday; Labs: 12:20-1:10pm, Monday.

Textbook: "Operations Research: Applications and Algorithms" by Wayne L. Winston, 4th edition.

> 新月圖書; (02) 2231-7856.

References: "Introduction to Operations Research" by F.S. Hillier and G.J. Lieberman.

> "Game Theory for Applied Economists" by R. Gibbons.

> "管理科學：作業研究與電腦應用" by 陳文賢 and 陳靜枝.

On-line: To check grades: CEIBA.

> To download materials: http://www.ntu.edu.tw/~lckung/courses/ORSp13/.

> To discuss: "NTUIM-lckung" on PTT.

Course description:

Operations Research (OR) is a field in which people use mathematical and engineering methods to solve decision problems. While the main application of OR is to solve business problems, people in the fields of Economics, Computer Science, Civil Engineering, Electrical Engineering, etc., also benefit from OR methods. People use those models, algorithms, and solution processes in OR to optimize their decisions. This is why people refer to OR as a decision making tool. In this course, we will study how to facilitate decision making from three different perspectives: (1) deterministic methods for a single decision maker, (2) stochastic methods for a single decision maker, and (3) methods for multiple decision makers. Most examples will be adopted from the business world while some will be from various engineering fields. Basic knowledge on Calculus, Linear Algebra, and Probability is required for taking this course.

Tentative plan:

Category	Topic	Reading	Estimated number of weeks
Overview	Overview	Ch. 1	1
Single-player deterministic methods	Linear programming	Ch. 3, 4, 6	4
	Integer programming	Ch. 9	1
	Nonlinear programming	Ch. 11, 15, 16	2
Multi-player methods	Game theory	Ch. 14[1]	4
Single-player stochastic methods	Markov chain	Ch. 17	1
	Simulation	Ch. 21, 22	1

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[1] Many supplemental materials outside the textbook will be prepared by the instructor.

Grading:

Homework	15%
Three projects	30% (project 1: 8%; project 2: 8%; project 3: 14%)
Class participation	5%
Two exams	50% (one of the following two plans will be chosen to maximize your grades)

Plan 1: midterm 20% and final 30%; Plan 2: midterm 15% and final 35%.

The final letter grades will be given according to the following conversion rule:

Letter	A+	A	A–	B+	B	B–	C+	C	C–
Range	[90, 100]	[85, 90)	[80, 85)	[77, 80)	[73, 77)	[70, 73)	[67, 70)	[63, 67)	[60, 63)

Policies:

Office hour: You are welcome to my office hour to ask me any question. You may ask me to clarify some concepts, give you hints for homework problems, or even demonstrate how to use OR software. In fact, discussions not related to OR are also welcome. If you don't want to come in the designated time, feel free to send me an e-mail to schedule a meeting.

Class participation: We do not require one to attend all the lectures and labs. If you have something more important to do, feel free to drop a class. Nevertheless, as **communication skills** are essential for almost everyone, we encourage class participation and include it in evaluating each student. In other words, class participation is not just sitting in the classroom. During lecture time or office hour, you are more than welcome to **ask or answer questions** and **provide comments**. You are also encouraged to use **the course bulletin board on PTT**. These will not only give you a good grade but also significantly help your learning.

Homework:

♦ Weekly homework will be assigned every Thursday or Friday and due the following Thursday (unless there is a holiday or exam). Please put a hard copy of your work into ***my mailbox*** on the first floor of the Management Building II ***by 1:00pm*** on the due date. No submission in class or in lab. ***No late submission***. Each student must turn in her/his own homework.

♦ The **lowest two** homework grades will be **dropped** (i.e., you may skip two homework if you want). The TAs will grade homework and regrade them upon request. If you have a regrading request, please contact the TAs directly (e.g., in the labs).

Labs: The instructor or the TAs will conduct a lab every Monday. In the lab, the instructor may give extra lectures or lead project presentations and the TAs may demonstrate how to solve problems with useful analytical tools or computer techniques. In my opinion, attending labs is as important as, if not more important than, attending lectures.

Projects 1 and 2: Please form a group with no more than five persons. You may have different teammates for different projects. For each of these two projects, at most five teams may volunteer to do a 10-minute presentation in a lab to earn extra credits. If too many teams want to present, teams who volunteer earlier will be selected. All team members must be in class for the team to present.

Project 3: Please form a group with five to eight persons. Each team will do a 15-minute presentation in the designated lecture. All team members must be in class for the team to present.

Exams: Both the two exams will be in-class and open-book. Except a calculator, no electronic device is allowed. No discussion is allowed. Cheating will result in severe penalty.