

Illinois Institute of Technology
Stuart School of Business
Course Syllabus¹
Fall 2010

Instructor Information

Name: Jiong Sun, Assistant Professor of Management
Office: MC TP-Central 4A3-2, DTC 444
Telephone: 312-567-5009 (MC, M&W), 312-906-6527 (DTC, T,H&F)
Email: jsun22@iit.edu
Office hours: Wednesdays 1-5pm, extra office hours before exams to be announced

Course Information

Course #: BUS321
Course name: MANAGEMENT SCIENCE

Course objectives:

- Understand and appreciate the role and impact of science and technology on business, and the creation of value through production, finance, marketing and distribution by learning how optimization techniques fit into the decision-making processes in these areas.
- Formulate various types of business problems into linear programming (LP), integer programming (IP), non-linear programming (NLP) and network models.
- Solve LP problems using Simplex method and Excel solvers and interpret sensitivity reports, solve IP problems using Branch-and-Bound methods.
- Understand convexity and optimality conditions of NLP problems, and solve NLP problems using Newton's method.
- Understand how to solve network problems such as shortest-path, maximum-flow, and minimum-cost-flow problems.
- Learn how to understand and interpret results both qualitatively and quantitatively.

Course day and time: Mondays and Wednesdays 10-11:15am, TP-C 4B8-1

¹ **Note:** The instructor reserves the right to change the syllabus. You will be given sufficient advance notice for major changes.

Required Course Materials

Text:

Winston, Wayne L. *Operations Research: Applications and Algorithms*, 4th ed. ISBN 0534380581.

Note: The textbook is available for purchasing at the campus bookstore. A copy of it (call number PC 1017) and a CD-ROM (PC1018) have been kept on reserve in the Galvin library. You can check out and read it in the library.

Lecture Notes and the Course Blackboard:

The following documents will be available on the course website (Blackboard):

- Syllabus of the course
- Course notes (PowerPoint slides for each class) and annotated ones
- Homework assignments
- Solutions for the assignments and quizzes

Throughout the course, there will be announcements and updated documents posted on our course website, so please visit the website periodically.

Course & Instructor Policies

Assignments Submission Policy:

I will assign a number of exercises for each lecture, which will help you to understand the concepts and the methods introduced in lectures and how to apply them to solve business decision problems.

All problem sets can be done in groups of THREE. No credits will be given if more than three members in a group. Problem set solutions are due at the beginning of the class on the due dates (10:00am). You must submit to the instructor in person, or the Digital Dropbox on the Blackboard.

EMAIL SUBMISSIONS WILL BE DISREGARDED.

We permit a 24-hour extension on ONE homework assignment during the semester. In order to take advantage of this extension, an email needs to be sent to the instructor at least THREE hours before the homework is due. Other late submissions will receive no credit, without exception.

Class attendance, conduct and discipline:

- We keep track of your attendance.

- Come to class on time.
- Well-prepared for classes.
- Actively involved in the class discussion.
- Do the assignments on time.
- Make good use of our office hours!
- "Ownership" and responsibility for the success of the course.

It is your responsibility to keep up with the material. But if you find that you are falling behind and you feel that the course material is difficult, do not hesitate to seek help. Make an appointment with the instructor or ask other students. Remember that the longer you wait before dealing with the problem the harder it will be to fix it.

Readings and review sessions:

Often the concepts are more difficult to truly understand than they may first appear. I will assign reading materials for each lecture (See Course Schedule). You should read the assigned material thoroughly at least twice: once before coming to class, and again soon afterward.

We will conduct a review session prior to each exam. During the sessions, a review of key concepts, and example problems will be worked through. Please make sure you attend these sessions.

Exams:

Exams are open book and notes.

Grading System/Policy

Grading Scheme:

Homework:	10%
Midterm 1:	28%
Midterm 2:	28%
Final Exam:	30%
Attendance:	4%

Note that homework reports are graded based on your effort.

Disabilities

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appointment to speak with me as soon as possible. My office hours are listed on the first page of the syllabus. The Center for Disability Resources is located in the Life Sciences Building, room 218, 312-567-5744 or disabilities@iit.edu

Copyright/Plagiarism/Academic Integrity Rules on Plagiarism and Academic Integrity

Plagiarism and other violations of academic integrity are strictly prohibited and subject to penalty as defined by the University. Information about the IIT academic requirements for graduate students can be found at:

http://www.iit.edu/graduate_admission/admitted_students/orientation/pdfs/Graduate_Student_Handbook.pdf

The academic integrity material in the handbook is found at page 31 in the IIT student handbook. Other parts of the handbook also contain material and rules that apply to graduate students. Students will be expected to conform to the rules and procedures set forth in the handbook.

The code of conduct governing writing by students at IIT requires original writing, prohibits plagiarism and provides severe sanctions for plagiarism. Original writing consists of thinking through ideas and expressing them in your own way. If the ideas are from other sources, use footnotes or other citation methods to indicate the source of the ideas. Plagiarism is the act of passing off someone else's work or ideas as your own. The sanctions include, but are not limited to, expulsion and the imposition of a punitive grade of 'E'.

What is Plagiarism?

Often there is some confusion as to what constitutes plagiarism. Plagiarism is the act of passing off someone else's work as your own. To assist in providing an understanding of the types of writing that constitute plagiarism, three types of are each discussed below. Also discussed below is the problem of "string citations." String citations are not plagiarism, but many professors will reject string citations because they are not the student's original work.

Word for Word copying: The use of any phrase or excerpt from another source requires the use of quotation marks around the copied material, or if the material is more than a few lines, the copied material should be placed in its own indented paragraph. A citation in proper form is always required to identify the source.

Plagiarizing by Paraphrase: When a writer uses a source, substitutes words and sentences, or even changes the order but keeps the meaning of the original, a citation is required. In the example given below, the original is on the left. The paraphrase in the right box constitutes plagiarism.

<p><u>Original:</u> It is not generally recognized that at the same time when women are making their way into every corner of our work-world, only one percent of the professional engineers in the nation are female. A generation ago, this statistic would have raised no eyebrows, but today, it is hard to believe.</p>	<p><u>Paraphrase:</u> Few people realize now that women are finding jobs in all fields, that a tiny percentage of the country's engineers are female. Years ago this would have surprised no one, but now it seems incredible.</p>
--	--

The writer could avoid plagiarism here by acknowledging the source and providing a proper citation.

Mosaic Plagiarism: Here the writer lifts phrases and terms from the source and embeds them in his own prose. An example follows in which the lifted phrases are underlined:

The pressure is on to get more women into engineering. The engineering schools and major corporations have opened wide their gates and are recruiting women zealously. Practically all women engineering graduates can find attractive jobs. Nevertheless, at the moment, only one percent of the professional engineers in the country are female.

Mosaic plagiarism is sometimes caused by careless note taking. However, it looks dishonest and is judged as such. The use of quotation marks around the original wording and citation avoid the problem of plagiarism. Often a better approach is to use paraphrase or to quote directly (with appropriate citations).

Plagiarism can be avoided by providing citations for the sources of any material, including *ideas, phrases, or sentences* that you have used in your paper. A number of different systems are available for providing citations. The key to all of them is that the writer must clearly identify for the reader the sources of all material (including ideas) that have come from somewhere else.

String Quotation Problem: Sometimes a student will write a paper consisting of a string of quotations. It is usually much better for a student to provide his or her own analysis and write the paper in his or her own words. Many professors will reject a paper consisting primarily of material quoted from other sources because they do not view such a paper as the student's own work. You should understand your professor's view with respect to string quotations prior to writing your paper.

Course Schedule and Important Dates

Course Schedule

The following is a tentative outline. The instructor reserves the right to change. Midterm Exam 1 covers Lectures 1-8. Midterm Exam 2 covers Lectures 9-16. Final Exam covers Lectures 17-25 and formulations of linear, network, and integer programs.

	Date	Module	Topic	Readings	Homework
1	08/23(M)		Introduction to Operations Research and Linear Programming	Sections 1.1 to 1.5	
2	08/25(W)	#1: Linear Programming	Formulations of Linear Programs	Sections 3.1, 3.4, 3.5, 3.7 to 3.9	
3	08/30(M)		Geometry of Linear Programming	Sections 3.2 and 5.1	
4	09/01(W)		The Simplex Method 1	Ch. 2, Sections 4.1 to 4.6	
	09/06(M)		<i>Labor Day, no class</i>		
5	09/08(W)		The Simplex Method 2	Sections 4.7, 4.8, and 4.11	HW 1 due
6	09/13(M)		The Simplex Method 3	Sections 4.17	
7	09/15(W)		Sensitivity Analysis 1	Sections 5.1 to 5.3	HW 2 due
8	09/20(M)		Sensitivity Analysis 2	Sections 6.3 and 6.8	
R1	09/22(W)		Review Session #1		HW 3 due
	09/27(M)		Midterm #1		
9	09/29(W)	#2: Network Theory	Introduction and Shortest Path Problems	Sections 8.1 and 8.2	
10	10/04(M)		Maximum Flow Problems	Section 8.3	
11	10/06(W)		Critical Path Methods	Section 8.4	HW 4 due
	10/11(M)			<i>Fall break, no class</i>	
12	10/13(W)		Minimum Cost Flow Problems	Section 8.5	
13	10/18(M)		Minimum Spanning Tree Problems	Section 8.6	
14	10/20(W)	#3: Integer Programming	Formulations of Integer Programs	Sections 9.1 and 9.2	HW 5 due
15	10/25(M)		Branch and Bound	Sections 9.3, and 9.5 to 9.7	
16& R2	10/27(W)		Cutting Planes and Review Session #2	Section 9.8	HW 6 due
	11/01(M)		Midterm #2		
17	11/03(W)	#4: Nonlinear Programming	Modeling Non-linear Programs	Sections 11.1 to 11.2	
18	11/08(M)		Convexity, Optimality Conditions and Searching Techniques	Sections 11.3 to 11.6	
19	11/10(W)	#5: Game	Introduction	Sections 14.1	

20	11/15(M)	Theory	2-Person Constant-Sum Games	Sections 14.2	HW 7 due
21	11/17(W)		Nash Equilibrium	Sections 14.4	
22	11/22(M) 11/24(W)	#6: Revenue Management	Protection Level <i>Thanksgiving holiday, no class</i>	Class handouts	
23	11/29(M)		Overbooking, Bulk and Spot Markets	Class handouts	HW 8 due
R3	12/01(W)		Review Session #3	Class handouts	
Week of 12/07			Final exam		

Important Dates

Last Day to Add/Drop with 100% Tuition Refund	Sept 3
Midterm Grades Due	Oct 22
Last Day to Withdraw	Nov 1
Final Grades Due	Dec 15