

**Illinois Institute of Technology
Stuart School of Business
Course Syllabus¹
Fall 2011**

Instructor Information

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TA: **Hendrarto Supangkat**, PhD Candidate,
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TA's Office hours: Tuesdays 3:30-5:30pm, Garvin Library. Hendrarto will be sitting at one of the tables by the top of the stairs or in one of the study rooms.

You may also make appointments outside our office hours as needed. Email the instructor or the TA at least six hours in advance to setup.

Course Information

Course title: BUS321 Management Science
Class time: Monday and Wednesday, 10-11:15
Course description:

Many managerial decisions – regardless of their functional orientation – are increasingly based on analysis using *quantitative* models from the discipline of management science. Management science tools, techniques and concepts have dramatically changed the way business operates in manufacturing, service operations, marketing and finance. This subject is designed to introduce students to the various ways of modeling, or thinking structurally about, decision problems in order to enhance decision-making skills.

Course objectives:

- To enable the students to find some structured ways of dealing with complex managerial decision problems.
- To introduce students to simple decision models and management science ideas that provide powerful and (often surprising) qualitative insights about a large spectrum of managerial problems.
- To provide students with tools for deciding when and which decision models to use for the specific problems.

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

- To provide the students with more powerful ways of using spreadsheets, this will be a ubiquitous tool in their managerial careers.

Pre-requisites: Calculus I

Course Materials

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

Two copies of the book (Call numbers **PC1016**, **PC1017**) and a CD-ROM (**PC1018**) have been kept on reserve in the Garvin library. You can check out and read it in the library. The textbook is also available for purchasing at the campus bookstore.

You are NOT required to buy the textbook. Our lecture notes are self-contained.

Materials: All course materials will be available in electronic format, and will be posted at Blackboard course web site.

- Lecture notes will be posted before class.
- Annotated slides will be posted after class.
- Homework problems will be posted one week before they are due.
- Solutions to homework problems will be posted one week after they are assigned.

Course & Instructor Policies

Homework: Homework is an essential tool for learning class materials. Problems vary from routine exercises that help reinforce the basics to more challenging problems that require insights into the models and algorithms.

- All problem sets can be done in groups of at most THREE. No credits will be given if more than three members.
- Problem set solutions are due at the beginning of the class on the due dates (10:00am). Email submissions will NOT be accepted. You must turn in your reports:
 - to the instructor in person, or
 - into the Digital Dropbox on the Blackboard before 10am.
- The points earned on each problem set will correlate to a grade on a scale of 0 - 5 as follows:

Homework Grade	Converted Grade
85 to 100	5
75 to 84	4
60 to 74	3
50 to 59	2
49 or less	1

This grading scheme permits students to receive full credit without having to get every detail correct. It applies to all homework assignments, including both the Excel and the non-Excel assignments. It does not apply to midterms, the final exam, or quizzes.

Late work: 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 TA at least three hours before the homework is due.

Other late submissions will NOT be accepted.

Attendance: Regular attendance at all class meetings is expected. We will keep track of attendance. Students should sign their name (and only their name) next to their printed name on the attendance sheet. You will be assigned five points for your participation grade.

Examinations: If you have conflict on an exam date please email us no later than TWO weeks prior to the exam.

Quizzes: The purpose of the quizzes is to encourage students to keep current with the course materials and to encourage students to review lecture materials so that they can follow the class.

Assistance: 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 extremely difficult, do not hesitate to seek help. Make an appointment with the instructor or TA. Ask other students. Remember that the longer you wait before dealing with the problem the harder it will be to fix it.

Review Sessions: We will lead a review session prior to each exam. During the sessions, hints about the exam, a review of the key concepts, and example problems will be worked through.

What is expected of you?

- Well-prepared for classes
- Come to class on time!
- Actively involved in the class discussion
- Do the assignments on time
- "Ownership" and responsibility for the success of the learning process

What can you expect from the Instructor?

- High commitment to teaching
- Well-prepared for classes
- Be concerned about students' needs and be available to help

- Fair treatment of every student
- Provide thorough and prompt evaluations of students' exams

Grading System/Policy

Homework:	10%
Quizzes:	15%
Midterm 1:	20%
Midterm 2:	20%
Final Exam:	30%
Attendance:	5%

Course Outline

Course outline:

The course covers the following six topics:

1. Linear Programming (LP)
2. Network Theory (NT)
3. Integer Programming (IP)
4. Non-linear Programming (NLP)
5. Game Theory (GT)
6. Revenue Management (RM): RM is an application of the optimization techniques in the real world.

A detailed course schedule can be found on page #7.

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. The academic integrity material in the handbook is found at page 30 in the IIT student handbook. 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>
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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.

Tentative Course Schedule: (I reserve the rights for possible changes)

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 and Quiz	
1	08/22(M)		Introduction to Operations Research and Linear Programming	Sections 1.1 to 1.5	
2	08/24(W)	#1: LP	Formulations of Linear Programs	Sections 3.1, 3.4, 3.5, 3.7 to 3.9	
3	08/29(M)		Geometry of Linear Programming	Sections 3.2 and 5.1	
4	08/31(W)		The Simplex Method 1	Ch. 2, Sections 4.1 to 4.6	
	09/05(M)		<i>Labor Day, no class</i>		
5	09/07(W)		The Simplex Method 2	Sections 4.7, 4.8, and 4.11	HW 1 due, Quiz 1
6	09/12(M)		The Simplex Method 3	Sections 4.17	
7	09/14(W)		Sensitivity Analysis 1	Sections 5.1 to 5.3	HW 2 due, Quiz 2
8	09/19(M)		Sensitivity Analysis 2	Sections 6.3 and 6.8	
R1	09/21(W)		Review Session #1		HW 3 due
	09/26(M)		Midterm #1		
9	09/28(W)	#2: NT	Introduction and Shortest Path Problems	Sections 8.1 and 8.2	
10	10/03(M)		Maximum Flow Problems	Section 8.3	
11	10/05(W)		Critical Path Methods	Section 8.4	HW 4 due, Quiz 3
	10/10(M)		<i>Fall break, no class</i>		
12	10/12(W)		Minimum Cost Flow Problems	Section 8.5	
13	10/17(M)		Minimum Spanning Tree Problems	Section 8.6	
14	10/19(W)	#3: IP	Formulations of Integer Programs	Sections 9.1 and 9.2	HW 5 due, Quiz 4
15	10/24(M)		Branch and Bound	Sections 9.3, and 9.5 to 9.7	
16&R2	10/26(W)		Cutting Planes and Review Session #2	Section 9.8	HW 6 due
	10/31(M)		Midterm #2		
17	11/02(W)	#4:	Modeling Non-linear Programs	Sections 11.1 to 11.2	
18	11/07(M)	NLP	Convexity, Optimality Conditions and Searching Techniques	Sections 11.3 to 11.6	
19	11/09(W)	#5: GT	Introduction	Sections 14.1	
20	11/14(M)		2-Person Constant-Sum Games	Sections 14.2	HW 7 due, Quiz 5
21	11/16(W)		Nash Equilibrium	Sections 14.4	
22	11/21(M)	#6: RM	Protection Level	Class handouts	
	11/23(W)		<i>Thanksgiving holiday, no class</i>		
23	11/28(M)		Overbooking, Bulk and Spot Markets	Class handouts	HW 8 due, Quiz 6
R3	11/30(W)		Review Session #3	Class handouts	
	Week of 12/05		Final exam		

Last Day to Add/Drop with 100% Tuition Refund	Fri, Sept 2
Last Day to Withdraw	Mon, Oct 31