



**MSCI 6070 (3.0 CH)
QUANTITATIVE ANALYSIS
Winter 2010**

INSTRUCTOR

| | | | |
|--------|--|------------------|--|
| Name: | Dr. Suresh K. Bhatt | Office Location: | 456 Drake |
| Phone: | 474-9231 | Office Hours: | Tuesday 5:00 – 6:15 Wednesday 1:00 – 2:30 |
| Fax: | 474-7545 | Class Time: | A01 Tuesday 6:15 – 9:30 A02 Wednesday 2:30 – 5:45 |
| Email: | skbhatt@ms.umanitoba.ca | | |

COURSE DESCRIPTION

This course provides an introduction to the use of quantitative techniques, and computers to solve management problems. Mathematical optimization models, network analysis, and probability models.

BACKGROUND

A pre-requisite of course MSCI 5010 is required. This will provide a fundamental knowledge of college mathematics such as linear algebra, calculus, descriptive statistics and some probability. Also, the participants should have a basic knowledge of spreadsheets and Microsoft Excel.

COURSE OBJECTIVE

The objective of this course is to introduce the subject of Management Science, a quantitative approach to problem solving in business, industry and government organizations. The students will learn to formulate the mathematical models in a variety of sectors, such as Finance, Production, Marketing, Insurance, and supply Chain Management etc., and solve them by a computational procedure or by computer.

TEXT

Bernard W. Taylor, *Introduction to Management Science*, Prentice Hall, 10th Edition.

GRADES

| | |
|--------------------|-----|
| Three assignments: | 20% |
| Test | 30% |
| Project | 50% |

THE PROJECT

The purpose of the project is to provide you with an opportunity to apply your knowledge of management science to the real world problem solving. Set-up a team of one, or two students, choose a business problem, formulate the relevant model and solve. To assess the legitimacy of the results, discuss the business environment, mode of decision-making in the organization, pros and cons of implementation, and literature search. The hand in date and other details will be discussed in the class later.

TENTATIVE LECTURE SCHEDULE AND READING ASSIGNMENT

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|---------------------|--|
| Week 1 Jan 5/6 | Chapter 1, Management Science, pp. 1-28 Chapter 2, Linear Programming and Graphical Solution, pp. 29-70 |
| Week 2 Jan 12/13 | Chapter 2, LP, graphical solutions and standard form, pp. 29-70 Chapter 3, Excel solver |
| Week 3 Jan 19/20 | Chapter 3, LP, Computer solutions, duality (class notes) Sensitivity analysis from computer output, pp. 71-109 |
| Week 4 Jan 26/27 | Chapter 4, LP modeling examples Interpreting computer output and sensitivity analysis, pp. 110-180 |
| Week 5 Feb 2/3 | Chapter 4, Data envelopment analysis (DEA) Chapter 6, LP formulation of Transportation, Transshipment and Assignment problems, Excel solutions, pp. 226-279 |
| Week 6 Feb 9/10 | Chapter 6 continued Chapter 8, Project management, PERT/CPM and LP formulation, pp. 328-397 |

MID-TERM BREAK - FEBRUARY 15 - 19

| | |
|---------------------|---|
| Week 7 Feb 23/24 | Chapter 8 continued |
| Week 8 Mar 2/3 | Multi-criteria decision making-Min-max optimization (class notes) Chapter 9, Multi-criteria decision making - Goal programming |

TEST ON FRIDAY EVENING, MARCH 5, 2010

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|----------------------|--|
| Week 9 Mar 9/10 | Chapter 9, Multi-criteria decision making- Analytical Hierarchy Process (AHP), pp. 389-447 |
| Week 10 Mar 16/17 | Multi-criteria technique for order preference by similarity to Ideal Solution (TOPSIS). Chapter 5, Integer programming |



ACADEMIC INTEGRITY

I.H. Asper School of Business, The University of Manitoba

It is critical to the reputation of the I. H. Asper School of Business and of our degrees that everyone associated with our faculty behaves with the highest academic integrity. As the faculty that helps create business and government leaders, we have a special obligation to ensure that our ethical standards are beyond reproach. Any dishonesty in our academic transactions violates this trust. The University of Manitoba Graduate Calendar addresses the issue of academic dishonesty under the heading "Plagiarism and Cheating." Specifically, acts of academic dishonesty include, but are not limited to:

- using the exact words of a published or unpublished author without quotation marks and without referencing the source of these words
- duplicating a table, graph or diagram, in whole or in part, without referencing the source
- paraphrasing the conceptual framework, research design, interpretation, or any other ideas of another person, whether written or verbal (e.g., personal communications, ideas from a verbal presentation) without referencing the source
- copying the answers of another student in any test, examination, or take-home assignment
- providing answers to another student in any test, examination, or take-home assignment
- taking any unauthorized materials into an examination or term test (crib notes)
- impersonating another student or allowing another person to impersonate oneself for the purpose of submitting academic work or writing any test or examination
- stealing or mutilating library materials
- accessing tests prior to the time and date of the sitting
- changing name or answer(s) on a test after that test has been graded and returned
- submitting the same paper or portions thereof for more than one assignment, without discussions with the instructors involved.

Many courses in the I. H. Asper School of Business require group projects. Students should be aware that group projects are subject to the same rules regarding academic dishonesty. Because of the unique nature of group projects, all group members should exercise special care to insure that the group project does not violate the policy on Academic Integrity. Should a violation occur, group members are jointly accountable unless the violation can be attributed to a specific individual(s).

Some courses, while not requiring group projects, encourage students to work together in groups (or at least do not prohibit it) before submitting individual assignments. Students are encouraged to discuss this issue as it related to academic integrity with their instructor to avoid violating this policy.

In the I. H. Asper School of Business, all suspected cases of academic dishonesty are passed to the Dean's office in order to ensure consistency of treatment.



MEDICAL ABSENTEEISM FORM

I.H. Asper School of Business, The University of Manitoba

STUDENT IDENTIFICATION: (PLEASE PRINT CLEARLY)

| | | | |
|---------------------|-----------------|----------------|--------------------------------------|
| _____ | _____ | _____ | _____ |
| Last Name | First Name | Middle Initial | U of M Student Identification Number |
| _____ | _____ | | |
| Course # | Instructor Name | | |
| _____ | _____ | | |
| Student's Signature | Date | | |

TO BE COMPLETED BY THE ATTENDING PHYSICIAN: (after the above section is completed) (PLEASE PRINT CLEARLY)

| | | |
|---|------------------------|---------------------|
| _____ | _____ | _____ |
| Physician's Last Name | Physician's First Name | Middle Initial |
| _____ | _____ | _____ |
| Street Address | City, Province | Postal Code |
| _____ | _____ | _____ |
| Telephone Number | Fax Number | |
| _____ | _____ | |
| <p>To the attention of the physician: Your evaluation of the student's condition is being used for the purpose of determining whether or not the student has a <u>valid reason</u> to miss an important <u>exam</u> or <u>assignment</u>. Your professional evaluation is necessary to ensure that only valid cases are excused.</p> | | |
| <p>I certify that the nature of the student's condition is severe enough to prevent the student from taking an exam or completing an assignment. If requested, my associates or I will verify for the above named instructor/administrator that this information is accurate.</p> | | |
| The student's condition will likely span the following dates: | | |
| _____ | until | _____ |
| (Indicate start date) | | (Indicate end date) |
| _____ | _____ | |
| Physician's Signature | Date | |

NOTES TO PHYSICIAN:

- Please make a note in the student/patient's file indicating that the student has given the above named instructor/administrator permission to verify with you, your staff, or your colleagues, that the information contained on this form is correct. Thank you for your professional evaluation of this student's condition.
- **PLEASE ATTACH THIS FORM TO YOUR REGULAR OFFICE STATIONERY THAT INDICATES THE STUDENT VISITED YOUR OFFICE.**

NOTES TO STUDENT:

- The use of this form is at the option of the student. However, in order to obtain an excused absence for an assignment or exam the student must obtain a doctor's certification that the student's condition is severe enough to prevent the student from taking the exam or completing the assignment.
- It is NOT SUFFICIENT to provide a note that only indicates the student visited the doctor's office.



FACULTY BIOGRAPHY

I.H. Asper School of Business, The University of Manitoba

Dr. Suresh Kumar Bhatt

Department of Supply Chain Management

Areas of Research Interest: Theory and application of Management Science / Operations Research. The area of interest covers mathematical programming, inventory management, multi-objective optimization, scoring models and productivity analysis and their application to Agriculture Economics, Water Resource management, Engineering Optimization, Production and Supply Chain Management.

Areas of Teaching: Management Science, Production and Inventory Systems, Mathematical Optimization Models (project course), Mathematical Control Models (project course), Mathematics of Management, Business Statistics, Mathematics of Finance, and Doctoral Seminar in Management Science.

Dr. Bhatt is full professor of management science in the Faculty of Management at the University of Manitoba since 1984. Prior to joining University of Manitoba as a visiting professor in 1975, Dr. Bhatt taught at the Indian Statistical Institute, Calcutta. Dr. Bhatt obtained his Ph.D. from the Indian Institute of Technology, Kanpur, India. Before that, he was involved in research and development projects for R & D organization of national defense.

Dr. Bhatt has more than fifty articles published in international journals and proceedings. Professor Bhatt received the "best paper" award at the Administrative Sciences Association of Canada conference held in Montreal in 1996. He also received the "honorable mention award" for his paper at the ASAC conference in Ottawa in 2007. He has guided many Master's theses and has served on several Ph.D. committees.

Professor Bhatt emphasizes relating the quantitative models to the real world situations. Some of the work in the project courses he has taught was done for the local business and other organizations.

Dr. Bhatt served as an Associate Program Chairman of the Canadian Operations Research Society silver jubilee conference at Winnipeg in 1983, Program Chairman, management science division, Administrative Sciences Association of Canada conference in Vancouver, 1986; Acting Head, Dept. of Actuarial and Management Sciences for a term; Chairman of MBA program committee and Chairman, Faculty of Management Ph.D. committee for a year.

Professor Bhatt played soccer and table tennis for his university teams. He is also interested in theatre and a drama directed by him won a special award in the Manitoba theatre competition in 1986.