MSCI 2150 A02 (3 CH)
INTRODUCTION TO MANAGEMENT SCIENCE
WINTER 2021
Online Teaching, MW 11:30 AM- 12:45 PM

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INSTRUCTOR

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Phone: 204-4746870:
Email: ss.appadoo@umanitoba.ca
Office hours: Friday 11:30 -12:45 PM through Zoom or by appointment

COURSE DESCRIPTION

An introduction to management science techniques and models. Topics include linear programming, distribution problems, decision theory and queuing models. May not be held with ABIZ 2520 or MSCI 2151. Prerequisites: A grade of "C" or better in MATH 1230 or MATH 1520 or MATH 1500 (or MATH 1501) and a grade of "C" or better in STAT 1000 (or STAT 1001) or STAT 1150.

This is a three-credit, introductory course for commerce students designed to provide students with the basic concepts and methods of management science. This course covers many approaches for solving business problems from a managerial point of view. Topics include linear programming, distribution problems, decision theory and queuing models. Students develop optimization models which relate to their areas of interest. Spreadsheets are used to accomplish the mathematical manipulations. Emphasis is placed on input requirements and interpretation of results.

The course is useful for students interested in the area of Supply Chain Management. This course provides a good foundation in basic problem solving skills. This course prepares student for upper level quantitative
courses (Finance, Production/Operations Management, Accounting, M.I.S., Marketing, Operational Research, Supply Chain Management etc.).

COURSE OBJECTIVES

After completing this course, students will be able to:
1. Perform break even analysis to make managerial decision.
2. Build a linear programming based mathematical model to capture the real life decision making process.
4. Perform sensitivity analysis to know the managerial interpretation of linear programming model.
5. Model a wide variety of medium to large linear programming (LP) problem applied in the various functional area of management such as marketing, production, Finance, transportation etc.
6. Perform network analysis, decision analysis for uncertain situation and waiting line analysis to make managerial decision.

COURSE FORMAT AND ONLINE ACCESS

This course will be conducted “live” via videoconferencing using “Zoom” and will not involve in-person instruction. Classes will be during the scheduled class time.

For recording attendance and class participation, you will be expected to have your camera and microphone on during class time and exams. The instructor may tell you to leave your camera/mic on for the duration of the class or may require you to mute yourself and unmute yourself only at certain times.

You are strongly advised to go through solved examples, problems and case problems in the textbook. Always adopt pen and paper for doing Management Science problems. In order to draw the maximum benefit of this course, you are encouraged to complete the reading assignment and solve the problems in the textbook. This will create greater interest in the lecture.

We will cover a wide range of topics in this class. The exams will require that you can solve analytical problems in a limited amount of time. The best way to succeed in this class is to practice solving problems, doing the homework, reading the textbook, and reviewing the lecture notes and examples given in class. I strongly advise you to start studying for this class well before the exam date. Few people manage to learn all the required topics in the last week before the exam. Limited knowledge of a few of the covered topics may not be sufficient to pass the course. Your textbook contains numerous Problems, Exercises and Case Problems (voluntary or otherwise) at the conclusion of each chapter. You are seriously encouraged to work through many of them in order to consolidate your understanding and provide you with confidence when writing the examinations. In addition to homework, I will provide practice midterms and a practice final. These are based on past exams and are meant as a guide for how the exams may look. They are not meant to tell you what will be on the exam.
COURSE MATERIALS

As classes will be delivered synchronously via videoconferencing, a device enabled with a camera and microphone is required. Further, you are expected to be in a location with a reliable Internet connection that is strong enough for streaming video. You may also want to consider using earphones/headset with a mic, unless you have a computer/tablet with good speakers/mic.

Exams, which will be administered via the Respondus Lockdown browser, you will need a device (computer or tablet; smartphone will not work) with one of the following operating systems:

- Windows 10, 8, or 7
- Mac OS 10.15 to 10.12, OS X 10.11, or OSX 10.10
- iOS: 11.0+ (iPad only)

Text book is only available in digital versions of Introduction to Management Science 13th edition. This is a required text book.

*Introduction to Management Science 13th edition – 180 day subscription; ISBN 9780134731254; retail price $63.00*

*Introduction to Management Science 13th edition – downloadable (perpetual) version; ISBN 9780134731230; retail price $95.30*

https://www.campusebookstore.com/integration/AccessCodes/default.aspx?bookseller_id=33&Course=MSCI+2150&frame=YES&t=permalink

Please respect copyright laws. Photocopying textbooks or other reading material is a violation of copyright laws and is unethical, unless permission to copy has been obtained.

The *Introduction to Management Science* is a well written book with lots of example questions. The modelling techniques presented in this book are explained with straightforward examples that avoid lengthy written explanations. The examples presented in the book are organized in a logical step-by-step fashion that the student can subsequently apply to the problems at the end of each chapter.

ASSESSMENT OF LEARNING

There will be four components of the grading:

- Class Assignments - 10 %
- Quizzes - 10 %
Mid-Term Exam (March 12th) - 30%
Final Exam (decided by registrar’s office) - 50%

Grade Conversion:

The following table shows the tentative grade cut-offs:

<table>
<thead>
<tr>
<th>Cumulative Marks</th>
<th>Grade</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>93 ≤ x ≤ 100</td>
<td>A+</td>
<td>Excellent</td>
</tr>
<tr>
<td>87 ≤ x &lt; 93</td>
<td>A</td>
<td>Very Good</td>
</tr>
<tr>
<td>80 ≤ x &lt; 87</td>
<td>B+</td>
<td>Good</td>
</tr>
<tr>
<td>71 ≤ x &lt; 80</td>
<td>B</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>65 ≤ x &lt; 71</td>
<td>C+</td>
<td>Marginal</td>
</tr>
<tr>
<td>60 ≤ x &lt; 65</td>
<td>C</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>50 ≤ x &lt; 60</td>
<td>D</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>F</td>
<td>Unsatisfactory</td>
</tr>
</tbody>
</table>

In the event of a skewed distribution of grades, the total course marks may be curved up or down as necessary (the weighting of each component will remain unchanged).

Exams: The exam will consist of TRUE/FALSE, MULTIPLE CHOICE and long-answers questions, mainly solving numerical problems. The exact format of the exams will be announced sufficiently in advance.

Class Assignments: The class assignments are based on the lecture taught in that day. You need to finish these assignments during class through Quiz portal online. There is no fixed schedule for class assignments. Your attendance is required to complete the class assignments. If you miss the class, you will miss the class assignment. All class assignments will be conducted through Quiz section of UM Learn.

To protect the academic integrity of education at the Asper School, certain protocols will be observed for online exams. For instance, the online exam will set up such that each student will get a random subset of questions from a larger question bank, which means no two students will get exactly the same exam. Further, a very small number of questions will appear on a screen and you may not have the option to move back to questions you have already answered. The instructor may require your camera be on and directed at you for the entire duration of the exam.

MISSED EXAM AND LATE SUBMISSION POLICY
No make-up examinations will be given. If you miss a Mid-Term Examination for health reasons you are expected to have your doctor complete the University of Manitoba Medical Absenteeism Form and submit it to your instructor. In that case you will write a 100% final exam.

If you miss a Mid-Term Examination for a reason other than illness, you are expected to contact your instructor at your earliest possible opportunity and explain the circumstances surrounding your absence. Your instructor will require appropriate documentary evidence to justify your absence. Then the matter will be referred to the Department Head to ensure that all scenarios are dealt with in a uniform manner. There will be no make-up mid-term exams.

If you miss the Final Examination you will be required to consult with the Student Advisors in the Undergraduate Program Office, Room 268 Drake Centre. If you meet the criteria and qualify for a Deferred Final Examination, the Department of Supply Chain Management will schedule another opportunity for you to write your Final Examination in the course.

Do not make travel plans before the Final Exam. I cannot let you take the exam earlier/later because you booked a flight ticket for a date earlier than the final exam. In the event you have to miss the Final Exam for a valid reason, a request for a deferred exam must be made at your home Faculty’s Undergraduate Program Office (b_comm@umanitoba.ca, if you are an Asper student). Applying for a deferred exam does not guarantee your request will be granted.

**ATTENDANCE POLICY**

You are expected to attend the classes. While your absences will not directly influence your grades, you are responsible for all material covered in class whether you attend classes regularly or not. Ultimately, the final grade will depend on how much you have learned and not how often you came to class (although the two are usually highly correlated since missing classes may impair your understanding of the material). If you need my help and are unable to come to my office hours, don’t hesitate to schedule an appointment to see me some other time. The best way to contact me outside of office hours is by e-mail. Feel free to interrupt me (as long as you don’t overdo it) during class and talk to me after class if you have questions. You are expected to be in a professional business manner in asking questions and replying to questions from both the instructor and other classmates.

For recording attendance, you will be required to have your camera on during the class. A screenshot may be taken as a record of attendance.

**ELECTRONIC DEVICE POLICY**

This class requires the use of computer or smartphone with a camera/mic during class.

You are NOT allowed to audio/video record any lectures.

Although this is course is taught in a remote teaching format, we will observe the protocols that would be expected during in-person classes. Please make sure your cellphone does not ring during class. No frivolous posting of messages in the Chat area during class. Practice self-control—don’t browse the
Internet or check your e-mail/social media/text messages while class is in progress. Do not video/audio record class lectures or take pictures of the screen without the instructor’s permission.

**OUT-OF-CLASS COMMUNICATION**

PowerPoint files, assignment/project guidelines, other class-related files, and grades will be posted on UM Learn. Moreover, any announcements outside of class will be sent by e-mail from UM Learn. It is your responsibility to check your UofM e-mail account frequently so that you don’t miss these emails.

There are many questions that cannot be answered succinctly over email. If you email me a question, please consider whether it can be easily and effectively answered by email. If it cannot, please talk to me before or after class. If I receive a question that is difficulty to answer electronically or will require a lengthy response, I will ask you to meet with me to discuss instead.

**CLASS SCHEDULE**

**Tentative Course Schedule – Fall 2020 M/W**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 18, 20</td>
<td>Ch1: Introduction, Break Even Analysis (Brief discussion)</td>
</tr>
<tr>
<td>Jan 25</td>
<td>Ch2: Introduction to Linear Programming Model Formulation</td>
</tr>
<tr>
<td>Jan 27</td>
<td>Ch2: Introduction to Linear Programming Graphical Solution</td>
</tr>
<tr>
<td>Feb 01</td>
<td>Ch2: Graphical Solution (continued), slack/surplus variables</td>
</tr>
<tr>
<td>Feb 3, 8, 10</td>
<td>Ch3: Linear Programming: Computer Solution and Sensitivity Analysis</td>
</tr>
<tr>
<td>Feb 15-19</td>
<td>Winter Term Break</td>
</tr>
<tr>
<td>Feb 22, 24,</td>
<td></td>
</tr>
<tr>
<td>Mar 01,03,08</td>
<td>Ch4: Linear Programming: Modelling Examples Applications in various</td>
</tr>
<tr>
<td></td>
<td>business areas</td>
</tr>
<tr>
<td>Mar 10</td>
<td>Ch6: Transportation, Transshipment and Assignment Problems</td>
</tr>
<tr>
<td>Midterm Test</td>
<td>Friday March 12, 2020 6:00 P.M. - 8.30 P.M.</td>
</tr>
<tr>
<td>Weight -</td>
<td>30%</td>
</tr>
<tr>
<td>Material</td>
<td>covered: From Ch1 to Ch4</td>
</tr>
<tr>
<td>Exam room:</td>
<td>Online in zoom</td>
</tr>
<tr>
<td>March 15</td>
<td>Ch6: Transportation, Transshipment and Assignment Problems</td>
</tr>
<tr>
<td>March 17, 22,24</td>
<td>Ch7: Network Flow Models. Shortest Route Problem, Minimal Spanning</td>
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<td></td>
<td>Tree Problem</td>
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</tbody>
</table>
IMPORTANT DATES

Refund deadline - Jan 29th
Midterm - March 12th
VW deadline - Mar 31st
Final Exam - TBA

INTENDED LEARNING OUTCOMES

AACSB Assurance of Learning Goals and Objectives
The Asper School of Business is proudly accredited by AACSB. Accreditation requires a process of continuous improvement of the School and our students. Part of “student improvement” is ensuring that students graduate with the knowledge and skills they need to succeed in their careers. To do so, the Asper School has set the learning goals and objectives listed below for the Undergraduate Program. The checked goal(s) and objective(s) will be addressed in this course and done so by means of the items listed next to the checkmark.

<table>
<thead>
<tr>
<th>Goals and Objectives in the Undergraduate Program</th>
<th>Goals and Objectives Addressed in this Course</th>
<th>Course Item(s) Relevant to these Goals and Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Quantitative Reasoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Determine which quantitative analysis technique is appropriate for solving a specific problem.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Use the appropriate quantitative method in a technically correct way to solve a business problem.</td>
<td>✓</td>
<td>Assignments, Quizzes, and Exams</td>
</tr>
<tr>
<td>C. Analyze quantitative output and arrive at a conclusion.</td>
<td>✓</td>
<td>Assignments, Quizzes, and Exams</td>
</tr>
<tr>
<td>2 Written Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Use correct English grammar and mechanics in their written work.</td>
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<tr>
<td>B. Communicate in a coherent and logical manner</td>
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<tr>
<td>C. Present ideas in a clear and organized fashion.</td>
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<td></td>
</tr>
<tr>
<td><strong>3 Ethical Thinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Identify ethical issues in a problem or case situation</td>
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<td></td>
</tr>
<tr>
<td>B. Identify the stakeholders in the situation.</td>
<td></td>
<td></td>
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<tr>
<td>C. Analyze the consequences of alternatives from an ethical standpoint.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Discuss the ethical implications of the decision.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4 Core Business Knowledge</strong></td>
<td>✔</td>
<td>Entire course</td>
</tr>
</tbody>
</table>
ACADEMIC INTEGRITY POLICY

The online format of class delivery does not lower the Asper School’s academic integrity standards. The same high levels of academic integrity are expected in online courses as they are in regular terms.

It is critical to the reputation of the Asper School of Business and of our degrees that everyone associated with our faculty behave 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 General 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 (includes Chat messages posted during videoconference sessions)
- 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
- recording exam questions using any method, regardless of whether those are shared with others
- sharing exam questions with those who are yet to take the exam, including future students
- 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), regardless of whether those are used during the exam
- impersonating another student or allowing another person to impersonate oneself for the purpose of attendance, earning class participation marks, submitting academic work, or writing any test or examination
- stealing or mutilating library materials
- accessing test 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
**STUDENT SERVICES AND SUPPORTS**

The University of Manitoba provides many different services that can enhance learning and provide support for a variety of academic and personal concerns. You are encouraged to visit the below websites to learn more about these services and supports. If you have any questions or concerns, please do not hesitate to contact your instructor or the Undergraduate Program Office.

<table>
<thead>
<tr>
<th>For Information on...</th>
<th>...follow this link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech-related issues with UM Learn or videoconferencing</td>
<td>Information Services &amp; Technology</td>
</tr>
<tr>
<td>Admission, Registration, Tuition Fees, Important Dates, Final Exams, Graduation, and Transcripts</td>
<td>Registrar’s Office</td>
</tr>
<tr>
<td>Academic policies &amp; procedures, regulations, Faculty-specific information, degree and major requirements</td>
<td>Academic Calendar</td>
</tr>
<tr>
<td>Help with research needs such as books, journals, sources of data, how to cite, and writing</td>
<td>Library Resources</td>
</tr>
<tr>
<td>Tutors, workshops, and resources to help you improve your learning, writing, time management, and test-taking skills</td>
<td>Writing and Learning Support</td>
</tr>
<tr>
<td>Support and advocacy for students with disabilities to help them in their academic work and progress</td>
<td>Student Accessibility Services</td>
</tr>
<tr>
<td>Copyright-related questions and resources to help you avoid plagiarism or intellectual property violations</td>
<td>Copyright Office</td>
</tr>
<tr>
<td>Student discipline bylaws, policies and procedures on academic integrity and misconduct, appeal procedures</td>
<td>Academic Integrity</td>
</tr>
<tr>
<td>Policies &amp; procedures with respect to student discipline or misconduct, including academic integrity violations</td>
<td>Student Discipline</td>
</tr>
<tr>
<td>Students’ rights &amp; responsibilities, policies &amp; procedures, and support services for academic or discipline concerns</td>
<td>Student Advocacy</td>
</tr>
<tr>
<td>Your rights and responsibilities as a student, in both academic and non-academic contexts</td>
<td>Your rights and responsibilities</td>
</tr>
<tr>
<td>Full range of medical services for any physical or mental health issues</td>
<td>University Health Service</td>
</tr>
<tr>
<td>Information on health topics, including physical/mental health, alcohol/substance use harms, and sexual assault</td>
<td>Health and Wellness</td>
</tr>
<tr>
<td>Any aspect of mental health, including anxiety, stress, depression, help with relationships or other life concerns, crisis services, and counselling.</td>
<td>Student Counselling Centre</td>
</tr>
<tr>
<td>Support services available for help regarding any aspect of student and campus life, especially safety issues</td>
<td>Student Support Case Management</td>
</tr>
<tr>
<td>Resources available on campus, for environmental, mental, physical, socio-cultural, and spiritual well-being</td>
<td>Live Well @ UofM</td>
</tr>
<tr>
<td>Help with any concerns of harassment, discrimination, or sexual assault</td>
<td>Respectful Work and Learning Environment</td>
</tr>
</tbody>
</table>
Concerns involving violence or threats, protocols for reporting, and how the university addresses them

Violent or Threatening Behaviour

ABOUT THE INSTRUCTOR

Professor Appadoo is a Professor of Management Science in the Department of Supply Chain Management at the University of Manitoba, Canada. He teaches undergraduate and graduate courses for the Department of Supply Chain Management. His research work is published in esteemed international journals and referred proceedings. His research is well regarded and are frequently cited. On an ongoing basis, he receives numerous invitations to work cooperatively with distinguished peers and publish his work internationally. Professor Appadoo has published over hundred articles in international journals and proceedings. Some articles appeared on the Top 25 Hottest Articles on Science Direct Elsevier and were among the most cited articles on Elsevier.

The National Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant as the Principal Investigator support his research. Professor Appadoo received the Associates’ Achievement Award, Honorable Mention Awards and Best Paper Awards at several Conferences. He is also the recipient of the Joint UM/UMFA Committees on Merit Award recognizing his outstanding contribution to research. He served on the Program Committee for various International Conference. Professor Appadoo serves on the editorial review boards for several international journals. He has been a reviewer for several journals, conferences proceeding and Grant applications. Professor Appadoo was also on the Presidential Advisory Committee and Curriculum Review for a new BBA Supply Chain Management as an expert in SCM. Curriculum review is a critical examination of academic program for optimizing the learning outcomes of a program.

Students appreciate Professor Appadoo’s teaching methodology and consistently rank his classes and instruction well above average. He serves on departmental, faculty, and university committees and contributes extensively to the professional community through review processes, sitting as conference chair, academic reviewer and other scholarly activities. He has served as an external examiner for various MSc and PhD theses committees.

Professor Appadoo’s research Interests is in theory and application of Management Science/Operations Research related to mathematical programming, application of fuzzy systems, possibility theory, and time series models in both deterministic and fuzzy setup, GARCH modeling, inventory models, decision analysis, multi-criteria decision making, scoring models, AHP, supplier selection, TOPSIS model and its application to supply chain management.