

Business 9872 Management Science: Applications of Decision Theory Fall 2024

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LAND ACKNOWLEDGEMENT

Western University is situated on the traditional lands of the Anishinaabek, Haudenosaunee, Lunaapewak, and Chonnonton Nations, who have long-standing relationships to the land and region of southwestern Ontario and the city of London. The local First Nations communities are the Chippewas of the Thames First Nation, the Oneida Nation of the Thames, and the Munsee Delaware Nation.

COURSE DESCRIPTION

This course is a seminar course in management science. The focus of the course will be management science methods and models applied to health care problems.

We will cover the following topics:

- Cost-effectiveness analysis and health economic evaluation
- Disease model
- Decision-analytic models in health care
- Optimization and resource allocation
- Markov decision processes
- Operations management
- Insurance, incentives, and game theory
- Risk-sharing agreements
- Machine learning
- Modeling to support public policy decisions

COURSE TIMELINE AND FORMAT

In-person class sessions on **Tuesday and Thursdays** unless otherwise noted. The full course calendar is posted in Learn. Check Learn for updates to the calendar.

Exceptions to class schedule:

Class is cancelled on October 22 and October 24

These class times will be made up at the end of the term and have already been built into the schedule.

PRE-REQUISITES

- Probability at the approximate level of Ross S. A First Course in Probability. Pearson Education.
- Calculus at the level of a second-year university course: multi-variable differential calculus and integration.
- Basic knowledge of game theory.

LEARNING OUTCOMES/OBJECTIVES

At the end of this course, students will be able to:

- Understand many of the methods used in modern research papers in management science, operations research, and operations management
- Understand a wide range of important topics related to management science applications in health care
- Extract important information from a paper to include in a presentation
- Critically evaluate research in management science
- Identify future research directions based on extant literature
- Present research in seminar-style environments
- Conduct a literature review
- Write a research proposal

MATERIALS/REQUIRED READING

All required readings for this course are from either published journal articles or book chapters. They are available on open-access web sites or online through Western's library site licenses. There is one technical note that will be provided on the course web page.

METHODS OF EVALUATION

Component	Weight
Assignments (4)	20%
Discussion Lead	20%
Exam	15%
Project	25%
Classroom Contribution	20%
Total	100%

Class Contribution: Your participation in class will provide the basis for my judgment of your normal level of day-to-day preparation. I expect you to be fully engaged in the entire learning process and you should be prepared in each class to participate voluntarily and when called upon. Students are expected to actively participate and contribute to the class-room discussion. Students are therefore required to have read the required reading and prepared questions and discussion points to share with their classmates.

Asking questions can make high quality contributions to class when they advance general understanding by stimulating an in-depth analysis or explanation of a point. Remember, the main objective of your contribution is not evaluation, but learning and helping your colleagues to learn.

Leading Article Discussion: Each week we will discuss one or more research articles on class topics. The number of discussions that each student leads will depend on the size of the class. The discussion should include a description of the problem, motivation, brief literature review, model framework, assumptions, analysis/results explanation, and future work or extensions.

Homework Assignments: There will be 4 written homework assignments throughout the term. Late assignments will be penalized.

Exam: There will be an in-class exam at the end of the term.

Final project: Each student will write a 2500-3000 word report and give an in-class presentation at the end of the term. The report will consist of a brief literature review of a topic related to health care management science and a formulation of a model that could extend this literature stream.

Additional details of each assignment will be provided in class and/or on Learn.

PENALTIES FOR LATE ASSIGNMENTS

For all assignments, work that is submitted or completed late will be penalized as follows:

- 0-24 hours late: Penalty of 10%
- 24-48 hours late: Penalty of 30%
- 48-72 hours late: Penalty of 50%
- More than 72 hours late: Assignment receives a grade of zero.

Grade penalties above are applied by subtracting the amount indicated from the grade you would have received (e.g., your grade – 30% for an assignment that is 24-48 hours late).

For assignments where the primary deliverable is a presentation, the presentation must be delivered in the designated class. Presentations that are not done in class will receive a penalty of 50% if submitted as a video file within 72 hours of the deadline. Presentations submitted more than 72 hours late will receive a grade of zero.

LEARNING TOOLS AND RESOURCES

No specific tools or software are required for this course. It is expected that all assignments can be completed “pencil and paper,” or with simple statistical tools.

ENROLLMENT RESTRICTIONS

Enrollment in this course is restricted to graduate students in the Ivey PhD Program, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student’s home program.

CLASSROOM NORMS

The classroom norm is no laptop or cell phone use during class sessions. Using your computer during class for personal activities such as reading/writing email, writing letters, surfing the internet, playing games, etc. is also distracting and counterproductive and violates our norms.

IVEY EXPECTATIONS

At Ivey we are proud of the diversity in our students, faculty, staff, and alumni. You will work with people who differ in their gender, race, religion, nationality, and sexual orientation. You will benefit from these differences in the school in the form of higher diversity in thought. With this benefit comes the responsibility to value and respect each other despite and for their differences. Any behaviour or language that is negative or harmful about someone’s gender, race, religion, nationality, and sexual orientation health is against Ivey’s values and will not be tolerated.

TEAM ASSIGNMENTS

Students completing team assignments will receive the same base grade as their team members for the same group report. Peer evaluation, in which students evaluate the contributions of other group members, may be used on group assignments. If peer evaluation is used, then a student’s individual grade on group assignment will reflect both the base grade for the assignment and the peer evaluation score.

Students are expected to contribute substantially to group work. Every student understands that all group members are equally responsible for the entire project unless otherwise indicated by the professor. When you submit work as part of a group project, you agree that you were an author of the entire project. Specifically, this means that you agree that you contributed to all four of the following elements of the project¹:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; and
2. Drafting the work or revising it critically for important intellectual content; and
3. Final approval of the version to be submitted for grading; and
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

¹ These four authorship criteria are taken from the ICMJE authorship criteria guidelines, <https://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html> .

If an individual(s) has not contributed significantly to the group's work, then the individual in question may be removed from the group and receive a grade independent from the group. The faculty reserve the right to assign a failing grade to any individual who has not meaningfully contributed to the group.

ATTENDANCE

Attendance at all sessions in this course are mandatory and it is your responsibility to advise me if you are unable to attend a class. Circumstances may arise which make it impossible for you to attend such as due to health-related reasons.

Students missing class, regardless of the reason, will not receive credit for class contribution, nor will class contribution grades be pro-rated to accommodate the number of missed classes. Any student who, in the opinion of the instructor, is absent too frequently from class or will be reported to the PhD Faculty Director (after due warning has been given). Specifically, any student missing more than 30 percent of the classes will not be permitted to receive credit for the course and will be debarred from completing the final graded deliverable (e.g., exam or assignment) in the course.

See also Western's Policy on Accommodation for Illness at https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf. In the event of an illness requiring medical documentation, please contact MMA Program Services for instructions.

ACADEMIC OFFENSES

Scholastic offenses are taken seriously and students are expected to read the appropriate policies at:

- Scholastic Discipline for Graduate Students: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf
- Graduate Student Academic Appeals: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/appealsgrad.pdf

CODE OF CONDUCT POLICIES

- Western Code of Student Conduct: <http://www.uwo.ca/univsec/pdf/board/code.pdf>
- Ivey Student Code of Professional Conduct located in the Student Handbook.
- Western Non-Discrimination/Harassment Policy: https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp135.pdf
- The Code of Behaviour for Use of Computer Resources and Corporate Data: https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf

PLAGIARISM

Plagiarism is a major academic offence. Students must write their essays and assignments (at Ivey this includes case exams and reports) in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations.

All required papers (at lvey this includes case exams and reports) may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com (www.turnitin.com).

GENERATIVE AI USE

The use of generative AI has implications for a student's relationship with academic rigor, academic integrity and data privacy. There are opportunities and there are risks; many of which are not yet comprehensively known.

It has been documented that generative AI tools can produce inaccurate, biased and/or outdated information. Please take the necessary steps to verify the accuracy of the information produced and its references. **You alone are responsible for the accuracy of your work**, including appropriate citations of any work that you submit.

In general, using generative AI is discouraged. If it is used,

- It must be cited using a commonly accepted citation format
- You must include all prompts and responses as appendices to your work

Also, see the Western guidance on AI here:

- https://grad.uwo.ca/about_us/policies_procedures_regulations/ai.html
- <https://ai.uwo.ca/Guidance/Policy.html>

PROHIBITED INFORMATION

Unless explicit instructions are received from your instructor to the contrary, your preparation must be limited to the information provided by your instructor(s), plus your own experience and that of your class peers. Class contributions should be based exclusively on your preparation and discussions with members of your learning team or section classmates, and not augmented with information obtained anywhere else. Information related to cases that have been obtained from sources other than your instructor in paper, electronic or verbal form is not permitted to be used for class contribution purposes. Such prohibited information includes, but is not limited to, the following:

- Hand-outs, including follow-on ("B") cases
- Exam or report feedback (related to a particular case) for other students or provided in other sections or years
- Notes, spreadsheets, etc. specific to cases (obtained before the case has been taught) prepared by students in other sections or years
- Company information that is not provided in the case (and that is not derived from your own experience)
- Teaching notes
- Notes and solutions from web sites and other sources that sell, share, or distribute homework solutions

If it is determined that such prohibited information is used in class discussions, such an incident will be deemed to be a violation of Ivey's Student Code of Professional Conduct. For case exams and reports, use of prohibited information may also constitute a scholastic offense at Western.

RECORDING REMOTE LEARNING ACTIVITIES

All of the remote learning sessions for this course may be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings. Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

HEALTH AND WELLNESS SERVICES

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as a faculty member, the Faculty Program Director, or the MSc Program Services Director. Students who are in emotional and/or mental distress should also

refer to Mental Health@Western http://uwo.ca/health/mental_wellbeing for a complete list of options about how to obtain help.

OFFICE HOURS/APPOINTMENTS

I am available to meet with you at a mutually convenient time. If you wish to meet, please see me after class or e-mail my assistant or myself for an appointment. Please do not hesitate to set up a meeting if you have any questions or issues you would like to discuss.

ACCESSIBLE EDUCATION WESTERN (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

GENDER-BASED AND SEXUAL VIOLENCE

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website: https://www.uwo.ca/health/student_support/survivor_support/gethelp.html. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

A FINAL WELCOME AND REQUEST OF MY STUDENTS

I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability, and other visible and nonvisible differences. I consider this classroom to be a place where you will be treated with respect. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. If it is appropriate to our learning and you feel comfortable doing so, I ask that you share your unique point of view as we explore the course content.