



ORIGINAL COURSE IMPLEMENTATION DATE: November 1994
REVISED COURSE IMPLEMENTATION DATE: September 2026
COURSE TO BE REVIEWED (six years after UEC approval): April 2032
 Course outline form version: 29/08/2024

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BUS 404	Number of Credits: 3 Course credit policy (105)										
Course Full Title: Management Science Course Short Title: Management Science											
Faculty: Faculty of Business and Computing	Department/School: School of Business										
Calendar Description: Management science covers the application of basic mathematics and statistics to aid managerial decision making in order to help solve a wide variety of problems in the business environment. Students acquire essential management science skills through the use of up-to-date computer-based solutions (e.g., software, cloud platforms, or AI-powered tools) for informed decision-making, incorporating the advancement of Indigenous and diverse perspectives.											
Prerequisites (or NONE):	45 university-level credits including STAT 106 or BUS 226.										
Corequisites (if applicable, or NONE):	None.										
Pre/corequisites (if applicable, or NONE):	None.										
Antirequisite Courses (<i>Cannot be taken for additional credit.</i>) Former course code/number: Cross-listed with: Equivalent course(s): <i>(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)</i>	Course Details Special Topics course: No <i>(If yes, the course will be offered under different letter designations representing different topics.)</i> Directed Study course: No <i>(See policy 207 for more information.)</i> Grading System: Letter grades Delivery Mode: May be offered in multiple delivery modes Expected frequency: Twice per year Maximum enrolment (for information only): 25										
Typical Structure of Instructional Hours <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Supervised laboratory hours (computer lab)</td> <td style="width: 20%; text-align: center;">45</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td style="text-align: right;">Total hours</td> <td style="text-align: center;">45</td> </tr> </table>	Supervised laboratory hours (computer lab)	45							Total hours	45	Prior Learning Assessment and Recognition (PLAR) PLAR is available for this course. Transfer Credit (See bctransferguide.ca.) Transfer credit already exists: Yes Submit outline for (re)articulation: No <i>(If yes, fill in transfer credit form.)</i>
Supervised laboratory hours (computer lab)	45										
Total hours	45										
Scheduled Laboratory Hours Labs to be scheduled independent of lecture hours: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes											
Department approval	Date of meeting: October 29, 2025										
Faculty Council approval	Date of meeting: December 5, 2025										
Undergraduate Education Committee (UEC) approval	Date of meeting: April 24, 2026										

Learning Outcomes

1. Formulate linear programming (LP) models for various business decision problems in algebraic form.
2. Solve LP models using up-to-date computer-based solutions (e.g., software, cloud platforms, or AI-powered tools).
3. Interpret sensitivity analysis results to assess the impact of parameter changes on the optimal solution.
4. Analyze uncertainty through probability concepts and probability trees, supported by up-to-date computer-based solutions.
5. Evaluate business decisions under different risk attitudes by applying decision-support tools.
6. Reflect ethical considerations and diverse cultural perspectives—including Indigenous knowledge systems—into quantitative decision-making processes (e.g., land stewardship, food security, sustainability).

Recommended Evaluation Methods and Weighting (*Evaluation should align to learning outcomes.*)

Final exam:	30%	Assignments:	30%
Quizzes/tests/midterm	30%	Holistic assessment:	10%

Details: Midterm is 30%. Assignments include 10% class contribution.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Instructional Methods (*Guest lecturers, presentations, online instruction, field trips, etc.*)

In a computer lab for lectures and exercises.

Texts and Resource Materials (*Include online resources and Indigenous knowledge sources. [Open Educational Resources](#) (OER) should be included whenever possible. If more space is required, use the [Supplemental Texts and Resource Materials form](#).)*)

Type	Author or description	Title and publication/access details	Year
1. Textbook	Frederick Hillier and Mark Hillier	Introduction to Management Science and Business Analytics: A Modeling and Case Studies Approach with Spreadsheets	Current
2. Paper	Mökander, J., Morley, J., Taddeo, M., & Floridi, L.	Ethics-based auditing of automated decision-making systems: Nature, scope, and limitations	2021
3.			

Required Additional Supplies and Materials (*Software, hardware, tools, specialized clothing, etc.*)

All required software and computing resources (e.g., optimization solvers, cloud-based platforms, and decision-support tools) will be provided through the university's computer labs.

Course Content and Topics

Module 1: Introduction to Linear Programming

- Critically examine the fundamentals of LP and its applications in business decision-making.
- Formulate LP models to represent business decision problems algebraically.
- Utilize up-to-date computer-based solutions (e.g., advanced software, cloud platforms, or AI-powered tools) to model and solve LP problems.
- Assess the role of LP in optimizing business operations.

Assessments: Homework 1 – Basic setup in computer-based solutions and algebraic formulation (LO1, LO2)

Module 2: Sensitivity Analysis

- Analyze multiple optimal solutions and their managerial implications.
- Perform sensitivity analysis on objective coefficients to evaluate the impact of changes.
- Interpret sensitivity reports, including shadow prices and allowable increases/decreases.

Assessments: Homework 2 – Sensitivity analysis (LO3)

Module 3: Advanced LP Models

- Develop blending, scheduling, and transportation models to address complex business scenarios.
- Explore special topics in LP and their real-world applications.
- Apply advanced computer-based techniques to model and solve these LP problems.

Assessments: Homework 3 – Blending models (LO1, LO2, LO3)

Midterm Exam (LO1-3)

Module 4: Probability Concepts

- Introduce fundamental probability concepts in the context of business decision-making.
- Use up-to-date computer-based solutions to construct and interpret probability trees.
- Apply probability measures (joint, conditional, marginal) to analyze uncertainty and support data-driven decisions.
- Explore simulation and probability modeling as tools for business applications.

Assessments: Homework 4 – Probability trees (LO4)

Module 5: Decision Analysis

- Evaluate decision-making criteria using different risk attitudes, including conservative, optimistic, and regret-based approaches.
- Develop decision trees incorporating Expected Monetary Value (EMV) and Expected Value of Perfect Information (EVPI).
- Apply Bayes' Theorem to update probabilities based on new information.
- Assess the value of perfect and sample information in business decisions, including Expected Value of Survey Information (EVS).

Assessments: Homework 5 – EVPI and EVSI calculations (LO5)

Module 6: Ethical and Cultural Perspectives in Decision-Making

- Integrate ethical considerations into quantitative models and decision-making processes.
- Engage with Indigenous knowledge systems to enhance understanding of business problems.
- Reflect on the importance of diversity and inclusion in quantitative analysis.
- Discuss the impact of cultural perspectives on managerial decisions.

Assessments: Homework 6 – Reflection essays (LO6)

Final Exam (LO4-6)