

TOMS5301 – Prescriptive Analytics

Course Syllabus

Course Title: Prescriptive Analytics

Course Credit Weight: 0.25 credits

Prerequisites: BUSI 5801 – Statistics for Managers and ITIS 5431 – Business Analytics for Managers

Course Instructor:

Course Details

Course Description

This course equips students with practical skills in prescriptive analytics to support complex business decision-making. Emphasizing the full decision-making cycle—problem identification, model formulation, solution analysis, and implementation—the course introduces linear programming, integer optimization, simulation, decision trees, and multicriteria models. Students will learn how to translate business problems into structured models and analyze trade-offs between competing objectives. The course also explores how assumptions, constraints, and uncertainty affect model outcomes and managerial decisions. Students will apply these techniques to real-world scenarios using commercial tools such as Excel Solver and Analytic Solver. Special focus is given to selecting appropriate methods, interpreting results, and communicating insights to influence decisions and drive change in organizations. By the end of the course, students will be able to critically assess business problems, choose suitable analytics tools, and contribute to data-driven strategies with confidence.

Course Rationale (optional)

In today's data-driven business environment, MBA students must be equipped not only to interpret data but also to make optimal decisions based on it. While descriptive and predictive analytics help organizations understand what has happened and what might happen, prescriptive analytics goes a step further—providing actionable recommendations to achieve desired outcomes. This course introduces students to essential frameworks and quantitative methods that form the foundation of prescriptive analytics. By learning how to structure complex problems, apply optimization techniques, and evaluate alternative strategies, students gain the tools to enhance decision-making across finance, operations, marketing, and other business functions. The course prepares MBA graduates to lead with analytical insight, driving efficiency, minimizing risk, and gaining a competitive edge in an increasingly data-centric world.

Course Learning Objectives

After successfully completing this course, you will be able to:

CLO1: Describe the role of decision modeling in business and distinguish between different types of decision models

CLO 2: Apply linear programming, including integer and network models, to optimize business decisions

CLO 3: Use spreadsheet tools to build, solve, and interpret decision models

CLO 4: Perform and interpret sensitivity analysis to evaluate the robustness of model solutions

CLO 5: Construct and analyze decision trees to support decision-making under uncertainty

CLO 6: Apply multicriteria decision-making techniques such as scoring models and Analytic Hierarchy Process

CLO 7: Communicate analytical findings clearly and justify decisions based on model outcomes

Contribution to Program Learning Goals (optional)

MBA Learning Goal	Not Covered	Introduced	Taught but not Assessed	Taught and Assessed
MB1 Leadership and Collaboration		X		
MB2 Communication				X
MB3 Critical Thinking and Problem Solving				X
MB4 Functional Knowledge				X
MB5 Global Awareness			X	
MB6 Ethics and Responsible Management			X	

Learning Materials & Tools

Textbook

Required:

- ❑ [Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Business Analytics](#), by Cliff Ragsdale | 9th Edition | Copyright 2022, ISBN: 978-0-357-13209-8, Cengage Publication

Optional:

- ❑ Introduction to Management Science and Business Analytics: A Modeling and Case Studies Approach with Spreadsheets, 7th Edition, ISBN: 9781260716290, By Frederick Hillier and Mark Hillier © 2023 McGraw-Hill Publication

Course Reserves

All readings are available via the Course Reserves (Ares).

Other Resources (sample/optional)

Sample:

- Slides available on Brightspace
- HTMLs available on Brightspace
- Recordings available on Brightspace

Educational Technology

- Microsoft Excel, Word, and PowerPoint
- Analytic Solver Platform
- MS Team and Zoom for optional office hours

Course Map

Assessment Plan

Assessment	Course Learning Outcomes Assessed	Percent of Total Grade
Quiz	CLO1, CLO2, CLO3, CLO4, CLO6	7 x 4% = 28%
Assignment 1	CLO1, CLO2, CLO3, CLO4, CLO7	16%
Assignment 2	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7	16%
Assignment 3	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7	20%
Final Exam	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6	20%
TOTAL		100%

Grading Scheme

Letter grades correspond to the following percentages:

Percentage	Final Grade
90-100	A+
85-89	A
80-84	A-
77-79	B+
73-76	B
70-72	B-
67-69	C+
63-66	C
60-62	C-
57-59	D+
53-56	D
50-52	D-
0-49	F

Final grades in this course are determined by the course instructor and must be approved by the Dean. Grades submitted by the instructor are subject to revision and should not be considered final until they have been approved by the Dean.

Course Policies

Academic Regulations

University rules regarding registration, withdrawal, appealing marks, and related matters can be found at: <https://calendar.carleton.ca/grad/gradregulations>

Requests for Academic Accommodation

Academic accommodation refers to educational practices, systems , and support mechanisms that accommodate diversity and difference and allow students to perform the essential requirements of their academic programs. Carleton University is committed to academic accessibility for all. The processes for submitting requests are as follows:

Pregnancy

Please contact your teaching team with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please visit the *Student guide to academic accommodation*: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Religious Observations

Please contact your teaching team with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please visit the *Student guide to academic accommodation*: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Students with Disabilities

If you have a documented disability that requires academic accommodation in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You

must also contact the PMC no later than two weeks before the due date of the first assignment or exam for which you require accommodation. After requesting accommodation from PMC, be sure to communicate with your instructor to ensure that the necessary accommodation arrangements are in place. <https://carleton.ca/pmc/>.

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services

available at the university and to obtain information about sexual violence and/or support, visit <https://carleton.ca/sexual-violence-support/>.

For more information on academic accommodation, please contact the departmental administrator or visit: <https://students.carleton.ca/course-outline/>.

Late Policy (adapt as needed)

By virtue of being in the Online MBA program, students are expected to behave professionally, including meeting deadlines; however, we understand that in some cases, despite a student's best efforts and for good reason, deadlines may be missed (e.g., illness, family emergency, etc.). As such, a 24-hour grace period will be permitted on all posted deadlines, no questions asked (note: feedback may be delayed). **Submissions beyond the grace period will incur increasing penalties of 10 percentage points per day.** Submissions more than 5 days late will not be accepted and a grade of 0 will be issued.

For example, if a student scored 45/50 on an assignment (i.e. 90%) and was 2.5 days late, they will be awarded 35/50 (i.e. 70%).

To avoid penalties when unforeseen circumstances arise, students are encouraged to work ahead when possible.

Academic Integrity

Carleton University's Academic Integrity Policy defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source.

Examples of plagiarism include, but are not limited to:

- Any submission prepared in whole or in part by someone else;
- Using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgement;
- Using another person's data or research findings without appropriate acknowledgement, and;
- Failing to acknowledge sources through the use of proper citations when using another person's work and/or failing to use quotation marks.

Violations of academic integrity also include:

- Using unauthorized material when completing an assignment or exam;
- Fabricating or misrepresenting research data;
- Unauthorized co-operation or collaboration, and;
- Completing work for another student.

Academic integrity violations constitute a serious academic offence, weaken the quality of the degree, and will not be tolerated. Penalties may include: a failing grade for the submitted work and/or course; academic probation; suspension from full-time studies; suspension from all studies at Carleton, and; expulsion from Carleton.

Students should familiarize themselves with and follow the Carleton University Student Academic Integrity Policy which is available, along with resources for compliance, at:

<https://carleton.ca/registrar/academic-integrity>.

AI Statement

As our understanding of the uses of Artificial Intelligence (AI) and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Note: Additional sample statements can be sourced here:
<https://carleton.ca/tls/teachingresources/sample-syllabus-statements-for-ai-use-in-courses/>.

Copyright

Materials used in this course—including lectures, PowerPoint presentations, discussions, learning activities, posted notes, case studies, assignments, and exams—are copyright protected and remain the intellectual property of their respective author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

Students registered in this course may take notes and make copies of course materials for their own educational use only. Students may not reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

Equity, Diversity, Inclusion and Decolonization

All members of the Carleton University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race,

sex (including pregnancy), or sexual orientation, please visit the Department of Equity and Inclusive Communities website at: <https://carleton.ca/equity/>.

Privacy Statements

Provide links to relevant third-party technology platforms' privacy policies [e.g., Zoom; McGraw-Hill connect, etc.]. These may be introduced in the following manner, for example:

This course makes use of third-party technology. Note that the following technologies take students out of Brightspace and onto the sites of such parties. Please familiarize yourself with the privacy statements of all educational technology used in this course:

Zoom: Link to privacy statement

Etc.

Expectations

Communication

Course forums and email are the primary means of communicating with the teaching team. Questions posted to the Course Q & A forum will be prioritized over emails to the teaching team, so that everyone may benefit from the answer(s) provided. The teaching team should be contacted only regarding personal circumstances that would not be appropriate to share on the course forums.

To respond to your emails, the teaching team and administrators need to see your full name and Carleton University ID. For this reason, it is important to send all messages from your Carleton email account. If you do not have or have yet to activate this account, you can do so by visiting <https://carleton.ca/its/get-started/new-students-2/>.

Teaching Team Response Times

Every effort will be made to grade assignments within a week. Every effort will be made to reply to your question(s) within 24 hours, Monday through Friday, unless otherwise posted. Response times may be longer on weekends.

Netiquette

Please use the following rules of netiquette as you post to online discussions and send messages to your teaching team and fellow students in the course:

- **Use professional language.** Be positive and constructive in your feedback. Be polite by including please and thank you. Use inclusive language and terminology.
- **Try not to use all caps.** ALL CAPS comes across as shouting to the reader. Use **bold** formatting to emphasize words instead.
- Use **proper language and titles**, no slang or profanity. Even if a word is one you consider to be "not so bad," it could be offensive to others.
- **Review posts and messages before saving.** Check for grammar and spelling errors and restate your message when necessary.
- **Ask for clarification.** If you do not understand an assignment or feedback, please ask for clarification. We will do our best to word posts/messages as clearly as possible, but in an online environment, it can be difficult to "see" if messages are being understood.

Group Work

Group work offers opportunities to develop interpersonal, collaboration, communication, leadership, and other skills. It is also an effective way to learn integrative skills to address complex tasks. While embarking on a group project, it is your responsibility to ensure that the assigned tasks contribute to the group assignment and not an individual one.

Peer Evaluation for Group Work (as relevant)

To ensure fairness in grading, you will be asked to assess the contribution of other group members. This information will be factored into individual scores on group work.

Resources

Student Academic Support

The Centre for Student Academic Support (CSAS) is a collection of support services designed to help students achieve their goals and improve their learning. CSAS can help you with academic reading, academic writing, critical thinking, time management, and more. For complete information on their workshops and other services, please visit: <https://carleton.ca/csas/>.