ADS2298B 570
Introduction to Analytics and Decision Science
Winter 2026

Instructor: Dr. Luisa Liboni
Email: luisa.liboni@uwo.ca

Course Information

Mode of Instruction: In Person

Calendar Description:

Decision analysis, linear programming, integer programming, statistical distributions, Markov chains, Monte Carlo simulation, queuing, discrete event simulation. Students will use a variety of tools to investigate applications including transportation networks, revenue management, production scheduling and sports analytics.

Pre-requisite(s): 0.5 course from Analytics and Decision Sciences 2288F/G, Data Science 1200A/B, or Statistical Sciences 2864A/B; and 1.0 courses from any 1000-level courses in Applied Mathematics, Calculus, Mathematics, Numerical and Mathematical Methods, and/or Statistical Sciences. Pre-or Corequisite(s): 0.5 course from: Economics 2122A/B, Economics 2222A/B, Statistical Sciences 2035, Statistical Sciences 2141A/B, Statistical Sciences 2857A/B, or by permission of the School of Management, Economics, and Mathematics.

Anti-requisite(s): Financial Modelling 3817A/B, Statistical Sciences 4654A/B.

Extra Information: 3 lecture hours, 2 lab hours.

Course Weight: 0.50
Breadth: CATEGORY A
Subject Code: ADS

Notice: Unless you have either the requisites for this course (fulfilment of pre-requisites, no anti-requisite conflicts), or special permission from your Dean to enrol in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

KING'S UNIVERSITY COLLEGE
LONDON CANADA
SCHOOL OF MANAGEMENT, ECONOMICS, AND MATHEMATICS

Analytics and Decision Science 2298B – Section 570
Introduction to Analytics and Decision Sciences

Instructor: Dr. Luisa Liboni
Email: luisa.liboni@uwo.ca

Tutorial / Lab Instructor:
Grader:

Course Description:
Decision analysis, linear programming, integer programming, dynamic programming, statistical distributions, Monte Carlo simulation, queuing, discrete event simulation. Students will use a variety of tools to investigate applications, including transportation networks, revenue management, production scheduling and sports analytics.

Prerequisites:
0.5 course from Analytics and Decision Sciences 2288A/B, Data Science 1200A/B, or Statistical Sciences 2864A/B; and 1.0 courses from any 1000-level courses in Applied Mathematics, Calculus, Mathematics, Numerical and Mathematical Methods, and/or Statistical Sciences. Pre-or Corequisite(s): 0.5 course from: Economics 2122A/B, Economics 2222A/B, Statistical Sciences 2035, Statistical Sciences 2141A/B, Statistical Sciences 2857A/B, or by permission of the School of Management, Economics, and Mathematics.

Antirequisites*:*
Financial Modelling 3817A/B, Statistical Sciences 4654A/B.

Textbook(s):
There are no mandatory textbooks. Here are some introductory texts on the topics that can be used as auxiliary resources:

1. *A Modelling and Case Studies Approach with Spreadsheets (7.e.) by Hillier and Hillier*
2. *Business Analytics* by Camm, Cochran, Fry, and Ohlman (Cengage)
3. *Introduction to Operations Research* by Hillier and Lieberman (McGraw-Hill)
4. *Decision Modeling* by Tulett (https://linney.mun.ca/pages/view.php?ref=36808)

Important websites and their utilization in this course:

OWL – This learning management system will be your hub for finding all the resources posted for this course. This will include pre-and post-lecture notes, problem sets, laboratory instructions, data sets and any additional resources necessary for this course. It is your responsibility to check OWL each day, and to read all announcements posted on OWL.

Microsoft Excel – An important tool in operations research and a main focus of future ADS courses is Microsoft Excel. We will introduce basic ideas of spreadsheet modelling and utilize Excel's "Solver" add-in to solve optimization problems. It is necessary for you to have Excel downloaded on your personal computer and to have the "Solver" add-in. Details on how to ensure you have "Solver" can be found on OWL. Some familiarity with the program will be assumed, but the first laboratory session will be focused on basic Excel skills.

Python – We will learn how to use Python to solve some predictive analytics problems. Python is a tool used to develop simulation models. A "refresher lab" will be scheduled to remind you of some basic skills. It is recommended that students use Spyder IDE as their Python interface in ADS2298B. If they choose, students are welcome to use some other Python interface such as Jupyter notebooks.

Technology Requirements:
It is required that you have a personal computer (either desktop or laptop) that has the computing power to run MS Excel and Python. Before the first laboratory session, you **must** have Excel downloaded and working on your personal computer. Please download Anaconda to load code in Spyder IDE. If you need any assistance with either program, please email the course instructor as soon as possible

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Course-Level Learning Outcomes:
By the end of the course, students should be able to:

1. Utilize linear and integer programming, simulations and other tools to suggest appropriate optimization strategies for real-world problems.
2. Utilize Excel spreadsheets with Solver to model optimization problems and understand the results presented, including the sensitivity report.
3. Apply queuing theory to basic problems and identify the applications of such methodologies.
4. Understand the method of Monte Carlo simulation in developing strategies for businesses and
5. Use basic Python commands to create programs to develop predictive analysis of real-world problems.

Evaluation:
Your final grade will be calculated through the following grading scheme:

Problem Sets (3, in groups)	40%
Laboratory Assignments (3, individual)	30%
Quizz (3, individual)	30%

Details regarding each evaluation method are given below:

Problem Sets: There will be three (3) equally weighted problem sets that will be due approximately every month. The problem sets will cover previously taught material in lecture and will be an opportunity to demonstrate your learning. Assignments must be organized, clear and well structured. Solutions must be clear and communicated appropriately – simply writing a final answer will result in zero points. It is highly recommended that students type their assignments – preferably using. Microsoft Word or LaTeX. Assignments are to be completed in groups of 2 to 3 students.

Lab Assignments: Lab sessions can include an assignment that must be completed within one week time frame. Some instructional labs will not have assignments. These will be individual assignments that will involve programming skills in either Microsoft Excel or Python. There will be three (3) equally weighted assignments. Students will submit their spreadsheet/code and a small report through OWL. Details will be given in the first laboratory.

Quizzes: There are three (3) quizzes. Students have the span of one day to complete quizzes. More details about content structure of the quiz will be give closer to the deadline date.

Class Structure:
Class will attempt to be a balance between note taking, discussion and active learning. We will write notes together each class and discuss various problems that an analyst may face in the real world.

Office Hours:
Office hours will be scheduled on the first day of classes to ensure a time that works best for the class.

Extra Notes Regarding Laboratories:
Please read the following notes regarding the laboratories for this course.

1. Within this course, generative AI tools such as ChatGPT are permitted exclusively for: Information-gathering and preliminary research purposes; development of an essay outline.
2.
3. If AI tools are used, students must acknowledge their use and state how the tool was used. Unauthorized use of AI will be subject to academic discipline. It is beneficial to your learning to understand that AI is not perfect. It is also a useful skill to give a "pseudocode" to an AI tool and generate a program. We do expect that you, as a learner, do not rely solely on AI to produce code. Copying and pasting code from ChatGPT is not going to offer much value to an employer and can hinder your learning and also your career.

4. Understanding the intricacies of Python and Excel is an important outcome of this course.

5. Instructions for the lab assignments will be available at the beginning of the lab.

6. The instructor reserves the right to interview students about all submitted work, for any reason, including but not limited to seeking clarification and/or investigating suspected violations of academic integrity (cheating).

Equal Opportunity and Evaluation Policy:
The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in the course because they are not criteria for evaluation.

Tentative Class Schedule:
This is subject to change and should not be held as absolute. All due dates and deadlines will be posted on OWL for reference.

	Class Content	**Labs/Problem Sets/ Project**
Week 1 January 5th	• Welcome to the Course + What is Operations Research? • Introduction to Linear Programming	**NO LAB**
Week 2	• Examples of Linear Programming • Introduction to Sensitivity Analysis	**NO LAB**
Week 3	• Integer Programming • Examples of Integer Programming • Sensitivity Analysis Cases	**Instructional Lab** • *Intro to the Lab.* • *Basics of Excel and Solver Solving a Linear Program in Excel*
Week 4	• Introduction to Nonlinear Programming • Examples of Nonlinear Programing	**NO LAB**
Week 5	• Examples of Nonlinear Programming • Decision Trees	**Instructional Lab** • *Python solving LP and what if*
Week 6	• Decision Trees	**NO LAB**
Week 7 – Reading week February 14-22	No class	No lab
Week 8	Optimization Examples: • Inventory Analysis, • Revenue Management • Scheduling Problem • Game Theory	**Instructional Lab** • *Decision Trees*
Week 9	Optimization Examples: • Inventory Analysis, • Revenue Management • Scheduling Problem • Game Theory	**NO LAB**

Week 10	• Queuing Theory	**NO LAB**
Week 11	• Queuing Theory /Monte Carlo	**I NO LAB**
Week 12	• Monte Carlo/Simulations	**Instructional Lab** *Monte Carlo* *Queuing Theory*
Week 13 Apr 9th (classes end)	• Simulations	**NO LAB**
Final Examination Period Apr 12-30	No Class	**NO LAB**

KING'S UNIVERSITY COLLEGE
GENERAL COURSE POLICIES
2025-2026

1. Academic Accommodations, Consideration for Absences

Academic Accommodation (Accessibility)

Accessibility Services works to ensure that academic programs are accessible to all students, and supports students who may have a condition related to, but not limited to, vision, hearing, mobility, different ways of learning, mental health, chronic illnesses, chronic pain, autism spectrum disorder, ADD/ADHD, and temporary conditions (beyond short-term academic consideration). Accessibility Services provides recommendations for accommodation based on medical documentation or psychological and cognitive assessment. The accommodation policy can be found here Academic Accommodation for Students with Disabilities. Information on Accessibility Services at King's can be found here.

Academic Consideration for Student Absence

If a student is unable to meet a course requirement due to substantial but temporary extenuating circumstances (medical or compassionate), they should follow the procedures below.

In some cases, where instructors have built flexibility into their assessments, this flexibility will already address consideration needs.

Requests for academic consideration should be directed to the Academic Advising Office of your faculty/college of registration. Requests must be made as soon as possible and no later than 48 hours after the missed assessment.

As a rule, documentation is required for academic consideration. For academic consideration requests on medical grounds, the Student Medical Certificate is available at https://www.kings.uwo.ca/kings/assets/File/currentStudents/courses_enrollment/exams_and_tests/SMC-Feb-2025.pdf.

Students are permitted one academic consideration request without supporting documentation per term per course.

Instructors may designate one assessment per half-course weight as requiring formal supporting documentation. Please refer to the course outline for each course.

For further information, please see:
https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

Absences from Final Examinations

If you miss the Final Exam, contact the Academic Advising Office of your faculty/college of registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, or more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give notice in writing to the instructor and Academic Advising Office if a course requirement will be affected by a religious holiday/observance. Notice must be given as early as possible, and no later than two weeks prior to an examination, and one week prior to a midterm test date. It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

2. Support Services

Accessibility, Counselling and Student Development at King's University College: https://www.kings.uwo.ca/current-students/student-services/

Students experiencing emotional or mental health distress can access services at King's University College: http://www.kings.uwo.ca/current-students/campus-services/student-support-services/personal-counselling/

Good2talk is a good online and phone 24/7 resource for students and is available in English, Mandarin, and French: https://good2talk.ca, 1-866-925-5454

MentalHealth@Western provides a complete list of options about how to obtain help: https://www.uwo.ca/health/mental_wellbeing/

Academic Support Services at King's University College: https://www.kings.uwo.ca/current-students/academic-resources/

GBSV Support:

King's is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at: https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/

You can reach someone supports at Kings by emailing Care@kings.uwo.ca or calling 519-930-4640 to reach a social worker who can offer help.

You can also reach Western's Gender-Based Violence & Survivor Support Case Manager by email or by calling 519-661-3568.

Further supports can be found on this website: https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/

See also https://www.uwo.ca/health/student_support/survivor_support/get-help.html

University Students' Council offers many valuable support services for students, including the health insurance plan: http://westernusc.ca/services/

3. Statement on Use of Electronic Devices

Use of Electronic Devices: Unless explicitly stated otherwise, you are not allowed to have a cell phone, or any other electronic device, with you during tests or examinations. Unauthorized possession of such a device during a test or examination constitutes an academic offence.

Use of Laptops, Tablets, and Smartphones in the Classroom: King's University College at Western University acknowledges the integration of new technologies and learning methods into the curriculum. The use of electronic devices such as laptop computers, tablets, or smartphones can contribute to student engagement and effective learning. At the same time, King's recognizes that instructors and students share jointly the responsibility to establish and maintain a respectful classroom environment conducive to learning.

The use of electronic devices by students during lectures, seminars, labs, etc., shall be for matters related to the course at hand only. Students found to be using electronic devices for purposes not directly related to the class may be subject to sanctions under the Student Code of Conduct; see https://www.kings.uwo.ca/current-students/student-affairs/code-of-student-conduct1/

Inappropriate use of electronics (e.g., laptops, tablets, smartphones) during lectures, seminars, labs, etc., creates a significant disruption. As a consequence, instructors may choose to limit the use of electronic devices in these settings. In addition, in order to provide a safe classroom environment, students attending in-person class sessions are strongly advised to operate laptops with batteries rather than power cords.

4. Statement on Academic Offences

King's is committed to academic integrity. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, is posted at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

It is expected that students will submit work that is truly their own, completed without external assistance (human or artificial) except as explicitly permitted by the course instructor. Check with you instructor on what tools, including generative AI (ChatGPT, translation tools, grammar-checking tools) are permitted in the course. Because a tool is permitted in one course, that does not mean it is permitted in other courses.

All required papers 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 for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system; see https://elearningtoolkit.uwo.ca/tools/Originality Reports - TurnItIn.html.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5. Copyright of Course Material

Lectures and course materials, including PowerPoint presentations, tests, outlines, and similar materials are protected by copyright. Faculty members are the exclusive owner of copyright in those materials they create. Students may take notes and make copies for their own use. Students may not allow others to reproduce or distribute lecture notes and course materials publicly (whether or not a fee is charged) without the express written consent of a faculty member. Unauthorized sharing of class content is subject to academic discipline.

Similarly, students own copyright in their own original papers and exam essays. If a faculty member wishes to post a student's answers or papers on the course website, they should ask for the student's written permission.

6. Use of Recordings

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation and/or the participant has the prior written permission of the instructor. Unauthorized recording and/or sharing of class content is subject to academic discipline.

7. Policy on Attendance

Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean of the Faculty offering the course, after due warning has been given. On the recommendation of the department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course.