

WESTERN UNIVERSITY
Department of Statistical and Actuarial Sciences
FM 3817B Winter 2018
Course Outline

- Instructor:** Dr. Zinovi Krougly, Office MC 250
Phone 519 661-2111 ext. 88787
Email zkrougly@stats.uwo.ca
Website <http://www.stats.uwo.ca/faculty/krougly/>
- Class Times:** M W F 9:30 AM - 10:30 AM in TC-204
- Office Hours:** M W 12:00 PM – 1:30 PM in MC 250 or by appointment
- Antirequisite(s):** The former Applied Mathematics 3817A/B.
- Prerequisite(s):** [Mathematics 1600A/B](#) and one of [Calculus 2302A/B](#), [2502A/B](#) or [2402A/B](#).
- Course Text:** Introduction to Operations Research, by Frederick S. Hillier and Gerald J. Lieberman, McGraw Hill, 10th ed., 2015.
- Optional:** Optimization in Operations Research, by Ronald L. Rardin, Pearson, 2017 or 1998.
- Course Website:** <http://owl.uwo.ca>
- Course Description:** An introduction to linear programming, simplex method, duality theory and sensitivity analysis, formulating linear programming models, nonlinear optimization, unconstrained and constrained optimization, quadratic programming. Applications in financial modelling (investment portfolio selection).

Course Objectives:

Timings given are approximate.

- Classification of Optimization Problems, Introduction to linear programming, Graphical Solutions (1/2 week)
- Solving Linear Programming Problems: Simplex Method (1 week)
- Simplex Method in Matrix Form, Revised Simplex Method (1 week)
- Sensitivity Analysis and Duality (1 week)
- Nonlinear Programming and Multi-variable Optimization, Nonlinear Equations (3 weeks)
- Constrained Nonlinear Optimization, Lagrangian, Penalty and Barrier Methods (2 week)
- Optimization Using Quadratic Forms, Quadratic Programming (1.5 weeks)
- Discrete Optimization, Branch and Bound Methods (1 week)
- Applications: Portfolio Optimization, Optimization Toolbox (1 week).

Most examples have versions for Matlab, R, or C++. Students can use software by their choice for the assignments.

Assessment

Assignments and/or Quizzes

Assignment 1 - February 5, 2018

Assignment 2 - February 26, 2018

Assignment 3 - March 12, 2018

Assignment 4 - April 2, 2018

Midterms or Tests

Tuesday, February 13, 2018, 7:00 PM – 9:00 PM

Final Exam

TBA

Evaluation

5% Assignment 1
30% Midterm
5% Assignment 2
5% Assignment 3
5% Assignment 4
50% Final Exam

The final exam will cover the entire course but with greater emphasis on the topics taught after the midterm.

What is expected of the student: Students are responsible for learning the material presented in lectures, for learning how to solve the suggested exercises, and for demonstrating that learning on exams, quizzes, and/or assignments. For each hour of lecture, an average student should spend about 2 hours studying the material at home. This includes reading the relevant sections of the textbook and, above all, doing the exercises at the end of each section. Do as many of them as necessary to feel comfortable with the material. This course covers a lot of material, and is cumulative, so it will be necessary to work **regularly** throughout the term to do well.

Remember: You understand the material if you can answer questions about it that you have not seen before. For this, it is important to understand the concepts. Remembering all the formulas is not enough. In particular, it is expected that you learn and remember the definitions and the statements of the theorems, and that you can provide examples of each concepts presented in class.

Medical Excuse Regulations: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Deans Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Deans Office immediately. For further information please see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Deans Office) for visits to Student Health Services. The form can be found here:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Exam Conflicts See the University's policy on exam conflicts:

http://www.uwo.ca/univsec/pdf/academic_policies/exam/conflicts.pdf

Here are the first two paragraphs:

A student who is scheduled to write more than two examinations in any 23-hour period may request alternative arrangements through the office of the dean of their faculty.

A student who is scheduled to write two examinations concurrently must notify the Registrar so that arrangements may be made for both examinations to be written in the Examination Conflict Room in a sequence established by the Registrar.

Please also let your instructor know about the conflict, and read the entire University policy.

Academic Offences: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 for any specific question regarding an accommodation.

Health and Wellness: As part of a successful 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 degree. Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.