ENGG*3700 Optimization
Fall 2013

UNIVERSITY of GUELPH

School of Engineering

(Revision 0: Sept 5, 2013)

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1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Instructor: Soha Eid Moussa, Ph.D., P.Eng.
Office: THRN 1341, ext. 56141
Email: smoussa@uoguelph.ca
Office hours: open door policy or by appointment

1.2 Lab Technician

N/A

1.3 Teaching Assistants

GTA	Email	Office Hours
Seyedfarhad Shafigh	sshafigh@uoguelph.ca	TBA on Courselink

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2 LEARNING RESOURCES

2.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the ENGG*3700 Courselink site. You are responsible for checking the site regularly.

2.2 Required Resources

1. Hamdy A. Taha *Operations Research An Introduction* Ninth Edition Prentice Hall, 2011

An electronic version of this book may be rented/accessed at the following web site:
http://www.coursesmart.com/IR/4030454/9780132555951?__hdv=6.8

2.3 Recommended Resources

N/A

2.4 Additional Resources

Lecture Information: All the lecture notes are posted on the web page (week #1-#12).

Assignments: Download the assignments, all the solutions will be posted.

Miscellaneous Information: Other information may be posted on the web page.

2.5 Communication & Email Policy:

Please use lectures and lab help sessions as your main opportunity to ask questions about the course. Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

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3 ASSESSMENT

3.1 Dates and Distribution

Midterm test 1: 25%
Wed Oct 9, 16:00-17:00, Room TBA on Courselink

Midterm test 2: 25%
Wed Nov 6, 16:00-17:00, Room TBA on Courselink

Final Exam: 50%
Fri Dec 6, 19:00-21:00, Room TBA on Webadvisor

3.2 Course Grading Policies

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please email the course instructor. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Missed midterm tests: If you miss a test due to grounds for granting academic consideration or religious accommodation, the weight of the missed test will be added to the final exam. There will be no makeup midterm tests.

Passing grade: In order to pass the course, you must obtain a grade of 50% or higher in the course.

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4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course serves as an introduction to combinatorics and optimization and discusses classical direct search-for-optimum methods for constrained optimization, including linear and quadratic programming, and others. Topics to be covered include: complexity theory, linear integer programming techinique, constrained/unconstrained optimization and heuristic search techniques such as tabu search, genetic algorithms, particle swarm optimization, simulated annealing and GRASP.

Prerequisite(s): CIS*1500, MATH*2130, MATH*2270

4.2 Course Aims

The main goal of this course is to help you learn how to determine the best choice among a set of alternatives.

4.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Utilize the Simplex Algorithm to solve Linear Programming Problems.
2. Utilize Branch and Bound technique to solve Integer Programming Problems.
3. Design a solution method and solve Dynamic Programming Problems.
4. Apply the appropriate optimization technique to optimize their system.
5. Concisely and articulately communicate the results of their optimization solution procedure.

4.4 Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

Graduate Attribute	Learning Objectives	Assessment
1. Knowledge Base for Engineering	-	-
2. Problem Analysis	1,2,3,4	Exams
3. Investigation	-	-
4. Design	3	Exams
5. Use of Engineering Tools	-	-
6. Communication	-	-
7. Individual and Teamwork	-	-
8. Professionalism	-	-
9. Impact of Engineering on Society and the Environment	-	-
10. Ethics and Equity	-	-
11. Environment, Society, Business, & Project Management	-	-
12. Life-Long Learning	1,2,3,4,5	-

4.5 Instructor's Role and Responsibility to Students

The instructor's role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and project.

4.6 Students' Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.

4.7 Relationships with other Courses & Labs

Previous Courses:

CIS*1500: Introduction to Programming

MATH*2130: Numerical Methods

MATH*2270: Applied Differential Equations

Follow-on Courses: N/A

5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures:

Monday	16:00 – 17:20	MACK 117
Wednesday	16:00 – 17:20	MACK 117

5.2 Lecture Schedule

The proposed schedule of topics is shown below.

Topic	Learning Objectives
What is Operations Research?	
Modeling with Linear Programming	1, 4, 5
The Simplex Method and Sensitivity Analysis	1, 4, 5
Duality and Post-Optimal Analysis	1, 4, 5
Integer Linear Programming	2, 4, 5
Dynamic Programming	3, 4, 5
Transportation Method	4, 5
Heuristic Programming	4, 5
Advanced topics	4, 5

5.3 Design Lab Schedule

N/A

5.4 Lab Schedule

N/A

5.5 Other Important Dates

Thursday, 5 September 2013: First class

Monday, 14 October 2013: Thanks giving holiday

Thursday, 31 October 2013: drop date – 40th class

Thursday, 28 November 2013: last class (Monday Schedule in effect)

Please refer to the undergraduate calendars for the semester scheduled dates.

6 LAB SAFETY

Safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. As a student in a lab course you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible

7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

A tutorial on Academic Misconduct produced by the Learning Commons can be found at:
http://www.academicintegrity.uoguelph.ca/

Please also review the section on Academic Misconduct in your Engineering Program Guide.

The School of Engineering has adopted a Code of Ethics that can be found at:
http://www.uoguelph.ca/engineering/undergrad-counselling-ethics

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or

accommodation, whether due to an identified, ongoing disability for a short-term disability should contact the Centre for Students with Disabilities as soon as possible

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.csd.uoguelph.ca/csd/