

APS1005: Operations Research for Engineering Management
Summer 2016

Course Description: This course introduces optimization techniques applicable in solving various engineering problems. These techniques are widely used in engineering design, optimal control, production planning, reliability engineering, and operations management. The contents of this course can be classified into two major categories: Modeling techniques and Optimization algorithms. Topics include linear programming, network programming, integer programming, dynamic programming, and decision making under uncertainty. Widely available software will be used for numerically solving linear, network and integer programming models.

Lecturer: Daniel Frances (frances@mie.utoronto.ca)

Reference: Operations Research - Applications and Algorithms
by Wayne L. Winston, 4th Edition. 2004

Participation by Incoming students: Students accepted into the MIE graduate program starting Fall 2016, can also participate and receive credit for APS1005 by following the attached instructions

Course Duration and Format: For the first time the course can be accessed over the Internet, to allow wider participation by students. Video lectures are posted daily August 2nd-5th and 8th-12th. Students are expected to do problems between video postings, and to participate in the daily 4-5 pm EST tutorial session in person. Remote students will be able to participate in the daily tutorials through the internet in real time. Students submit a daily assignment online, and write an in-person final exam 9-12 Tuesday August 16, or Friday September 30th.

Required Software to Complete Assignments: Microsoft Excel with Solver Add-In.

Daily Tutorials: 4-5 pm in RS211 (Online access for remote students)

Marking: Daily Assignments (Submitted online) 50%
In-person Final Exam 9-12 Aug 16th or Sep 30 50%

<u>Day</u>	<u>Date</u>	<u>Topic</u>	<u>Ref</u>
1	02-Aug	Linear Programming (LP) Formulations & Software	Ch 3
2	03-Aug	Network Problem (NP) Formulations & Software	Ch 7-8
3	04-Aug	Integer Programming (IP) Formulations & Software	Ch 9
4	05-Aug	Dynamic Programming Formulations and Algorithm	Ch 18
	06-Aug		
	07-Aug		
5	08-Aug	LP Solution Algorithm	Ch 4
6	09-Aug	LP Postoptimality Analysis	Ch 5-6
7	10-Aug	NP Solution Algorithm	Ch 7-8
8	11-Aug	IP Solution Algorithm	Ch 9
9	12-Aug	Decision Analysis	Ch 13



Mechanical & Industrial Engineering UNIVERSITY OF TORONTO

March 17, 2016

Access to APS1005 – Introduction to Operations Research BEFORE the Fall term.

Dear Incoming MIE Students,

APS1005 is an introductory course for grad students interested in Operations Research offered each Summer. This year it is being offered August 2-12. The course is structured to develop your modeling skills, teach the basic OR methods and software for solving models

For many years it has been a pre-requisite for a number of our Operations Research courses, yet not accessible to students until the summer after the first year! To remedy the situation

- APS1005 is being ported to be accessible on-line
- Incoming students will be able to participate in the course
- Students that participated will be able to get course credit upon MIE registration

If you have never taken an Operations Research course, or if you need a refresher, we highly recommend you take advantage of this opportunity:

1. Send in the attached form and Participation Fee by Friday July 1, 2016. The fee is fully refunded in early October, to all students registered in MIE by end of September.
2. Access the course Website using a **temporary UTORid** to be provided and used **for this course only**. It is an on-line course plus daily in-person tutorial sessions, to help you solve the more challenging problems. (Note that your temporary UTORid for this course will be different from your JOINid. Your JOINid turns into your permanent UTORid.)
3. If you wish to receive credit for the course, submit an APS1005F Course-Add form to the MIE grad office by Friday September 23, 2016. (No APS1005F withdrawals after that date). 50% of your mark will be based on your daily on-line assignment submissions during the course, and 50% of your mark will be based on a final exam on Friday Sept 30, 2016.

For further questions, please contact Professor Daniel Frances (frances@mie.utoronto.ca).

Sincerely Yours,

Professor Chi-Guhn Lee
Associate Chair of Graduate Studies, MIE.

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Tel: +1 416 946-7435 • frances@mie.utoronto.ca

APPLICATION FORM TO PARTICIPATE IN
APS1005 – Introduction to Operations Research
August 2-12, 2016
Department of Mechanical and Industrial Engineering
University of Toronto

This form is intended for applicants who are not yet registered students at the University of Toronto and who wish to participate in APS1005 Summer 2016.

The fee for participating in the course is \$1,000.00 for domestic students, and \$2,000 for international students. The fee can be paid by:

1. Certified cheque or money order from a Canadian Bank made payable to the "University of Toronto" and forwarded to the Graduate Studies Office, Department of Mechanical and Industrial Engineering, University of Toronto, 5 King's College Road, Toronto, Ontario, Canada M5S 3G8 before July 1, 2016.
2. Wire transfer (See attached Instructions for Wire Transfers). Students are responsible to ensure the funds arrive in the University of Toronto account by July 1, 2016.

A full refund of the Participation Fee will be made only if the applicant is a registered MIE student by September 30, 2016.

Applicants are also given the option to receive credit for the course, by submitting an APS1005F Course-Add form to the MIE grad office by Friday September 23, 2016. (No APS1005F withdrawals are permitted after that date). 50% of the grade will be based on the daily on-line assignment submissions during the course, and 50% of the grade will be based on a final exam on Friday Sept 30, 2016.

1) Full Name: _____

2) E-mail Address: _____

Date: _____ Signature: _____

For Departmental Use:

Amount Received: _____

The University of Toronto respects your privacy. The information on this form is collected pursuant to section 2(14) of the University of Toronto Act, 1971. It is collected for the purpose of administering admission, registration, academic programs, university-related student activities, activities of student societies, financial assistance and awards, graduation and university advancement, and for the purpose of statistical reporting to government agencies. At all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. If you have questions, please refer to www.utoronto.ca/privacy or contact the University's Freedom of Information and Protection of Privacy Office at 416 946-5385, Room 201, McMurich Bldg., 12 Queen's Park Crescent, Toronto, ON, M5S 1A1

Instructions for Wire Transfers

Beneficiary name: The Governing Council of the University of Toronto

Beneficiary's address: 215 Huron Street, Toronto, ON

Beneficiary's Bank Account: 41-12415

Institution Number: 010

Branch Number: 00002

Bank: Canadian Imperial Bank of Commerce

Bank address: 199 Bay Street, Toronto, ON

SWIFT: CIBCCATT

ABA/Routing number: CC001000002