Outline for SFWR ENG 4TE3 - COMP SCI 4TE3 (6TE3) Continuous Optimization

The course introduces formulations, algorithms, and engineering and science applications of continuous optimization. The applicability of the introduced algorithms and their computational performance are highlighted.

Introduction to Optimization:

- Generic frame of optimization algorithms
- Elementary convex analysis
- Classification of continuous optimization problems

Unconstrained Optimization:

- Derivative-free (black-box) algorithms
- Line-search methods
- Gradient methods
- Newton and trust region methods
- Algorithms based on conjugate directions

Constrained Optimization:

- Linear optimization:
    - Pivoting algorithms
    - Interior point methods
- Convex quadratic optimization
- General nonlinear optimization problems:
    - Duality theory
    - Reduced gradient methods
    - Barrier methods

[Learning objectives, indicators, and rubrics](#)
The course introduces formulations, algorithms, and engineering and science applications of linear optimization. The applicability of the introduced algorithms and their computational performance are highlighted.

1 - Introduction to Linear Optimization
2 - Mathematical Models for Linear Optimization
3 - Geometric Analysis of Linear Optimization
4 - Simplex Method

5 - Dynamic Programming
6 - Combinatorial Optimization on Graphs
7 - Network Flow
8 - Integer Programming
9 - Polynomial vs Strongly Polynomial

[Learning objectives, indicators, and rubrics](#)

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and ac ademic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious co nsequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](#), located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

The following illustrates only three forms of academic dishonesty:

• plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
• improper collaboration in group work.
• copying or using unauthorized aids in tests and examinations.

Authenticity / plagiarism detection

Some courses may use a web-based service ([Turnitin.com](#)) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to [Turnitin.com](#) or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by [Turnitin.com](#)) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of [Turnitin.com](#) please go to [Academic Integrity](#).

Courses with an on-line element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and pro gram affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that us es on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and rec ord their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before t he test/exam begins.

Conduct expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and w orking communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions th at adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or remov al of the involved students' access to these platforms.

Academic accomodation of student with disabilities

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or `sas@mcmaster.ca` to make arrangements with a Program Coordinator. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities](#) policy.

Request for relief for missed academic term work

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the [Undergraduate Calendar](#) "Requests for Relief for Missed Academic Term Work".

Academic accomodation for religeous, indigenous or spiritual observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accom modation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for cla sses, assignments, and tests.

Copyright and recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please spe ak with the instructor if this is a concern for you.

Extreme circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.