

# Math\*4060 Topics in Mathematics II

## Department of Mathematics and Statistics

### Course Outline

Fall 2018 Course

	Name	Office	e-mail
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Office Hours: *see*: <http://eldar.mathstat.uoguelph.ca/dashlock/>

### Course Description:

**Prerequisites:** Math 3200, but this pre-requisite is not needed for this edition of math 4060.

**Restrictions:** None.

**Course Objectives:** The course covers advanced topics not covered by other mathematics courses. This year's edition of the course introduces students to *evolutionary computation*. The course will outline the basics of selectionist, population based algorithms. The issues of representation of problems for computational search and parameter tuning will be covered in detail. Students will learn to reason about selectionist systems with an emphasis on designing practical problem solving algorithms. A final project will cement students understanding of the discipline.

**Meeting Times:** MWF 11:30-12:20 in MacKinnon 308.

**Text:** online lecture notes.

#### Evaluation:

Eight homeworks	50%
Three small projects	30%
Final project	20%

### Course Topics, by Week

Week	Topic	Evaluation
Jan 8	The Scope of evolutionary computation	HW 1
Jan 15	Linear representations, onemax and SAW	HW 2
Jan 22	Real parameter optimization, alternate representation	Project 1
Jan 29	Ordered genes, traditional and random key reps.	HW 3
Feb 5	The generative adaptive representation	HW 4
Feb 12	State conditioned representations	Project 2
Feb 19	<b>Winter break, please rest up</b>	
Feb 26	Shaped representations	HW 5
Mar 5	Alternate algorithms, differential evolution	HW 6
Mar 12	Geographic algorithms and taxonomy	Project 3
Mar 19	Genetic programming and regression	HW 7
Mar 26	Virtual robotics	HW 8
Apr 2	Presentation of final projects	Draft final project

**The final project is due Wednesday April 18th.**

## Rights and Responsibilities

**Check your University E-mail** We mostly put stuff on course link for this course but emergencies and big changes may get to you first via the university e-mail. If you don't check the e-mail and miss something its is officially not our fault (tm).

**Keep Copies of Everything** Sometimes homeworks get lost and quiz grades are not recorded correctly. Please keep copies of any assignments you hand in and keep a folder with all your work in case there is a problem.

**Accommodation and use of the SAS exam center** Students requiring accommodation must register with SAS to receive accommodation. Examinations in the SAS center must be booked at least a week in advance and before the 40th day of class (Friday March 9th; Drop day). **This class has no timed exams.**

**Conflicts with Midterms in Other Courses.** Sometimes students will have a conflict between a midterm exam in another course and either a lecture or a lab in this course. The University has a very clear policy to cover this situation: the regularly-scheduled lecture or lab holds priority. In other words, it is the responsibility of the faculty member who has scheduled the midterm exam to make special arrangements with students who have conflicts. This policy is stated explicitly in the 2017-2018 Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/2017-2018/>

in Section VIII–Undergraduate Degree Regulations and Procedures under the heading *Examinations* (sub-heading *Mid-Term Examinations*).

**Attendance: Illness, etc.:** Attendance is, of course, very important. If you miss class because of illness or for compassionate reasons, please see the instructor for possible academic consideration.

<http://www.uoguelph.ca/registrar/calendars/undergraduate/2017-2018/>

– go to *Section VIII Undergraduate Degree Regulations and Procedures*, and click on the heading *Academic Consideration, Appeals and Petitions*.

**Collaboration:** Collaboration on homework and the three small projects is strongly encouraged – but the material turned in must be your own. If material is jointly developed, the name of collaborators must be clearly stated at the beginning of the evaluation. The final project is intended to be solely the work of the single student whose name appears on it.

**Course Feedback:** The sponsoring department require student assessments of all courses taught by the departments. These assessments provide essential feedback to faculty on their teaching by identifying both strengths and possible areas of improvement. In addition, annual student assessment of teaching provides part of the information used by the department's Tenure and Promotion Committee in evaluating the faculty member's contribution in the area of teaching. The department's teaching evaluation questionnaire invites student response both through numerically quantifiable data, and written student comments. In conformity with University of Guelph Faculty Policy, the department's Tenure and Promotions Committee **only considers comments signed by students (choosing "I agree" in question 14)**. Your instructor will see all signed and unsigned comments after final grades are submitted. Written student comments may also be used in support of a nomination for internal and external teaching awards. NOTE: No information will be passed on to the instructor until after the final grades have been submitted.

**Electronic Recording of Classes:** The electronic recording of classes is expressly forbidden without the prior consent of the instructor. This prohibition extends to all components of the course, including, but not limited to, lectures, tutorials, and lab instruction, whether conducted by the instructor or teaching assistant, or other designated person. When recordings are permitted

they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

### **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 offenses 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 offense should consult with a faculty member or faculty advisor. The **Academic Misconduct Policy** is detailed in the Undergraduate Calendar:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/2015-2016/c08/c08-amisconduct.shtml>

### **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 or a short-term disability should contact Student Accessibility Services as soon as possible. For more information, contact **519-824-4120 ext. 56208** or email [sas@uoguelph.ca](mailto:sas@uoguelph.ca) or see the website: <https://wellness.uoguelph.ca/accessibility/>

### **Drop date**

The last date to drop one-semester courses, without academic penalty, is Friday, March 9th, 2018. For regulations and procedures for Dropping Courses, see the Academic Calendar:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/2017-2018/c08/c08-drop.shtml>