

# Course Outline

## MATH 377: Mathematical Modeling

January--April 2019

**Instructor** Junling Ma ([junlingm@uvic.ca](mailto:junlingm@uvic.ca), Office David Turpin Building A536)

**Research Area** Mathematical modeling of the evolution, spread and control of infectious diseases, and other ecological problems.

### General Course Information

**Number of Units** 1.5

**Pre-requisites** MATH 110 or MATH 211; and MATH 200 or MATH 205; and MATH 201 or MATH 204; and one of STAT 252, STAT 254, STAT 255, STAT 260.

### Office Hours and Assistance

**Office hours** Mondays and Wednesdays 1:00 – 2:00PM or by appointment (send email to book one)

**Math Club** Students in Undergraduate Mathematics and Statistics (SUMS) was founded in 2014 as the reincarnation of a previous undergraduate course union that had been inactive for a few years. Please see <http://www.uvic.ca/science/math-statistics/current-students/undergraduate/sums/index.php> for more information.

### Learning Objectives

Understand how to setup mathematical models to describe financial, economic, biological, and other problems (e.g., chemical, engineering, and traffic problems). Conduct mathematical analysis on the models, and interpret the results.

### Course Materials and Online Resources

**Textbook** Giordano, Fox and Horto, *A First Course in Mathematical Modeling, Fifth Edition*, Brooks/Cole.

**Course webpage** Course materials are available on CourseSpaces.

### Class Meetings

Mondays and Thursdays at 11:00—12:50 in CLE C112.

## Evaluation and Grading

**Assignments:** There will be 6 assignments due on Thursdays of the week indicated in the course schedule. The highest 5 will be counted towards the course total. They will be posted a week before the due date.

**Midterm exam:** There will be one take-home midterm exam due on Wednesday February 27<sup>th</sup>. No make-up exam is available.

**Final exam:** A 3-hour final exam will be scheduled during the final exam period.

Your final percentage grade will be computed according to the following scheme.

Homework Assignments	Midterm project	Final Exam
30%	30%	40%

**Missing work** If you have a legitimate reason to miss an assignment, the other assignments will be reweighed to cover the missed one. If you have a legitimate reason to miss the midterm, the assignments will be reweighed as 40% and the final exam as 60%.

Off-schedule final examinations (i.e., deferred examinations) are given only in accordance with the university policy as outlined in the Calendar. If you are unable to write a final examination due to illness, accident or family affliction, please refer to the following webpages for detailed instructions how to proceed: <http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/concessions.html#>

Students are strongly advised not to make plans for travel or employment during the final examination period as special arrangements will not be made for examinations that conflict with such plans.

**Accessibility** Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Resource Centre for Students with a Disability (RCSD) as soon as possible. The RCSD staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations <http://rcsd.uvic.ca/>. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

**Supplemental Examinations.** The Department of Mathematics and Statistics does not award 'E' grades or offer Supplemental Examinations in any of its courses.

## Policies and Ethics

**Attendance** The university Calendar states 'Students are expected to attend all classes in which they are enrolled.' Our courses are conducted on that basis. If you miss an announcement (information concerning midterms, corrections to assignment, etc.) because you did not attend class, you must accept the consequences of not having

learned of the change. (see <http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/attendance.html#>).

**Guidelines on Religious Observances** Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

**Academic Integrity** Academic integrity is intellectual honesty and responsibility for academic work that you submit individual or group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offenses.

**The responsibility of the institution**

Instructors and academic units have the responsibility to ensure that standards of academic honesty are met. By doing so, the institution recognizes students for their hard work and assures them that other students do not have an unfair advantage through cheating on essays, exams, and projects.

**The responsibility of the student**

Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them. If you are unsure about the standards for citations or for referencing your sources, ask your instructor. Depending on the severity of the case, penalties include a warning, a failing grade, a record on the students transcript, or a suspension.

It is your responsibility to understand the University's policy on academic integrity:  
<http://web.uvic.ca/calendar2017-01/undergrad/info/regulations/academic-integrity.html#>



## Course Schedule (Dates are approximate)

Week	Lecture	Assignments and Midterm
Jan 07	Chapter 1: modeling changes	
Jan 14	Chapter 2: mathematical models, proportionality	HW #1 (Thu Jan 17)
Jan 21	Chapter 3: model fitting	
Jan 28	Chapter 4: experimental modeling	HW #2 (Thu Jan 31)
Feb 04	Chapter 5: simulation modeling	
Feb 11	Chapter 6: discrete probabilistic modeling	HW #3 (Thu Feb 07)
Feb 18	Reading Break, no classes	
Feb 25	Chapter 7: linear Programming	<b>Take-home Midterm hand out on Mon Feb 25<sup>st</sup> due on Wed Feb 27<sup>th</sup></b>
Mar 04	Chapter 8: graph theory models	HW #4 (Thu Mar 07)
Mar 11	Chapter 9: decision theory models	
Mar 18	Chapter 10: Game theory	HW #5 (Thu Mar 21)
Mar 25	Chapter 11: differential equation models	
Apr 01	Chapter 12: systems of differential equations	HW #6 (Thu Apr 04)

