

# Chemistry 4010/Biochemistry 4850

## Nonlinear Dynamics for (Bio)Chemists

### Fall 2019

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**Course web site:** <http://people.uleth.ca/~roussel/C4010nonlin>  
**Moodle:** <https://moodle.uleth.ca>

### Course prerequisites

The prerequisites for this course are **Mathematics 1410**, **Mathematics 2560/5**, and a course with some differential equations (e.g. CHEM 2740).

### Textbook

*Nonlinear Dynamics: A Hands-on Introductory Survey*, by Roussel. An electronic copy of the book is available in the class Moodle site. The textbook is for your personal use and is not to be shared by any means, physical or electronic.

### Email

Important information will frequently be communicated to the class via email. It is *your responsibility* to keep an eye on your email during the term.

### Office hours

**I strongly encourage office visits** to clarify any material with which you are having difficulty. I operate on an open-door basis: If I'm in, you are welcome to stop in to ask questions. However, because other commitments frequently have me away from my office, to avoid frustration, *I recommend that you email ahead or talk to me before or after class so we can agree on a time for us to meet.*

### Grading scheme

| Evaluation type | Weight | Date   |
|-----------------|--------|--------|
| Assignments     | 40%    |        |
| Test 1          | 15%    | Oct. 8 |
| Test 2          | 15%    | Nov. 5 |
| Final exam      | 30%    | TBA    |

Changes to the in-class test dates will only be made if absolutely necessary, and will be announced by email and posted on the course web site at least two weeks in advance of the test.

If you miss one of the in-class tests, you will receive a grade of zero unless you have a medical or other equally serious, documentable reason. **It is your responsibility to notify me.** You should be prepared to present appropriate documents on request to support any claims you make with respect to a missed test. If you do miss an in-class test with a valid reason, the weight of the final exam will be increased by the weight of the missed test.

The University is responsible for the scheduling of the final exam, which will be announced in due course. Arrangements for rescheduling the final exam, if missed for a reason beyond your control, are handled by the Faculty of Arts and Science.

## Conduct of exams

All exams will be conducted in a computer lab and will include a mixture of questions that require computer calculations and of pen-and-paper questions.

You can bring *handwritten* notes to the exams. There is no page limit. Index cards, looseleaf paper and notebooks are all permitted.

In-class tests will have a duration of two hours, with the remainder of the lab period devoted to instruction. The final exam will have a duration of three hours.

## Labs and assignments

Labs will combine instruction with time to work on the assignments, which will be handed out in the lab each week. Thus, you should expect weekly assignments, with some variance to this schedule around exam dates. My intention is that, most weeks, you would have time to get a good start on the assignment in the lab, perhaps even completing much of the technical (computer or mathematical) work before you leave.

## Syllabus

The course will closely follow the textbook, covering roughly one chapter per week. We may or may not have time to cover the entire book.

In addition, the graduate students registered in the course will each present one lecture at the end of the course. This material will also be examinable. Notes prepared by the graduate student will be provided for each lecture.

Nonlinear dynamics is a subject best studied using a combination of analytical mathematics and computer calculations. All the software you need is installed in the Linux labs on level 5 of University Hall (C513 and D519). All of the software chosen, except Maple, is free and can be installed on your home computer or laptop. The textbook provides some information on installing this software. Because of the wide variety of computers out there, I am only able to offer limited technical support, but I will do my best to help if you have trouble installing or running the software. I am most likely to be able to help you if you have a laptop that you can bring to me.