

COURSE OUTLINE

Math 492/550: Topics in applied mathematics (fluid dynamics and nonlinear dynamics)

Instructor

Lecturer David Goluskin, Assistant Professor

Research Area Nonlinear differential equations, computational methods, fluid dynamics

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Office David Turpin Building A539

General Course Information

Number of Units 1.5

Pre-requisites Introductory PDEs (e.g. MATH 346), basic programming/computation

Office Hours (subject to change)

Monday 3:30 pm to 5:00 pm, DTB A539

Wednesday 1:00 pm to 2:30 pm, DTB A539

By appointment Email to schedule.

Learning Objectives

- To learn the basic physics and mathematics of fluid mechanics
- To learn a variety of techniques for studying nonlinear ODEs and PDEs
- To apply analytical and computational methods to nonlinear ODEs and some PDEs
- To understand chaos and turbulence from the perspective of dynamical systems

Course Material and Online Resources

Textbook There is no textbook. I will provide typed lecture notes on the course webpage.

Course webpage <http://web.uvic.ca/~goluskin/math492>

¹I will respond to all emails but not always immediately. Questions that are not simple should be asked at office hours instead.



Class Meetings

Lectures are MTh 1:00-2:20 PM in Clearihue Building A302. Lectures run January 3 through April 5. There is no tutorial.

Specific Topics

Some of the topics I plan to cover are the following.

- PDEs of fluid dynamics
- Introduction to functional analysis
- Linear instability
- Bifurcations
- Nonlinear stability
- Estimating time averages
- Existence and regularity of solutions

Evaluation and Grading

Evaluation will be based 100% on biweekly homework assignments. There will be no exams.

Grading Percentage scores will be converted to letter grades according to the university-wide standard table.

Undergraduate:

<http://web.uvic.ca/calendar2018-01/undergrad/info/regulations/grading.html>

Graduate:

<https://web.uvic.ca/calendar2018-01/grad/academic-regulations/grading.html>

Policies and Ethics

Attendance If you miss an announcement because you did not attend class, you must accept the consequences. Find out from your classmates what you missed.

Guidelines on Religious Observances If you plan to miss a class in which homework is due, you must make arrangements to hand in the homework at an earlier time.

Missing work If you have a valid reason for not handing in a homework assignment on time (such as illness), make arrangements to hand it in as soon as possible.



Academic Integrity You are encouraged to discuss homework assignments. The work you hand in must be written by you and must reflect your own understanding.

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:

Undergraduate:

<http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html>

Graduate:

<http://web.uvic.ca/calendar/grad/academic-regulations/academic-integrity.html>

Course Schedule (subject to change)

16/1/18	Last day to drop with 100% fee reduction
18/1/18	Homework 1 due
1/2/18	Homework 2 due
6/2/18	Last day to drop with 50% fee reduction
12–16/2/18	Reading break (no lecture or office hours)
22/2/18	Homework 3 due
28/2/18	Last day to drop without failure
8/3/18	Homework 4 due
22/3/18	Homework 5 due
2/4/18	Easter (no lecture or office hours)
5/4/18	Homework 6 due, last lecture.

