Course Outline
MATH 348: Numerical Methods
Fall 2019, CRN 12188

Instructor

Lecturer David Goluskin

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

MATH 110 or MATH 211
One of MATH 200 and MATH 201, MATH 200 and MATH 204, or MATH 202
Basic programming ability

Note Credit will be granted for only one of MATH 348, CSC 340, CSC 349A.

Office Hours

Tuesday 2:30–3:20 and Wednesday 1:30–2:20, both in CLE A103.²

By appointment Email to schedule. No unscheduled drop-ins please.

Learning Objectives

• You will be introduced to scientific computing: the computing of approximate numerical solutions to math problems that are too complicated to solve exactly “by hand”. The vast majority of problems encountered in the practice of science, engineering, and even mathematics are of this type.

• You will learn computational methods for solving various common types of math problems, as well as how to analyze the performance of these methods in terms of both precision and computational efficiency.

¹Please use email only for administrative issues or simple clarifications. Mathematical questions should be asked in office hours instead. I respond to all emails. If you don’t get a response within two days, it is probably an issue with the UVic spam filter. If you suspect this, tell me in person about your email and/or email from a different address.

²This location is a computer lab, not my office. A couple of times during the semester the location will be different, which I will announce by email.
• You will implement computational methods by programming in Python.

Course Material and Online Resources

Textbook  The recommended textbook is *Numerical Analysis* by Timothy Sauer (3rd edition, or an earlier edition). Most course material is standard and can be found in other textbooks also.

Course webpage  To be decided.

Calculator  No calculators will be allowed on exams.

Class Meetings

Lectures are TWF 12:30–1:20 PM in Cornett Building A229, September 4 through December 4. There is no tutorial.

Specific Topics

The following is an approximate outline of topics in chronological order. Time permitting, a final topic will be chosen by the class.

• Review of Python syntax and mathematical topics
• Interpolation (chapter 3)
• Numerical differentiation and integration (chapter 5)
• Fundamentals (chapter 0)
• Algebraic equations in one variable (chapter 1)
• Systems of algebraic equations (chapter 2)
• Ordinary differential equations (chapter 6)

Evaluation and Grading

To pass the course, the average of your three exam scores must be at least 40%. If so, your grade will be determined by the following scheme.

<table>
<thead>
<tr>
<th></th>
<th>Homework</th>
<th>Midterm 1</th>
<th>Midterm 2</th>
<th>Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 18</td>
<td>40%</td>
<td>15%</td>
<td>15%</td>
<td>30%</td>
</tr>
<tr>
<td>Nov. 15</td>
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</table>

| TBA      |          |           |           |            |
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 Centre for Accessible Learning (CAL) as soon as possible. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations http://uvic.ca/cal. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Grading  Percentage scores will be converted to letter grades according to the university-wide standard table.
Undergraduate:  
http://web.uvic.ca/calendar2019-09/undergrad/info/regulations/grading.html
Graduate:  
http://web.uvic.ca/calendar2019-09/grad/academic-regulations/grading.html

Final Examination  Do not make travel plans for the final examination period until the final exam has been scheduled. Off-schedule final 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:
Undergraduate:  
http://web.uvic.ca/calendar2019-09/undergrad/info/regulations/concessions.html
Graduate:  
http://web.uvic.ca/calendar2019-09/grad/registration/concessions.html

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  If you miss an announcement because you did not attend class, you must accept the consequences. Find out from your classmates what you missed. Please do not ask me to catch you up.

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.

Missing work  If you miss one midterm for a valid reason, the other midterm will count for 20%, and the final will count for 40%. There will not be a makeup midterm. If you miss a homework assignment for a valid reason, your homework grade will be based on the other assignments. If you miss more course components than this, accommodations will be dealt with case-by-case and are not guaranteed.
Academic Integrity  You are encouraged to discuss homework assignments. The work you 
hand in, including computer code, 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 aca-
demic 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 under-
stand the University’s policy on academic integrity:
Undergraduate:  
html
Graduate:  
http://web.uvic.ca/calendar2019-09/grad/academic-regulations/academic-integrity. 
html

Course Schedule

The following is a tentative schedule. It is very likely that some homework dates will change.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/9/19</td>
<td>Homework 1 due</td>
</tr>
<tr>
<td>17/9/19</td>
<td>Last day to drop with 100% fee reduction</td>
</tr>
<tr>
<td>20/9/19</td>
<td>Homework 2 due</td>
</tr>
<tr>
<td>4/10/19</td>
<td>Homework 3 due</td>
</tr>
<tr>
<td>8/10/19</td>
<td>Last day to drop with 50% fee reduction</td>
</tr>
<tr>
<td>15/10/19</td>
<td>Homework 4 due</td>
</tr>
<tr>
<td>18/10/19</td>
<td>Midterm 1</td>
</tr>
<tr>
<td>29/10/19</td>
<td>Homework 5 due</td>
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<tr>
<td>31/10/19</td>
<td>Last day to drop without failure</td>
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<tr>
<td>8/11/19</td>
<td>Homework 6 due</td>
</tr>
<tr>
<td>11–13/11/19</td>
<td>Reading break (no lecture or office hours)</td>
</tr>
<tr>
<td>15/11/19</td>
<td>Midterm 2</td>
</tr>
<tr>
<td>27/11/19</td>
<td>Homework 7 due</td>
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<tr>
<td>4/12/19</td>
<td>Homework 8 due</td>
</tr>
<tr>
<td>4/12/19</td>
<td>Last lecture</td>
</tr>
<tr>
<td>7–20/12/19</td>
<td>Final exam will be during this period</td>
</tr>
</tbody>
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