



ECON 549 A01 (CRN 21059)

Computational Economics

Winter Session: 2025 01 – CRN 21059, Unit Value 1.5, Contact hours: classes 3.0, labs 1.0. Course schedule: Tuesday, Friday, 9:00am–10:20am, BEC Building, Room 363. Labs: Tuesday, 2:30pm–3:20pm, Clearihue Building, Room A30. Updated December 10th 2025.

UVic Land Acknowledgement

We acknowledge and respect the Ləkʷəŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Ləkʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

Instructor Name: Marco Cozzi

Office: BEC 368

Method of contact: E-Mail, mcozzi_@_uvic.ca (For legitimate questions and concerns, I'll get back within two business days).

Office Hours (in person): Monday: 2:30pm–3:15pm, Thursday: 5:00pm–5:45pm

TA Name: TBA

Office: TBA

Email: TBA

Office Hours: TBA

Teaching and assessment modality statement

This course is face to face and all exams are held in person.

Course Content

Calendar Description: An introduction to numerical methods and their application in economics.

The course is an introduction to numerical methods and their application in economic analysis. Steady advances in computer technology and numerical methods have changed the practice of economic science: computational skills are now an essential part of an economist's toolkit. The aim of the course is to expose students to some of the major themes and challenges of computational economics. This will involve problem-solving activities that require the numerical solution of a number of economic models, such as the AD-AS model, Cournot games, and non-linear econometric models. We will study in detail a number of economic applications, with a focus on the quantitative rather than qualitative analysis of an economic problem of interest. Moreover, students may be engaged in critical assessments of computational economics research. In the course, students will learn Python. No prior extensive programming experience is assumed or required.

Learning Outcomes

Students will be able to:

- *Master a set of key computational methods (e.g., optimization and simulation)*
- *Write sophisticated Python codes, working with a number of popular Python libraries/modules*
- *Use applied mathematical tools to numerically solve microeconomic, macroeconomic and statistical models*
- *Analyze complex economic issues, using realistic models*
- *Manipulate data to identify interesting patterns and empirical facts, and perform estimation*
- *Perform formal quantitative evaluations of policy reforms*
- *Apply critical thinking to interpret quantitative economic outcomes*
- *Understand the pros and cons of the economics literature based on numerical analysis*

Course prerequisites/corequisites

Recommended prerequisite: ECON 545 (or equivalent advanced undergraduate course).

Textbook/Software

Textbook: There is no required textbook for the course. However, the book *Applied Computational Economics and Finance*, by M. Miranda and P. Fackler (MIT Press, 2002) is recommended. The paperback edition is reasonably priced, and it is very useful for students wanting to specialize in this field. The exercises and examples included in that book rely on MATLAB, a programming language that we will not use. Currently, an electronic version is not available.

A former PhD student and I translated into Python all the codes that will be needed. Moreover, we included all the essential material in several Python notebooks, which will be distributed during the term. For a more comprehensive treatment, please refer to the book.

Software: Python is the required programming language for the course. In order to successfully complete this course, you must be able to run a version of Python 3.5 (or higher) on a computer you have easy (and frequent) access to. There are two ways to do so. Using Anaconda is highly recommended, while the other option might work as a temporary fix.

1) Install Python and Jupyter (Lab or Notebook) with Anaconda, a free software (for students) that automatically links a number of packages and libraries we will heavily rely on:

<https://www.anaconda.com/download>

Ideally, you should do this before the course will start. Given the typical class size, and the different operating systems the students use, I will not be in a position to provide help with the software installation (for example, I am not a Mac user). Please, do get in touch with the computer help desk instead (helpdesk@uvic.ca):

<https://www.uvic.ca/systems/services/contact/>

MS Windows users should be aware that, after the installation is complete, they might have to run Jupyter as an administrator. The many Linux installations I tried worked fine.

2) The other (temporary) solution is to use the free web interface of Python and Jupyter maintained by Google (only a Google account is needed, but the drawback is that some important features cannot be enabled):

<https://cybera.syzygy.ca/>

Brightspace

Brightspace is used extensively for the course. All students are expected to be fully functional with the system. The lecture notes will be posted in *Brightspace*. Please note that the lecture notes online are only outlines of the actual lectures.

All announcements will be posted in *Brightspace*. Students are advised to check it frequently.

Course Structure, Assessments, and Grading

Use of AI

In this course, you are authorized to make use of generative AI (GenAI) such as ChatGPT. You can work with GenAI in all the assessed course components, i.e. both in the assignments and in the final project or take-home exam.

In order to not violate academic integrity, in your answers you must declare that you used ChatGPT (or other GenAI), and how you used it.

Minimum Grade Requirements

Faculty of Graduate Studies policies apply.

Grading

Grading Scheme

The grade for the course is determined as follows:

Assignments (4): 50% (four assignments submitted, and graded, each worth 12.5%).

Final Project (timed): 40%.

Participation: 10% (attendance taken randomly and engagement in class).

Assignments: They are designed for the students to learn the course material in depth. They will be posted on Brightspace and submitted in the dedicated drop-boxes before their deadline. Students are encouraged to discuss with other classmates how to answer them. However, every student must submit their own work, independently written up, and list all people they worked with in the first page. During the term, there will be 4 assignments. All of them must be submitted (with a serious attempt at solving each question, otherwise at least 10 points will be deducted from the overall grade). Answers must be submitted in specific file formats, and further details will be provided during the term. Each assignment will count 12.5% towards the final grade. Note: if caught copying other students' answers, the assignment will receive a grade of 0, which will be counted directly in the overall grade for the course. In addition, the standard procedures pertaining Academic Integrity will be initiated.

The quality of both the codes and the economic interpretation of the numerical results will form the basis for the assignment grades. In the first part of the course, a higher weight will be placed on the programming component, to reward the students' efforts in learning this challenging task.

Midterm: There is no midterm exam for this course.

Attendance: I will randomly select approximately 10 lectures where I will take attendance. If you cannot attend a lecture because of a valid reason, e.g. you are sick, please notify me by email before the start of the lecture. Excused absences will not affect your attendance score.

Final Project: There will be a (take-home) timed project, taking place in the April examination period. It will be handled via Brightspace. From the moment it will be circulated, the students will have at most one day to answer it. It will cover the material presented in the whole course. It will be open-book, but students must work by themselves on each of its components. UVic's rules about cheating and plagiarism do apply. The printouts of the codes used to generate the results must be submitted, and students might be asked to briefly explain them in dedicated Zoom meetings. Unless agreed otherwise, the final exam scheduled by the University will be the day when the answers must be submitted.

The project must be submitted in a specific format, and further details will be provided in due time. Without illness or affliction, no extensions will be granted on the final project. If the final project is submitted late, points will be deducted per minute past the due date/time.

The quality of both the codes and the economic interpretation of the numerical results will form the basis for the assessment of the project. Since most economics students are hired based on the quality of the analysis they can perform, correct codes paired with comments that are lacking cannot receive high marks.

Grade concerns should be brought to the instructor as soon as possible. The grades of each assessment component are final after one week of being distributed. Students requesting to view their final projects must do so in writing and must request it within one week of the grades being posted.

Mandatory/Essential Course Components

Submitting all assignments is mandatory. Also, failure to submit the final exam will result in a grade of N, regardless of the cumulative percentage on the course. N is a failing grade and factors into GPA as a value of 0.

Dates of Assessments, Due Dates of Assignments

Note: it is the student's responsibility to submit assignments in a timely fashion. Unless a student has a CAL accommodation, or an approved in-course extension, there will be no flexibility on when the assignments are due (or on how to submit them).

Assignments (tentative) Due Dates: The tentative deadlines are January 29th, February 26th, March 19th, and April 2nd. There may be some changes if necessary.

Final project: The day the project will be due could be scheduled by the University. It is cumulative, namely it covers the material presented in the whole course.

Grading Scale

A+	90-100%
A	85-89%
A-	80-84%
B+	77-79%
B	73-76%
B-	70-72%
C+	65-69%
C	60-64%
D	50-59%
F or N	0-49%

Missing Assessments

Should students encounter a situation where they miss an exam or cannot submit an assignment at its due date, they may qualify for an academic concession. Students are required to indicate the specific grounds on which they are requesting an academic concession and to provide a justification outlining the impact of the circumstances on their ability to complete course requirements. For in-course extensions, please [fill in the form and follow the instructions on the form](#). I will not respond to informal requests of academic concessions.

Students are advised not to make work or travel plans until after the examination timetable has been finalized. Students who wish to finalize their travel plans at an earlier date should book flights that depart after the end of the examination period. Students do not qualify for an academic concession if travel plans conflict with the examination.

Course Policies

This course adheres to the policies of the Department of Economics that deal with the following issues:

- Academic concessions
- Academic integrity (plagiarism and cheating)
- Attendance

- Grading
- Inclusivity and diversity
- Late adds
- Late assignments
- Repeating courses
- Review of an assigned grade
- Sexualized violence prevention and response
- Students with a disability
- Term assignments and debarment from examinations
- Travel plans
- Waitlists

The following policies are explicitly included because of their importance:

Waitlist Policies

- Instructors have no discretion to admit waitlisted students or raise the cap on the course.
- Students on the waitlist should discuss with the instructor how to ensure they are not behind with coursework in the event they are admitted.
- Registered students who do not participate as specified in this outline during the first 7 calendar days from the start of the course may be dropped from the course.
- Registered students who decide not to take the course are responsible for dropping the course and are urged to do so promptly out of courtesy toward waitlisted students.
- Waitlist offers cease after the last date for adding courses irrespective of published waitlists.

Academic Integrity

Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. Students are expected to observe the same standards of scholarly integrity as their academic and professional counterparts. A student who is found to have engaged in unethical academic behaviour, including the practices described in the [Policy on Academic Integrity](#) in the University Calendar, is subject to penalty by the University.

Review [What is Plagiarism](#) for the definition of plagiarism. Note: Submitted work may be checked using plagiarism detection software.

Student Code of Conduct

The Humanities, Science, and Social Sciences Faculties have adopted this [Student code of conduct](#). Please, review.

University Policies and Statements

Please note that this course is executed in a manner consistent with these University statements and policies.

Resources for students

- a. [Student wellness](#)
- b. [Centre for Accessible Learning](#)
- c. [UVic Learn Anywhere](#). UVic Learn Anywhere is the primary learning resource for students that offers many learning workshops and resources to help students with academics and learning strategies.
- d. [Library](#) resources
- e. Centre for Academic Communication ([CAC](#))
- f. Learning Strategies Program ([LSP](#))
- g. [Academic Advising](#)
- h. Economics Undergraduate Advising: ecadvice@uvic.ca
- i. [Student Awards and Financial Aid](#)
- j. [International Student Advising](#)

Indigenous student services ([ISS](#))

Student Experience of Learning (SEL) Survey

I value your feedback on this course. Towards the end of term, you will have the opportunity to complete a confidential SEL survey regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future.

Course Structure

Topic	Chapter	Week	Due Dates and Exam Information
Introduction	1	1	
Programming Basics	1-2	1-2	
Linear Equations	2	3	
Macro Applications		4	Assignment 1
Non-Linear Equations	3	5	
Macro Applications		6 & 7	
Micro Applications		7 & 8	Assignment 2
Numerical Optimization	4	8	
Finance Applications		8	
Numerical Differentiation	5	9	Assignment 3
Numerical Integration	5	9 & 10	
Simulation		11	
Dynamic Applications	7-8	12	
Statistics Applications		12	Assignment 4
			Classes end on Apr 2nd

Course Content: the main goal of the course is to teach the students a number of computational tools. These will be used to numerically solve economic and statistical models. We will consider several applications, spanning microeconomics, macroeconomics and econometrics. Given the nature of computational work, this course is structured around a practical “learning-by-doing” principle. During the term, students will code and test their own computer programs. Although no prior extensive programming experience is required, proficiency in Python will become essential as the students tackle the assignments. Python is a free programming language, whose popularity has seen a spectacular increase in recent years. The availability of several reliable libraries, together with its top-notch plotting capabilities, make it a powerful tool and a valuable asset. Lab tutorials and exercises will initially focus on basic Python programming skills, which will become more sophisticated as the term progresses. I strongly encourage the Econ 549 students to become proficient in Python. I will organize the teaching around it, and I will provide guidance and feedback on Python codes only.

E-mail Correspondence

Emails should be limited to critical matters, such as inability to attend class, an exam, or prolonged illness, and should include the course name and number in the subject line. Questions on course material should be asked during office hours or in class. The standard format for writing a letter must be used. This means it should begin with a salutation (e.g. Dear...), include full sentences and it must conclude with a signature that includes your **full name and V#**. Text message lingo should not be used. Note that it is not uncommon for Uvic's spam filters to block emails sent from non-uvic email accounts.

Electronic Devices

Countless studies unequivocally show that using electronic devices in class is detrimental to student learning. Please refrain from using your phone in class. Taking notes with paper and pencil might prove a useful commitment device to minimize the temptations of social media.

Educational Technology involving storage outside Canada

The following educational technologies, which stores or accesses your personal information outside Canada, is required for this course: Zoom. I will make you aware if this list changes.

Personal information is required by the service. The privacy policy and the terms of use list the personal information stored outside of Canada and are available at <https://explore.zoom.us/en/privacy/>. I encourage you to read these documents.

If you are not comfortable with your personal information being stored outside of Canada, please speak to me within the first week of class about using an alternative (such as using an alias or nickname). Otherwise, by continuing in this course, you agree to the use of the educational technology in the course and the storage of personal information outside of Canada.