University of Victoria | Economics

# ECON 245 - A01: DESCRIPTIVE STATISTICS AND PROBABILITY

**Spring Session:** 2026 01; **CRN**: 21014 (A01) **Units**: 1.5.
**Lectures**: Monday and Thursday, 10:00 a.m. – 11:20 p.m. **Elliot Building**, room: **168**.

**University of Victoria Land Acknowledgement**

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

**Instructor:** Dr. Paola Beneras P., paolabeneras@uvic.ca
**Office:** BEC 376
**Office Hours:** Friday 12:30 p.m. – 2:30 p.m., in-person or Zoom and via appointment (please email).

**Teaching Assistants:**

- Zhoumo Zhang, pipilapilamora@uvic.ca;
- Zhaoyu Zhou, zhaoyuzhou@uvic.ca;
- Forough Ghadamyari, ghadamyari@uvic.ca.

**Course Content:**

Understanding and interpreting data is important to answer many questions in Economics.Descriptive Statistics and Probability is a foundational course that provides a rigorous introduction to statistics and probability theory.

Key topics include elementary probability, discrete and continuous random variables, as well as descriptive statistics of univariate and bivariate data.

The course also introduces basic programming and data visualization using R and Excel.

**Learning Outcomes**: Students will be able to:

- Recognize, describe, and compare statistical vocabulary, concepts and notation.
- Identify the components of a data set, describe the type of data being used/observed and their scale of measurement.
- Using tabular and graphical displays to summarize data for categorical and quantitative variables.
- Calculate and interpret measures of location, measures of variability, measures of distribution shape, relative location, outliers, as well as measures of association between two variables.
- Students will be able to identify, calculate and explain different relationships of probability associated with events, including being able to develop and interpret joint probability tables.
- Understand counting rules and calculate the number of outcomes of random experiments, assign probabilities to outcomes and events for a random experiment.
- Understanding models for discrete and continuous random variables as well the distribution functions associated with them.

**Course Prerequisites:** Can be found here.

**Minimum Grade Requirement:** ECON 245 has a C as minimum program requirement (for FME, BA and BSc students listed. Students pursuing an Honours degree should consult the academic calendar).

**Repeating Courses:** According to the University Calendar:

> "A student may not attempt a course a third time without the prior approval of the Dean of the Faculty and the Chair of the Department in which the course is offered unless the calendar course entry states that the course may be repeated for additional credit. A student who has not received this approval may be deregistered from the course at any point and may be asked to withdraw from his or her declared or intended program."

In order to request permission to attempt this course for the third time, you must follow the instructions provided under the Repeating Courses policy on the Economics website. Failure to obtain permission will result in deregistration from the course.

**Brightspace:** Brightspace is used extensively for the course. Materials for the course (including lecture notes, assignments, tutorials, additional reading materials, practice questions, solutions, and grades) will be posted on Brightspace. All students are expected to be fully functional with the system.

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

**Lectures:** Lectures are in-person. Lecture notes will be available on Brightspace as PDFs. These notes will be posted after class and are outlines of the information covered in the actual lectures. In addition to these notes, students are expected to work from their own notes and are strongly encouraged to attend all lectures to take their own notes during class.

**Laboratory Classes:** Are held weekly and their times depend on the section students are enrolled in. Students are required to register in one of the following sections:

- B01: Wednesday 02:30 p.m. - 03:20 p.m. – Business and Economics Building, room: 180
- B02: Wednesday 03:30 p.m. - 04:20 p.m. – Business and Economics Building, room: 180
- B03: Wednesday 04:30 p.m. - 05:20 p.m. – Business and Economics Building, room: 180

Exercises with instructions for each laboratory will be posted on Brightspace. Students' solutions and/or output from labs are due at the end of each laboratory.

Laboratories run all through term, starting on the second week of term. There are no labs during reading break.

Laboratory classes cover formal class material. Any components that might have been missed from what was discussed during the laboratory, and thus, not submitted if students choose to work on their own, will automatically receive a zero. We will be mostly using Excel and R during the course. The main objective of the laboratory classes is to understand and implement empirical applications of the topics covered in the lectures.

**Textbook:**

Abrevaya, J. (2025). *Probability and Statistics for Economics and Business: An Introduction Using R.* The MIT Press. – ISBN: 9780262553360.

- Any additional supplementary materials will be provided as PDFs on Brightspace.

**Grading Scheme and Assessments:** The course grade is determined as follows:

| | **Percent of Final Grade** | **Due Dates** |
|---|---|---|
| Assignments (best 3 of 4) | 15% | See course calendar. |
| Midterm Exam I | 20% | Jan. 29, 2026 |
| Midterm Exam II | 20% | Mar. 9, 2026 |
| Final Exam | 35% | TBD. |
| Laboratories | 10% | At the end of each lab. |

**Course Components:**

a. **Assignments (best 3 of 4): 15%** There will be four assignments throughout the course with the best three counted. Students will have one week to complete an assignment. Each assignment is worth 5% of the total grade. The main goal of assignments is to allow students in-depth understanding and implementation of the material and knowledge obtained from the lectures and to prepare students for exams and future courses.

   – *Late Assignments:* Assignments are due in class by 10:00 a.m. on the due date. Out of respect for students who do submit assignments on time, **late assignments will not be accepted** unless prior arrangement (*at least 48 hours prior to the deadline*) has been made with the instructor. Given that only the best three assignments will count towards the final grade, if a student misses an assignment due to medical reasons or exceptional circumstances, *and can provide documentation*, this assignment will be automatically dropped. Please use this form to ask for an in-course academic concession.

b. **Midterm Exams: 40%** There will be two 90-minute midterms (each worth 20% of the final grade) on **Jan. 29, 2026**, and on **March 9, 2026.**

   – **Make-up exams for midterms will not be given** and midterms cannot be deferred (i.e., made up after the course has ended).

   – If a student misses *one* midterm due to illness or family affliction, the weight of the missed exam will be shifted to the final exam. In the event that a student misses a *second* exam due to illness or family affliction, please consult the Academic Concessions portion of the Registrar's website to determine whether a late drop or a withdrawal under extenuating circumstances is appropriate.

   – If a student misses a midterm and a final exam, only the final exam can be deferred by filling a request for a deferral.

c. **Final Exam: 35%** The final examination will be a comprehensive 3-hour exam. It will be scheduled by the Registrar's Office and a timetable will be posted once available. Please wait *until the final examination timetable is available* before making any plans to leave Victoria.

d. **Laboratories (best 10 of 11): 10%** There are 11 laboratory classes scheduled. At the end of each laboratory class students are to submit the solutions to the exercises, including computer output. Please note that in line with academic integrity policies, students must *submit their own work*. If students choose to work on the exercises on their own rather than attending the laboratories, they are subject to the same time frames and grading schemes.

- **Mandatory Course Components:** The final exam is an essential course requirement, meaning, it must be attempted in order to pass the course. Failure to complete 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.

**Appealing Grades:** Students who have questions or concerns regarding a grade for any of the assessments should notify the instructor as soon as possible.

***All concerns should be addressed during office hours*** (please see email policy), **with specific questions and formal arguments** (i.e., no: "why did I get this grade?" rather: "I believe there is an error in the grading because after further investigation I have found that XYZ...").

Any concerns must be dealt with **within one week** after the grade was returned, otherwise, **the grade is final.**

**Ensuring Progress and Learning:**

We will start this course by doing a review of mathematics and notation. An important aspect of learning statistics and probability involves familiarizing yourself with the intuition behind core concepts. In order to do this, I *strongly* encourage that students practice and review mathematical concepts as well as "speaking the language" of statistics and probability. What I mean by this, is that students try to familiarize themselves with the meaning behind the formulas and operations, rather than simply reading the variables – e.g., while reviewing the material I encourage students to "translate" a formula or the operation performed to plain English next to the mathematical notation. I will provide examples of this during class.

Additionally, regularly trying and practising problem sets and exercises will be the most effective way to develop the skills needed to succeed in this class. When doing exercises, I strongly encourage students to identify and clearly denote each of the steps taken when performing operations (until a concept is crystal clear, I'd further motivate students to continue "translating" to plain English next to each step) to answer a question. This will help clarify the steps involved in a solution and will provide the basis of preparing for assessments as students will need to show their work.

One of the best ways to do well in this course is attending and participating in the lectures. I strongly encourage students to take their own notes while in class. When studying or reviewing material for exams, a helpful way to do so is to develop thorough and clear study guides by reviewing class notes, assignments, textbook, lecture slides and any supplementary materials.

Similarly, please know that I will always be happy to provide additional support during office hours. I strongly encourage students to come to office hours to seek additional help, especially if struggling with a particular concept. While I will not provide the solutions directly, I will help students understand the concepts so that they can arrive at the answers or understanding independently.

**Missing Assessments:** To reiterate, assessment components during the term have built in flexibility for all students. Students can miss one assignment and one laboratory without losing any weight on course components rendering the need for in-course concessions via special arrangements unnecessary.

Should students encounter a situation where they miss a midterm or cannot submit an assignment on the due date, they may qualify for an academic concession (as outlined above). 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. Please use this form to ask for an in-course academic concessions.

In case you miss the final exam, fill in a request for a deferral.

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.

**E-mail Correspondence:** I will do my best to respond to e-mails within 24 hours on a weekday, 48 hours on a weekend, according to the following policy:

- E-mails 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.**
- The standard format for writing a letter must be used. Include full sentences include a signature that includes your **full name and V#.** Text message lingo must be avoided.

- Students are **strongly** advised to use their @uvic.ca e-mail address to avoid being flagged as spam.
- I will respond to emails posing questions that can be answered in a sentence or two. For detailed questions, please see me during office hours.
- **Questions on course material should be asked during office hours or in class**.
- I will not reply to e-mails that request information that can be found on Brightspace or the syllabus, please check those places first.
- I will not reply to e-mails regarding the results of graded material - for that, please see me during office hours (see: Appealing Grades policy).

**Class Cancellations:** In the event of a cancelled class due to illness, campus closure or emergency, class will be automatically postponed and lectures will resume on the next scheduled class time.

**Office Hours:** The default format for this term is holding office hours in-person, office: BEC 376.

If office hours are moved to Zoom, an announcement will be made in-class and via Brightspace. The Zoom link is available here.

If there is a scheduling conflict with regular office hours, please email at least 48 hours in advance to make an appointment.

For **questions regarding the course material, please come prepared** and review the lecture notes and book chapters beforehand.

**Electronic Devices:** use of mobile phones, smart watches and laptops is **not permitted** during lectures (i.e.: they should not be in use nor visible). Students can take notes with a tablet by permission, only (please come see me during office hours). Ensure you bring something to write with (e.g.: pen, pencil) and to write on (e.g.: paper, notebook). The only exception to this policy is a CAL accommodation.

**Use of Large Language Models, AI:** Students are **strongly** encouraged to refrain from using AI, especially for assignments. The purpose of this class is that you learn; using AI directly restricts you from doing so as you directly obtain an output (answer, solution, definition) rather than developing the skills to conceptualize, think critically, read and revise material, research a topic. Similarly, the way many LLM generate output is vastly unknown, not only is it a black box but also, there are many issues with copyright infringement. The use of LLM has been linked to lower brain connectivity and lower attention engagement which is diametrically opposed to what we try to do in this class.

**Grading Scale:** all course components above will be assessed following a numerical score. Each component of the course will be then assigned the appropriate weight resulting in a total final score out of 100. The following grading scale will be used:

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

Students should review the University's more detailed summary of grading.

**Course Structure:**

- Introduction to Notation, Set Theory and Summation Operator
- Introduction to Probability Theory (Ch. 2)
- Conditional Probabilities and Independence (Ch. 3)
- Combinatorics (Counting Methods) (Ch. 4)
- Economic Data and Sampling (Ch. 5)
- Descriptive Statistics and Visuals: Univariate Data (Ch. 6)
- Descriptive Statistics and Visuals: Bivariate Data (Ch. 7)
- Discrete Random Variables (Ch. 8)

- Models of Discrete Random Variables (Ch. 9)
- Continuous Random Variables (Ch. 10)
- Models of Continuous Random Variables (Ch. 11)

**Course Calendar:**

**Note:** *The calendar and due dates are subject to minor changes depending on the pace of the course.*

| Week No. | Dates | Monday | Thursday | Laboratory |
|---|---|---|---|---|
| 1 | Jan. 5-9 | Introduction + Review | Review | |
| 2 | Jan. 12 - 16 | Review + Chapter. 2 | Chapter No. 2 | x |
| 3 | Jan. 19 - 23 | Ch. No. 3 **(Assign. #1 due)** | Chapter No. 3 + 4 | x |
| 4 | Jan. 26 - 30 | Chapter No. 4 | **Midterm** | x |
| 5 | Feb. 2 - 6 | Chapter No. 5 | Ch. No. 6 **(Assign. #2 due)** | x |
| 6 | Feb. 9 - 13 | Chapter No. 6 | Chapter No. 7 | x |
| 7 | Feb. 16 - 20 | **Reading Break** | **Reading Break** | |
| 8 | Feb. 23 - 27 | Chapter No. 7 | Chapter No. 7 | x |
| 9 | Mar. 2 - 6 | Chapter No. 7 + 8 | Ch. No. 8 **(Assign. #3 due)** | x |
| 10 | Mar. 9 - 13 | **Midterm** | Chapter No. 8 | x |
| 11 | Mar. 16 - 20 | Chapter No. 9 | Chapter No. 10 | x |
| 12 | Mar. 23 - 27 | Chapter No. 10 | Chapter No. 10 | x |
| 13 | Mar. 30 - Apr. 2 | Chapter No. 11 | Ch. No. 11 **(Assign. #4 due)** | x |

**Additional Course Policies** This course adheres to the Undergraduate Course 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:**

- University Calendar - Section "Information for all students."
- Creating a respectful, inclusive and productive learning environment
- Accommodation of Religious Observance
- Student Conduct
- Non-academic Student Misconduct
- Accessibility
- Diversity / EDI
- Equity statement
- Discrimination and Harassment Policy
- Policy on Human Rights, Equity and Fairness - The University is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members.

**Sexualized Violence Prevention & Response**

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. Students are encouraged to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Contact svpcoordinator@uvic.ca.

**Resources for Students** 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.

**Centre for Accessible Learning** - 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, you are free to approach me; however, you must register with the Centre for Accessible Learning (CAL) for formal arrangements to be made. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

**Centre for Academic Communication** - Offers coaching on academic integrity, including preventing accidental plagiarism. Provides support to students with time management, reading, writing, speaking, understanding academic expectations, and other aspects of academic communication as well as creating academic posters, blogposts, PowerPoint slides, and e-portfolios.

**Health Services** - University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives.

**Support Connect** - a 24/7 mental health support service for students

- Toll-free (calls from North America): 1-844-773-1427
- International collect calls: 1-250-999-7621

**Counselling Services** - Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.

**Indigenous Student Services** - Indigenous UVic students have access to many sources of support on campus. Before, during and after your time at UVic, you are encouraged to explore programs and services available to you, such as Indigenous counselling services and the Elders in Residence, as well as non-academic programs that may be of interest to you.

**International Student Support** - The University of Victoria offers a number of resources to support international students as they pursue their studies. UVic's International Centre for Students is the primary office supporting international students on campus at the university-wide level and provides various supportive program through the UVic Global Community Initiative, including a Mentorship Program and Conversation Partner Program.

For academic advising-related questions, students in the Economics Department are also encouraged to meet with the Economics Undergraduate Advisor (ecadvice@uvic.ca) as well as an academic advisor in the Academic Advising Centre early in their studies to help map out a plan to declare a major and complete university program requirements. Other resources include the Centre for Academic Communication and the Math and Stats Assistance Centre.

The International Student Liasson in the Economics Department is Dr. Paul Schure who can help you connect with other international and domestic students in the Department. His email address is schure@uvic.ca. Please, reach out if you are interested.

**Course Experience Survey (CES)**

I value your feedback on this course. Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) 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.

When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to the CES log-in. You will use your UVic NetLink ID to access the survey, which can be completed on your laptop, tablet or mobile device. I will remind you nearer the time, but please be thinking about this important activity, especially the following three questions, during the course.

- What strengths did your instructor demonstrate that helped you learn in this course?
- Please provide specific suggestions as to how the instructor could have helped you learn more effectively.
- Please provide specific suggestions as to how this course could be improved.

**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/. Please 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.

**Agreement:**

I, _____ (student name), have read the entirety of the course outline and fully understand all course requirements for ECON 245. By signing this document, I agree to all the course policies set out in the syllabus, especially those related to Academic Integrity.

_____

Signature

Once completed, please submit a signed copy of this page only to the Assignments > Syllabus Agreement Dropbox on Brightspace.