

**University of Waterloo**  
**Department of Economics - Spring 2022**  
**Econ 221 Section 001: Statistics for Economists**  
**08:30-09:50 AM - Monday & Wednesday - AL 211**

**Instructor Information**

Instructor: Zara Liaqat

Office Hours: Tuesday 11:30 am – 1:00 pm

Virtual office hours organized on WEBEX

Email: zliaqat@uwaterloo.ca

**Notes:**

- When sending an email, “Econ 221” must appear in the subject line and the message must include your full name and student ID number.
- Please use emails for administrative matters only. I will be available during office hours, or by appointment, to discuss course material.

Please note that course schedule, methodology, assessments, and exam policies have been planned based on current public health guidelines. Should these guidelines change, adjustments may be necessary, and alternate arrangements for a short-term (e.g., one-week) or a longer-term cancellation of in-person classes, whether for the course or university-wide, will be made. Course plans will be consistent with program, department, or faculty-wide contingency plans. The changes will be communicated to students through announcements on LEARN.

**Course Description**

In this course we ask how we can use a sample of individuals to make well-reasoned claims about an unobserved population. We start by discussing ways of describing a population. We then learn how probability theory can be used to model uncertain events. Next, we connect these two discussions and derive probability distributions of estimators of population characteristics. These distributions provide a basis for statistical inference about the population. The course introduces some basic forms of statistical modeling.

**Course Goals and Learning Outcomes**

Through lectures, reading and practice in solving problems by hand and spreadsheet calculations students will obtain:

- a basic literacy with regard to statistical techniques and data analysis;
- familiarity with the use of probability theory in modeling random events.

**Required Text**

Introductory Business Statistics from OpenStax:

<https://openstax.org/details/books/introductory-business-statistics>

Print ISBN 1-947172-46-8

Digital ISBN 1-947172-47-6

Your textbook for this class is available for free online! If you prefer, you can also get a print version at a very low cost via the campus bookstore or from OpenStax on Amazon.com. You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the

official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.)

**Other Resources:**

Paul Newbold, William L. Carlson, and Betty M. Thorne, *Statistics for Business and Economics* 8th edition, (Toronto: Pearson Education Inc., 2013)

**Course Webpage**

This course outline is available at two locations for the duration of the term:

- (a) Department of Economics website <http://economics.uwaterloo.ca/courses>
- (b) LEARN website <http://learn.uwaterloo.ca/> (use WatIAM/Quest username and password)

**Lectures & Readings Available on LEARN**

- Lecture slides and/or additional course material will be posted on LEARN <http://learn.uwaterloo.ca> on a weekly basis.
- The LEARN site is down occasionally. Save the course materials to your computer as soon as they are posted. Always be prepared!
- Students writing test and exams are responsible to save course materials on LEARN before the access to their courses is shut off (normally on the first day of classes of the next term).

**Course Requirements and Assessment**

Assessment	Weighting Scheme
Assignments (5 @ 5% each)	25%
Midterm Exam ( <b>June 15<sup>th</sup>, 2022, Wednesday</b> )	35%
Final Exam (Comprehensive)	40%
Total	100%

- Participation is recommended. Attend all the lectures and actively participate in class. Studying just from the lectures slides is not a substitute of attending lectures. Attendance is an important component in ensuring your complete understanding of the material presented.
- The date and time for the final exam will be set by the Registrar during the exam period and announced in class and on LEARN.
- Examinations in this course are based on the material contained in the assigned textbook readings and presented as lecture contents.
- Read the textbook and other assigned readings and go through your lecture notes. Some of the materials covered during lectures may NOT be available in lecture slides.
- Work out all optional assignments and practice questions in the textbook and on the textbook's website. These are meant for helping you prepare for the exams.
- The assignments and due dates will be posted on LEARN, and will be submitted online in the relevant Dropbox on LEARN before the deadline. Without a prior arrangement with the instructor, *no late assignments will be accepted.*
- **Tutorial Participation:** Students are required to attend all tutorial meetings over the course of the term.

The instructor and university reserve the right to modify elements of the course during the term. The instructor might need to make changes to course components due to the changes in public health guidelines, changes between in-person and remote instruction, issues with the use of technology and/or

uploading files to LEARN. The university may change the dates and deadlines and delivery methods for any or all courses in certain circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the students to check their UWaterloo email and course website on LEARN daily during the term and to note any changes.

Students will be able to [self-declare COVID-like symptoms](#) via Quest. Accommodation will be made available for students who cannot attend classes due to self-isolation. Assessments other than final exams that are impacted by illness may be re-weighted or deferred at the instructor's discretion.

### Economics Department Deferred Final Exam Policy

Deferred Final Exam Policy is detailed on the department website in the 'Resources and Policies' section of the Undergraduate program page. The web address is:

<https://uwaterloo.ca/economics/undergraduate/resources-and-policies/deferred-final-exam-policy>

### Course Schedule

This class schedule is tentative. Any necessary modifications to the course content will be communicated to you via email or LEARN Announcements.

Week	Topic	Readings Due
1	Course Introduction & Sampling and Data	Chapter 1
2	Descriptive Statistics & Probability Topics	Chapters 2 & 3
3	Probability Topics	Chapter 3
4	Discrete Random Variables	Chapter 4
5	Continuous Random Variables	Chapter 5
6	The Normal Distribution & The Central Limit Theorem	Chapters 6 & 7
7	<b>MIDTERM TEST &amp; Review Session (Chapters 1-5)</b>	
8	Confidence Intervals	Chapters 7 & 8
9	Introduction to Hypothesis Testing	Chapter 9
10	Hypothesis Testing with One Sample	Chapter 9
11	Linear Regression and Correlation	Chapter 13
12	Linear Regression and Correlation	Chapter 13
13	<b>Final Review</b>	

### **Cross-listed course**

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

### **Examination Policy**

- Failure to write an exam results in a grade of zero. Exceptions will only be made under the most extreme circumstances, with a written note, and according to the policies of the department of economics and faculty of Arts.
- Students must report to me the reasons for not writing an exam prior to the exam date or immediately after the exam for my approval.
- Travel plans are not an acceptable reason for requesting an alternative final exam. See <http://www.registrar.uwaterloo.ca/exams/finalexams.html> for details.
- Please note that students who decide to take an exam cannot be given accommodation after the fact due to illness or personal complicating factors that may have affected their performance. If you are not well on the day of an exam it is advisable that you not take the exam and obtain valid documentation of the circumstances of this decision.

#### *Submission of Exam Papers*

Late submission of exam papers is not accepted and missed submissions will receive a zero mark for whatever reason. Exam papers must be submitted in whole and on time. Exam papers: (a) not submitted on time, (b) submitted with missing pages, or (c) not received at all, will receive a grade of zero for whatever reason. It is the responsibility of students to ensure that they write exams on the date and time assigned to their sections.

#### *Missing the Midterm Exam*

- Missing the midterm will automatically result in a grade of zero. If the illness can be documented with a UW Verification of Illness Form (the only acceptable document), with approval you may be allowed to write a makeup midterm exam. This remedy is a privilege and not a right.
- Students are advised to notify the instructor about the missed exam in person or via email notification as soon as possible, and within 24 hours of the missed exam.

#### *Missing the Final Exam*

- Missing the final exam is a very serious matter which automatically results in a grade of zero for the final exam and possibly a failing grade for the course. Please carefully read the Economics Department policy on deferred final exams for instructions.
- No deferred final exam will be provided for students who missed all the exams (including the final exam) in this course.

### **Electronic Device Policy**

To avoid disruptions to the learning environment handheld devices must be turned off during the lecture and laptops must be used strictly for lecture-related purposes. If a student's use of a laptop becomes a distraction for adjacent students that student will be asked to discontinue its use.

## **Institutional-required statements for undergraduate course outlines approved by Senate Undergraduate Council, June 15, 2009 (updated June 2021)**

### **Academic Integrity**

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity webpage](#) for more information.

**Discipline:** A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. Check [the Office of Academic Integrity](#) for more information. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

**Appeals:** A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

### **Accommodation for Students with Disabilities**

**Note for students with disabilities:** The [AccessAbility Services](#) office, located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

### **Territorial Acknowledgement**

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometres on each side of the Grand River. For more information about the purpose of territorial acknowledgements, please see the [CAUT Guide to Acknowledging Traditional Territory](#).

### **Intellectual Property**

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights. Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

## **Mental Health Support**

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health support if they are needed.

### **On Campus**

***Due to COVID-19 and campus closures, services are available only online or by phone.***

- Counselling Services: [counselling.services@uwaterloo.ca](mailto:counselling.services@uwaterloo.ca) / 519-888-4567 ext. 32655
- [MATES](#): one-to-one peer support program offered by the Waterloo Undergraduate Student Association (WUSA) and Counselling Services

### **Off campus, 24/7**

- [Good2Talk](#): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-4300 ext. 6880
- [Here 24/7](#): Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- [OK2BME](#): set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online on the Faculty of Arts [website](#)

Download [UWaterloo and regional mental health resources \(PDF\)](#)

Download the [WatSafe app](#) to your phone to quickly access mental health support information.

## **Chosen/Preferred First Name**

Do you want professors and interviewers to call you by a different first name? Take a minute now to verify or tell us your chosen/preferred first name by logging into [WatIAM](#). Why? Starting in winter 2020, your chosen/preferred first name listed in WatIAM will be used broadly across campus (e.g., LEARN, Quest, WaterlooWorks, WatCard, etc). Note: Your legal first name will always be used on certain official documents. For more details, visit [Updating Personal Information](#).

### *Important notes:*

- If you included a preferred name on your OUAC application, it will be used as your chosen/preferred name unless you make a change now.
- If you don't provide a chosen/preferred name, your legal first name will continue to be used.

## **Academic freedom at the University of Waterloo**

[Policy 33, Ethical Behaviour](#) states, as one of its general principles (Section 1), "The University supports academic freedom for all members of the University community. Academic freedom carries with it the duty to use that freedom in a manner consistent with the scholarly obligation to base teaching and research on an honest and ethical quest for knowledge. In the context of this policy, 'academic freedom' refers to academic activities, including teaching and scholarship, as is articulated in the principles set out in the Memorandum of Agreement between the FAUW and the University of Waterloo, 1998 (Article 6). The academic environment which fosters free debate may from time to time include the presentation or discussion of unpopular opinions or controversial material. Such material shall be dealt with as openly, respectfully and sensitively as possible." This definition is repeated in Policies 70 and 71, and in the Memorandum of Agreement, Section 6.