

**University of Waterloo**  
**Economics 221 -- Statistics for Economists**  
**Spring 2019**

**Chris Riddell**

HH 104

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I will only guarantee a quick response to emails that include "Econ 221" in the subject line of the message.

Class Meeting:

RCH 302

Tuesday/Thursday 2:30 to 3:50

*Note—This course has required tutorials. Times are as follows:*

ECON 221 (101): Friday @ 1:30 – 2:20pm

ECON 221 (102): Friday @ 2:30 – 3:20pm

ECON 221 (103): Friday @ 3:30 – 4:20pm

*All in HH 150*

TA Information:

Tutorial Leader – TBA

TA (Grading): TBA

**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. Finally, the course introduces statistical modeling (single population, two population and simple regression).

## Course Goals and Learning Outcomes

Through lectures, readings, practice problems by hand, and analysis of data with statistical software, students will obtain:

- A basic literacy with regard to statistical techniques and data analysis using both MS Excel and Stata;
- Familiarity with the use of probability theory in modeling random events.

## Text and Software

Statistics for Business and Economics (8<sup>th</sup> edition) Paul Newbold, William Carson and Betty Thome (Pearson).

Additional Useful Text, especially Chapters 5, 8-12

David Freedman, Robert Pisani and Roger Purves. *Statistics* 4<sup>th</sup> edition, (W.W. Norton and Company, Inc).

Note: Additional information re: the readings in the course is discussed on the first day and can be found in the "First Class" slides @ LEARN

*Data analysis is an important component of this course.* We will be using both the statistical software package Stata as well as some MS Excel. All information relating to software is located in a separate file @ LEARN.

## LEARN

- I make heavy use of LEARN. This course outline including any revisions, and most importantly our updated schedule will be posted at LEARN. It is advisable to be in the habit of checking our revised schedule, particularly if you miss classes.
- Other announcements, assignments, all data we will be using, assigned problems, and all materials relating to the tutorials will also be available at LEARN.

## Course Requirements and Assessment

1. Assignments (3)	Due Dates @ LEARN	25%
2. Midterm 1	June 6 <sup>th</sup>	20%
3. Midterm 2	July 16 <sup>th</sup>	20%
4. Final	Scheduled by Registrar	35%

### KEY NOTES:

- There are 3 formal assignments for the course. In addition to these, there will be weekly assigned problems (problems typically done by hand) from the text and from me. **Please see the information on assignment policies below.**
- The format for both midterms will be primarily short answer/problems with the possibility of a small number of multiple-choice questions; the final exam is short answers/problems and a long answer. Midterm marks will be posted on LEARN. Only the Registrar's Office can issue final grades.
- Schedule and location of the final exam will be announced by the Registrar Office. Please visit <http://registrar.uwaterloo.ca/exams/index.html> for further details later in this term. Travel plans are NOT a sufficient reason to have a final exam deferred.
- Requests for accommodation based on religious holiday must be submitted to the Associate Dean.
- **Midterm II is not cumulative. The final exam is cumulative.**
- Combination of particular distribution and absolute measures will be used to determine the course grades. The university grading system will be relied on as benchmark.
- No programmable (graphing) calculator or electronic devices are allowed during the tests. You are required to have your student ID with you for all exams. Random checks may be made during exams.

## **Tentative Schedule**

*(Check my "Schedule" Excel file @ LEARN for Updates—this is tentative)*

The course is split into three sections: Part 1 motivates the course by examining patterns in data; Part 2 covers Probability, and Part 3 brings the first two sections together and covers Inference. Please note that this schedule is tentative. Always refer to LEARN for the most up-to-date information.

	<b>Topic</b>
May 7	Intro
May 9	Descriptive Statistics
May 14	Descriptive Statistics-Normal Model
May 16	The Standard Normal Model
May 21	Correlation
May 23	Simple Regression
May 28	Randomness/Probability Intro
May 30	Rules of Probability
June 4	Conditional Probability
June 6	MIDTERM 1
June 11	Probability conclude – Random Variables
June 13	Random Variables cont.
June 18	Probability Models-Geometric/Binomial
June 20	Probability Models Cont.
June 25	A Sampling Distribution Model
June 27	A Sampling Distribution Model cont.
July 4	Confidence Intervals for a Proportion
July 9	Hypothesis Testing for a Proportion
July 11	Hypothesis Testing Continued
July 16	MIDTERM 2
July 18	Hypothesis Testing for a Mean/Student's t Distribution
July 23	Inference for Simple Regression
July 25	Inference for Simple Regression Continued
July 30	Wrap-up

## **Policies**

### **1. Class Policies**

#### **Assignment Policy**

Assignments are **only** accepted in hard copy to the Drop-box in the Economics Department, 2<sup>nd</sup> floor Hagey Hall. The drop-box is located just down the Hall from the Department's main office. There are multiple signs through the Department. Please note that the assignments and their respective due dates are available from the beginning of term. *Late assignments are not accepted* (illness is not a valid reason for missing an assignment).

#### **Examination Policy**

##### *Missing a Midterm Due to Illness During the Term*

No make-up midterm is provided for Economics 221. Missing a midterm will automatically result in a grade of zero for that midterm. If the illness can be documented with a UW Verification of Illness Form (the only acceptable document), with approval you may transfer the weight of the missed midterm to the final exam (and only the final exam). This remedy is a privilege and not a right.

##### *Missing the Final Exam Due to Illness*

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.* Please see the policy below on deferred exams in the Department of Economics.

##### *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 in the exam room.

##### Exam papers

- a) Not submitted on time
- b) Submitted with missing pages
- c) Submitted elsewhere (with the exception of students with permission to write in the AS Office)

d) Not received at all

will receive a grade of zero.

Important note: It is the responsibility of students to ensure that they write exams in the location, date, and time assigned to their section. Students writing exams in the wrong section will be assessed a **20%** penalty on the final exam grade. There will be no accommodation for possible differences in exam material or content.

### **Attendance Policy**

Class attendance is an integral part of your educational experience. While attendance is not a graded component of this course, it is an important factor in ensuring your complete understanding of the material presented. You are responsible for all material presented in the scheduled lecture periods whether you choose to attend lectures or not.

### **Classroom Protocols**

The highest level of courtesy and professional behaviour are expected from every student. In particular, be punctual and turn off all audible ringers on all devices during class. As a courtesy to the custodial staff, if you have coffee, water, etc., please dispose of your garbage when you leave the classroom.

## **2. Institutional-required statements for undergraduate course outlines approved by Senate Undergraduate Council, April 14, 2009**

### **Economics Department Deferred Final Exam Policy**

Deferred Final Exam Policy found at

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

### **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.

**Discipline:** A student is expected to know what constitutes academic integrity, to avoid

committing academic offences, and to take responsibility for his/her actions. 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](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>)

**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](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>), Section 4.

**Appeals:** A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read [Policy 72 - Student Appeals](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72>).

***Other sources of information for students:***

[Academic Integrity website \(Arts\)](https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour)

<https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour>

[Academic Integrity Office \(UWaterloo\)](https://uwaterloo.ca/academic-integrity/) <https://uwaterloo.ca/academic-integrity/>

## **Accommodation for Students with Disabilities**

**Note for students with disabilities:** The [AccessAbility Services](https://uwaterloo.ca/disability-services) office (<https://uwaterloo.ca/disability-services>), located on the first floor of the Needles Hall extension (NH 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.