

University of Waterloo
Department of Economics
Econ 221 – Section 1
Statistics for Economists
Spring 2016
Tuesday and Thursday, 1-2:20 pm AL 113

Instructor Information

Instructor: Ryan George

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The instructor will only respond to emails that include “Econ 221” in the subject line of the message.

T.A. Information

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. The course introduces statistical modeling (single population and two population) and presents least squares estimation in terms of projections of sample information on model vectors.

Course Goals and Learning Outcomes

Through lectures, reading and practice in solving problems by hand and with the aid of statistical software 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

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

One copy of the 8th edition is on reserve in the Dana Porter Library.

Recommended Reading

1. Hoy et al. *Mathematics for Economics* 3rd ed. Section 10.1. (Available digitally through course e-reserves)
2. D.J. Saville and G.R. Wood, *Statistical Methods: The Geometric Approach* – “Chapter 2: The Geometric Toolkit” pp.10-38. . (Available digitally through course e-reserves)

Readings Available on LEARN

- Announcements, lecture summaries, assignments and their solutions, midterm solutions.
- Recommended textbook problems with solutions.

Course Requirements and Assessment

Assessment	Date of Evaluation (if known)	Weighting
Assignments (3 @ 5% each)	TBA	15%
Midterm 1	May 31 st	20%
Midterm 2	June 30 th	20%
Final Examination	Exam Period (scheduled by Registrar’s Office)	45%
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Total		100%

Assignments

There will be three assignments over the course of the term. Each will count for 5% of the final grade. The assignments will be posted on LEARN, and due in class. Due dates to be announced. Without a prior arrangement with the instructor, *no late assignments will be accepted*.

Midterm Examination

The midterm exams will be **held in class on May 31st and June 30th** . They will test students’ proficiency with the material covered in the lectures, assignments and practice problems.

Final Examination

The final exam is comprehensive. The date will be set by the Registrar’s Office.

Course Schedule (Tentative)

Week	Date	Topic	Readings Due
1	May 3 May 5	1. Describing a Population, Sampling and Statistics 2. Vector Representation of a Sample	NCT 1.1-3,5; 2.1,2,4; Hoy 10.1, Saville and Wood, pp.10-25.
2	May 10 May 12	3. Basic Set Theory 4. Introduction to Probability Theory	NCT 3.1 NCT 3.2-3
3	May 17 May 19	5. Conditional Probabilities 6. Discrete Random Variables I	NCT 3.3-5 NCT 4.1-3
4	May 24 May 26	7. Discrete Random Variables II Wrap-up and Review	NCT 4.4,5,7
5	May 31 June 2	Midterm 1 (May 31st) 8. Continuous Random Variables I	NCT 5.1-3,5
6	June 7 June 9	9. Continuous Random Variables II 10. Sampling Distributions	NCT 5.3,6 Appendix NCT 6.1-4.
7	June 14 and 16	11. Obtaining and Evaluating Estimators	NCT 7.1, Saville and Wood, pp.26-30.
8	June 21 and 23	12. Confidence Interval Estimation	NCT 7.2-5
9	June 28 June 30	Wrap-up and Review Midterm 2 (June 30th)	
10	July 5 and 7	13. Introduction to Hypothesis Testing	NCT 9.1-2, 5
11	July 11 July 13	14. Useful Hypothesis Tests 15. Geometric Approach to Testing	NCT 9.3,4,6; NCT 10.2
12	July 18 July 20	Geometric Approach to Testing (concluded)	
13	July 25	Wrap-up and Final Exam Details	

Missed Work and Accommodation Regarding Assessment

If a student is unable to take a midterm exam for documented reasons, the student's mark will be based upon one midterm mark with the balance of the weight shifted to the final exam. If a second midterm is missed for a documented reason, a make-up midterm must be taken. ***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.

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.

Attendance Policy

Lectures are an important component of the learning process and should be attended regularly.

Economics Department Deferred Final Exam Policy

Deferred Final Exam Policy found at <https://uwaterloo.ca/economics/current-undergraduates/policies-and-resources/deferred-final-exam-policy>.

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.

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.

If you are using Turnitin in your course

Turnitin.com: Text matching software (Turnitin®) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin® in this course.

(Note: students must be given a reasonable option if they do not want to have their assignment screened by Turnitin®. See [guidelines for instructors](#) for more information.)