

# Course Outline

## STAT 332: Sampling and Experimental Design

### Winter 2019

**Instructor:** Samuel Wong ([samuel.wong@uwaterloo.ca](mailto:samuel.wong@uwaterloo.ca))  
Office: M3 3104

**Office hours:** To be announced on Learn.

**TAs:** To be announced on Learn.

**Lectures:** Mon/Wed/Fri, 11:30am - 12:20pm, AHS 1689

**Tutorials:** Tuesday, 10:30am - 11:20pm, AHS 1689 (beginning January 15th)

**Course Website:** [learn.uwaterloo.ca](http://learn.uwaterloo.ca) You are expected to regularly read your UWaterloo email and visit the course website on Learn for announcements.

#### Course Description:

The course is divided into two main sections:

- Survey sampling: including probability sampling, simple random sampling, ratio and regression estimation, stratified random sampling, cluster sampling, and nonresponse.
- Experimental design: including fundamentals (randomization, blocking, replication), completely randomized designs (balanced and unbalanced), ANOVA, randomized block designs, fully factorial designs with two-way interactions.

#### Course Objectives:

By the end of the course, students should be able to:

- Define a target population, sampling frame and the parameters of interest.
- Identify and discuss sampling errors such as non-response, study, sample and measurement.
- Derive the sampling properties for basic sampling designs.
- Derive and apply the appropriate analysis for designs with two or more treatments and one or two factors.

**Required Text:**

- There is no required textbook. Notes and exercises to supplement lectures will be made available on Learn.

**Evaluation:**

Assessment will be based on four assignments (5% each), two midterms (15% each), and one final exam (50%). If you miss a test due to illness/extenuating circumstances with proper documentation then the weight for that test will move to the final exam.

**Assignments:**

There will be four assignments during the course. These will test your understanding of course material and help prepare you for the midterms and the final. The due dates of the assignments are as follows:

- Assignment 1: Due 10:30am Friday, January 25
- Assignment 2: Due 10:30am Friday, February 8
- Assignment 3: Due 10:30am Friday, March 8
- Assignment 4: Due 10:30am Friday, April 5

Assignments will be released two weeks before the due date and must be submitted via Crowdmark. You may discuss assignments with other students but you must submit your own unique solution written in your own words.

We take assignment deadlines **very seriously**. We provide the release and due dates in advance so that you may plan accordingly. Please do not ask for extensions.

**Midterms:**

There will be two midterms, held during the course's scheduled tutorial time of 10:30am - 11:20pm on Tuesdays.

- Midterm 1: Tuesday February 12th
- Midterm 2: Tuesday March 19th

Please check your schedules *now* for any potential conflict, and make arrangements accordingly.

**Remarking of Assignments/Midterms:**

If you have a question regarding the marking of an assignment or midterm you must first check the posted solutions. You have 7 days from the time it is handed back to you to appeal. Please send a formal email to your instructor that contains your name, student id, clearly stating you request a regrade. Give a clear explanation as to why you think you deserve a different mark. Note: You may gain or lose marks on appeals. We may not return appeals until the end of term.

## Tutorials:

Tutorials will be used for examples, experiments and/or reviews to supplement the material covered in lectures, in preparation for the examinations. Students are encouraged to attend these tutorials in order to be prepared for the tests and final exams.

## Calculator Policy:

For the midterms and final exam, only a non-programmable, non-graphical, math faculty approved calculator with a pink-tie or blue-goggles sticker will be allowed.

## Piazza:

A great place to get help with course material that you do not understand is the discussion forum for this course on Piazza. It enables you to learn from the questions of others, and to avoid asking questions that have already been asked and answered. To join the Piazza forum for this course, go to <https://piazza.com/uwaterloo.ca/winter2019/stat332/home>. Please post questions about course material to Piazza rather than emailing the instructor or the TAs.

**If you have a question or concern of a personal nature, you should contact the instructor directly.**

Here are some guidelines for posting questions to Piazza:

- 1) Please take a moment to check your question hasn't already been asked, or that the answer isn't in the syllabus/Learn. Asking 'when are the instructor office hours?', the details of which are on Learn, will waste *everyone's* time!
- 2) You can ask questions that show up as anonymous to your classmates *and* the instructor/TAs.
- 3) Make it easy for other students to find your question in case they have the same problem: put the most relevant information in the subject line.
- 4) Keep your questions concise and specific. For example:
  - A post like 'Can someone walk me through the solution to Problem 4.3.' is too broad - consider visiting a TA/instructor office hour for something like this.
  - Please do not cut and paste large sections of text and post 'I do not understand this.' - again, office hours are much better suited to this.
  - Always indicate what you have already tried in order to solve the problem (e.g. 'I tried Exercise 4 and thought the solution should be [this], but my solution is different from the solution provided. Can anyone please tell me what is wrong with my solution? Thanks.')
  - If you post a question, you should not expect a full solution to be posted in return. Instead, you may be given a hint to start the question or a suggestion to continue the question. The most learning occurs if you struggle a bit to solve a problem.

5) Please remember Piazza is a question and answer forum, and that other students will be using it. Limit your content to succinct questions and answers relating to the course material, and avoid clutter such as asking people what they're up to later, complaints about the course, or memes (no matter how dank).

You can also use Piazza from your smart phone or tablet see <https://piazza.com/product/mobile> for the iOS and Android Apps.

### **Out-of-Class Workload:**

As in any university course much of your learning in this course will take place outside of class time. You should plan to spend between 3 and 6 hours each week in out-of-class learning. This learning consists mostly of making sure you understand the concepts and steps that were used in class to solve problems and then solving exercises on your own.

### **Health Issues:**

If you do not write the final exam due to illness/extenuating circumstances with proper documentation then the Mathematics Faculty INC Grade Policy (see below) will apply. Normally, if you have not earned a passing grade on your term work, and/or you have missed both midterms and you do not write the final exam then you will be assigned a mark of DNW for the course.

NOTE: A verification of illness form is only required for the final exam. See: <https://uwaterloo.ca/campus-wellness/sites/ca.campus-wellness/files/uploads/files/VIF-online.pdf>

If you have a health concern that could affect your access to the course (such as a disability), then **please** consider contacting AccessAbility Services as soon as possible (more details below). The sooner such issues are raised, the easier it is to find solutions.

Don't forget that the University of Waterloo has dedicated mental health services <https://uwaterloo.ca/health-services/mental-health-services>.

## UW Academic Policies:

The following are the University of Waterloo's Academic Policies that all students and professors must go by.

**Academic Integrity:** In order to maintain a culture of academic integrity, member of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. See: [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/) for more information.

**Discipline:** A student is expected to know what constitutes academic integrity to avoid committing an academic offence, 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 instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, [www.adm.uwaterloo.ca/infosec/Policies/policy71.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm). See: [www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm](http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm) for guidelines for the assessment of penalties.

**Avoiding Academic Offenses:** For more information on commonly misunderstood academic offenses and how to avoid them, students should refer to the Faculty of Mathematics Cheating and Student Academic Discipline Policy. See: <https://uwaterloo.ca/math/current-undergraduates/regulations-and-procedures/cheating-and-student-academic-discipline-guidelines>.

**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. See Policy 70, Student Petitions and Grievances, Section 4: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>. When in doubt, please contact the departments 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). See: [www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm).

**Mathematics Faculty INC Grade Policy:** A grade of INC is awarded to a student who has completed course work during the term well enough that they could reasonably be expected to earn a passing mark in the course, but who was unable to complete end-of-term course requirements (usually the final exam) for reasons beyond his or her control. See: <https://uwaterloo.ca/math/current-undergraduates/regulations-and-procedures/incomplete-procedure>.

**AccessAbility Services:** AccessAbility Services, located in Needles Hall, Room 1132, 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 AccessAbility Services at the beginning of each academic term.