

Course Outline

STAT 332: Sampling and Experimental Design

Spring 2018

Instructor: Ryan Browne (rpbrowne@uwaterloo.ca)

Office hours: Tuesday 10am–11am and Thursday, Friday at 1pm–2pm; in M3 4011

TAs: To be announcement during the second week on Learn.

Lectures: Tuesday/Thursday, 11:30am - 12:50pm, MC 2065

Tutorials: Friday, 9:30am - 10:20am, M3 1006

Prerequisites: SYDE 212 ($\geq 70\%$) or STAT 231 ($\geq 60\%$) or STAT 241

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, 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 design with two or more treatments and one or two factors.

Required Textbook:

- There is no required textbook. Course notes and lecture slides will be made available on Learn.

Evaluation:

Every student in every section is treated the same way according to the grading scheme below. I cannot modify final grades to give you an extra percent, this would be unfair to the other students.

Assessment will be based on four assignments, two tutorial tests, and one final exam. By default, the assignments will be worth 5% each, the tutorial tests will be worth 10% each, and the final will be worth 60%.

A1-A4	Tests	Final	Total
20	20	60	100

If you miss a test due to illness/extenuating circumstances with proper documentation then the weight for that test will move to the 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 tests and the final. The due dates assignments are as follows (all dates are Fridays):

- Assignment 1: Due 9:00am Friday, May 25th
- Assignment 2: Due 9:00am Friday, June 8th
- Assignment 3: Due 9:00am Friday, July 6th
- Assignment 4: Due 9:00am Tuesday, July 24th

They will be released two weeks before the due date.

I take assignment deadlines **very seriously**. I provide the release and due dates in advance so that you may plan accordingly. You are advised to complete assignments as soon as possible after the release date and to not leave them until the last day/minute. Please do not ask for extensions.

Tutorial Tests:

There will be two tutorial tests, held during the course's scheduled tutorial time of 9:30am - 10:30am on Fridays.

- Tutorial Test 1: Friday June 15th
- Tutorial Test 2: Friday July 13th

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

Tutorials:

There will be tutorial every week. It will be used for experiments, review and examples.

Calculator Policy:

For the tutorial tests 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 piazza.com/uwaterloo.ca/spring2018/stat332. 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 (e.g. 'Exercise 3 in Chapter 2').
- 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 from the Course Notes or posted test solutions 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 in the Course Notes. 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). [N.B. If you have read this far in the course syllabus, I'd like it if you could send me an email with the subject line 'STAT 332 MEMES' and one of your favourite pictures from the Internet. This won't actually benefit you, but it will make me happy to know some people read the course syllabus.]

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 from the Course Notes on your own.

Health Issues:

The course is structured to minimize the potential impact of illness or other unforeseen circumstances. 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 tutorial tests 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/health-services/sites/ca.health-services/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. I've lived with a fairly severe visual impairment my entire life, so I have a pretty good understanding of how disability can affect access to education, and am committed to ensuring none of my students are disadvantaged in this way.

Don't forget that the University of Waterloo has dedicated mental health services <https://uwaterloo.ca/health-services/mental-health-services>. The Winter term can be particularly draining, so please keep an eye on both your own mental wellbeing as well as those of your friends and classmates!

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/ 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. See: 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: http://www.math.uwaterloo.ca/navigation/Current/cheating_policy.shtml.

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.

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: <http://www.math.uwaterloo.ca/navigation/Current/inc.procedure.shtml>.

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.