Course Details

Calendar Description

This course focuses on the practical methods of Statistics and the topics include: descriptive statistics; univariate models such as binomial, Poisson, uniform and normal; the central limit theorem; expected value; the t, F and chi-square models; point and interval estimation; hypothesis testing methods up to two-sample data; simple regression and correlation; introduction to analysis of variance. Assignments will deal with real data from the natural sciences and involve the use of statistical software for computing and visualization.

Pre-Requisite(s): 1 of 4U Calculus and Vectors, Advanced Functions and Calculus, OAC Calculus, MATH*1080

Co-Requisite(s): None

Restriction(s): STAT*2060, STAT*2080, STAT*2120, STAT*2230

Method of Delivery: Online

Final Exam

Date: December 10, 2019
Time: 11:30AM - 01:30PM
Location: On campus
Instructional Support

Instructor

Naghm Mohammad
Email: naghamm@uoguelph.ca
Office: MACN, Room 513

Teaching Assistant(s)

Name: TBA
Email: TBA

Learning Resources

Required Textbook

Title: Introductory Statistics Explained (PDF)
Author(s): Jeremy Balka
Edition / Year: Edition 1.10 / 2015

Title: Suggested Exercises and Answers for Introductory Statistics Explained
Author(s): Jeremy Balka

The textbook(s) are provided on the course website in PDF format (free of charge).

Supplementary Materials

This course includes supplementary materials. These materials are meant to supplement the required readings and course content. You can explore the materials at your own pace. To access these materials, select Content on the navbar to locate Supplementary Materials in the table of contents panel.

Course Website

CourseLink (powered by D2L’s Brightspace) is the course website and will act as your classroom. It is recommended that you log in to your course website every day to check for announcements, access course materials, and review the weekly schedule and assignment requirements.

https://courselink.uoguelph.ca/shared/login/login.html
Learning Outcomes

Course Learning Outcomes

This course is an introduction to descriptive and inferential statistics. We will discuss experiments and observational studies, descriptive statistics, probability, random variables, discrete and continuous probability distributions, sampling distributions, confidence intervals and hypothesis tests for means, variances, and proportions, chi-square tests for count data, one-way ANOVA, and simple linear regression.

It is hoped that students will become familiar with some methods of data collection and analysis, be able to carry out some of these analyses using statistical software, and be able to effectively communicate the results.

By the end of this course, you should be able to:

1. Create and properly interpret numerical and graphical data summaries;
2. Properly interpret probability and carry out basic probability calculations;
3. Carry out probability calculations for various discrete and continuous probability distributions, and choose the appropriate probability distribution in different scenarios;
4. Explain statistical inference concepts, including sampling distributions, confidence intervals, and hypothesis tests;
5. Choose an appropriate statistical inference procedure in a variety of situations, carry out the procedure, and effectively communicate a proper interpretation of the results;
6. Explain the design of some basic experiments and observational studies, and describe how statistical conclusions differ between experiments and observational studies; and
7. Carry out calculations for statistical inference procedures using appropriate statistical computing software.

Teaching and Learning Activities

Course Structure

The concepts of this course are presented in 14 online units to be completed within 12 weeks. These units will help guide you in pacing yourself through the course materials.

The units are as follows:

Unit 01: Introduction to Statistics
Unit 02: Numerical and Graphical Data Summaries
Unit 03: Introduction to Probability
Unit 04: Discrete Probability Distributions
Unit 05: Continuous Probability Distributions
Unit 06: Sampling Distributions
Unit 07: Confidence Intervals for a Single Population Mean
Unit 08: Introduction to Hypothesis Testing
Unit 09: Confidence Intervals and Hypothesis Tests for Two Means
Unit 10: Confidence Intervals and Hypothesis Tests for Proportions
Unit 11: Confidence Intervals and Hypothesis Tests for Variances.
Unit 12: Chi-square Tests
Unit 13: One-way ANOVA
Unit 14: Introduction to Simple Linear Regression

Schedule

It is strongly recommended that you follow the course schedule provided below. The schedule outlines what you should be working on each week of the course and lists the important due dates for the assessments. By following the schedule, you will be better prepared to complete the assessments and succeed in this course.

Unit 01: Introduction to Statistics

Week 1 – Thursday, September 5 to Sunday, September 15

Readings

- Website: Unit 01 Content
- Textbook:
  - Chapters 1 and 2

Activities

- Familiarize yourself with the course website by selecting Start Here on the navbar.
- Review Outline and Assessments on the course website to learn about course expectations, assessments, and due dates.
- Confirm your access to the course reserve materials by selecting Ares on the navbar.
- Introduce yourself to your classmates in the Class Introductions Discussion.
Complete the Exercises for Unit 01.

Unit 02: Numerical and Graphical Data Summaries

Week 2 – Monday, September 16 to Sunday, September 22

Readings
- Website: Unit 02 Content
- Textbook:
  - Chapter 3

Activities
- Complete the Exercises for Unit 02.

Assessments
- Möbius Quiz 1
  Opens: Monday, September 16 at 11:59 am ET
  Closes: Sunday, September 22 at 11:59 pm ET

Unit 03: Introduction to Probability

Week 3 – Monday, September 23 to Sunday, September 29

Readings
- Website: Unit 03 Content
- Textbook:
  - Chapter 4

Activities
- Complete the Exercises for Unit 03.

Assessments
- Möbius Quiz 2
  Opens: Monday, September 23 at 11:59 am ET
  Closes: Sunday, September 29 at 11:59 pm ET

Unit 04: Discrete Probability Distributions

Week 4 – Monday, September 30 to Sunday, October 6

Readings
- Website: Unit 04 Content
• Textbook:
  o Chapter 5

Activities
• Complete the Exercises for Unit 04.

Assessments
• Möbius Quiz 3
  Opens: Monday, September 30 at 11:59 am ET
  Closes: Sunday, October 6 at 11:59 pm ET

Unit 05: Unit 05: Continuous Probability Distributions &
Unit 06: Sampling Distributions

Week 5 – Monday, October 7 to Sunday, October 13

Readings
• Website: Unit 05 and 06 Content
• Textbook:
  o Unit 05: Chapter 6 (Ignore 6.2.1 and 6.6)
  o Unit 06: Chapter 7

Activities
• Complete the Exercises for Unit 05.
• Complete the Exercises for Unit 06.

Assessments
• Term Test 1
  Opens: Friday, October 11 at 11:59 am ET
  Closes: Saturday, October 12 at 11:59 pm ET

Unit 07: Confidence Intervals for a Single Population Mean

Week 6 – Monday, October 14 to Sunday, October 20

Readings
• Website: Unit 07 Content
• Textbook:
  o Chapter 8
Activities

- Complete the Exercises for Unit 07.

Assessments

- Möbius Quiz 4
  Opens: Monday, October 14 at 11:59 am ET
  Closes: Sunday, October 20 at 11:59 pm ET

Unit 08: Introduction to Hypothesis Testing

Week 7 – Monday, October 21 to Sunday, October 27

Readings

- Website: Unit 08 Content

- Textbook:
  - Chapter 9

Activities

- Complete the Exercises for Unit 08.

Assessments

- Möbius Quiz 5
  Opens: Monday, October 21 at 11:59 am ET
  Closes: Sunday, October 27 at 11:59 pm ET

Unit 09: Confidence Intervals and Hypothesis Tests for Two Means

Week 8 – Monday, October 28 to Sunday, November 3

Readings

- Website: Unit 09 Content

- Textbook:
  - Chapter 10

Activities

- Complete the Exercises for Unit 09.

Assessments

- Möbius Quiz 6
  Opens: Monday, October 28 at 11:59 am ET
  Closes: Sunday, November 3 at 11:59 pm ET
Unit 10: Confidence Intervals and Hypothesis Tests for Proportions

Week 9 – Monday, November 4 to Sunday, November 10

Readings

- Website: Unit 10 Content
- Textbook:
  - Chapter 11

Activities

- Complete the Exercises for Unit 10.

Assessments

- Term Test 2
  Opens: Friday, November 8 at 11:59 am ET
  Closes: Saturday, November 9 at 11:59 pm ET

- Begin working on the Data Analysis Assignment
  Due: Wednesday, November 20 by 11:59 pm ET

Unit 11: Confidence Intervals and Hypothesis Tests for Variances.
Unit 12: Chi-square Tests

Week 10 – Monday, November 11 to Sunday, November 17

Readings

- Website: Unit 11 and 12 Content
- Textbook:
  - Unit 11: Chapter 12
  - Unit 12: Chapter 13

Activities

- Complete the Exercises for Unit 12.

Assessments

- Möbius Quiz 7
  Opens: Monday, November 11 at 11:59 am ET
  Closes: Sunday, November 17 at 11:59 pm ET

- Continue working on the Data Analysis Assignment
  Due: Wednesday, November 20 by 11:59 pm ET
Unit 13: One-way ANOVA

Week 11 – Monday, November 18 to Sunday, November 24

Readings
- Website: Unit 13 Content
- Textbook:
  - Chapter 14

Activities
- Complete the Exercises for Unit 13.

Assessments
- Data Analysis Assignment
  Due: Wednesday, November 20 by 11:59 pm ET

Unit 14: Introduction to Simple Linear Regression

Week 12 – Monday, November 25 to Friday, November 29

Readings
- Website: Unit 14 Content
- Textbook:
  - Chapter 15

Activities
- Complete the Exercises for Unit 14.

Assessments

The grade determination for this course is indicated in the following table. A brief description of each assessment is provided below. Select Content on the navbar to locate Assessments in the table of contents panel to review further details of each assessment. Due dates can be found under the Schedule heading of this outline.

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Möbius Quizzes (7)</td>
<td>10%</td>
</tr>
</tbody>
</table>
Assessment Item | Weight
--- | ---
Term Test 1 | 12%
Term Test 2 | 12%
Data Analysis Assignment | 16%
Final Exam | 50%
Total | 100%

Assessment Descriptions

**Möbius Quizzes**

There will be 7 Möbius quizzes, in weeks 2, 3, 4, 6, 7, 8, and 10. Your worst quiz will be thrown out and your best 6 quizzes will count for 10% of your grade. The quizzes will be open to you from Monday 11:59 am ET until Sunday at 11:59 pm ET during the applicable week. The quizzes do not have a time limit. You will have 5 attempts at the quiz, and only your best attempt counts.

**Term Tests**

There will be 2 term tests, in weeks 5 and 9 that will be done in Möbius. Each term test will open at 11:59 am ET on Friday, and close at 11:59 ET on Saturday night. No extensions will be granted. You may start the quiz at any time in that window, but once you start the quiz you will have 60 minutes to complete it. You may attempt the test twice, and your best attempt is the only one that counts.

**Data Analysis Assignment**

This Data Analysis Assignment will require you to analyze one or more data sets using the statistical software R, and write up the results in a clear and concise manner. This assignment will be submitted through CrowdMark.

**Final Exam**

This course requires you to write a traditional sit-down final exam. Final exams are written on campus at the University of Guelph or at alternate locations for students at a distance. The final exam will be a combination of multiple choice and written response questions. You are responsible for all the content of the course and will be supplied formula sheets and appropriate statistical tables. You will need to bring a stand-alone calculator to the exam, no other electronic devices will be allowed. Note that you must achieve a passing grade in the Final Examination in order to pass this course. If your Final Examination grade is below 50% it will be your final grade in this course. For
example, if you get 43% on the Final Examination, you will get 43% in this course – no matter how well you do on the other assessments.

It is assumed that all DE students will be writing their final examination on campus at the University of Guelph. University of Guelph degree and associate diploma students must check WebAdvisor for their examination schedule. Open Learning program students must check the Open Learning Program Final Examination Schedule for their examination schedule.

If you are studying at a distance, you can request to write your final exam at an alternate location. It is recommended that you make arrangements as early as possible in the semester since changes cannot be guaranteed after the deadline. Exam schedules for off-campus exams will be emailed by Week 9 of the course. For more information, please visit Final Exams.

https://webadvisor.uoguelph.ca

http://opened.uoguelph.ca/student-resources/Open-Learning-Program-Final-Exam-Schedule

http://opened.uoguelph.ca/student-resources/final-exams

Course Technologies and Technical Support

CourseLink System Requirements

You are responsible for ensuring that your computer system meets the necessary system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window).

http://spaces.uoguelph.ca/ed/system-requirements/

https://courselink.uoguelph.ca/d2l/systemCheck

Technical Skills

As part of your online experience, you are expected to use a variety of technology as part of your learning:

- Manage files and folders on your computer (e.g., save, name, copy, backup, rename, delete, and check properties);
- Install software, security, and virus protection;
- Use office applications (e.g., Word, PowerPoint, Excel, or similar) to create documents;
- Be comfortable uploading and downloading saved files;
- Communicate using email (e.g., create, receive, reply, print, send, download, and open attachments);
• Navigate the CourseLink learning environment and use the essential tools, such as Dropbox, Quizzes, Discussions, and Grades (the instructions for this are given in your course);
• Access, navigate, and search the Internet using a web browser (e.g., Firefox, Internet Explorer); and
• Perform online research using various search engines (e.g., Google) and library databases.

Course Technologies

CourseLink

Distance Education courses are offered entirely online using CourseLink (powered by D2L's Brightspace), the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph’s Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace Learning Environment web accessibility standards.

http://www.uoguelph.ca/web/privacy/
https://www.d2l.com/legal/privacy/
https://www.d2l.com/accessibility/standards/

CrowdMark

This course will use CrowdMark, an online collaborative grading and analytic platform. For information on their privacy policy, please visit their website.

https://crowdmark.com/privacy/

Möbius

This course will use the Möbius tool for weekly homework assignments. Möbius is an online testing and assessment software created by Waterloo Maple Inc. Visit their website to read the company’s position on privacy and data protection and accessibility statement.

https://www.digitaled.com/privacy
https://digitaled.com/support/VPATAssessment

Technical Support

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

CourseLink Support
University of Guelph
Day Hall, Room 211
Email: courselink@uoguelph.ca
Course Specific Standard Statements

Acceptable Use

The University of Guelph has an Acceptable Use Policy, which you are expected to adhere to.

https://www.uoguelph.ca/ccs/infosec/aup

Communicating with Your Instructor

During the course, your instructor will interact with you on various course matters on the course website using the following ways of communication:

- **Announcements:** The instructor will use Announcements on the Course Home page to provide you with course reminders and updates. Please check this section frequently for course updates from your instructor.

- **Ask Your Instructor Discussion:** Use this discussion forum to ask questions of your instructor about content or course-related issues with which you are unfamiliar. If you encounter difficulties, the instructor is here to help you. Please post general course-related questions to the discussion forum so that all students have an opportunity to review the response. To access this discussion forum, select Discussions from the Tools dropdown menu.

- **Email:** If you have a conflict that prevents you from completing course requirements, or have a question concerning a personal matter, you can send your instructor a private message by email. The instructor will respond to your email within 48 to 72 hours.

- **Skype:** If you have a complex question you would like to discuss with your instructor, you may book a Skype meeting. Skype meetings depend on the availability of you and the instructor, and are booked on a first come first served basis.

Netiquette Expectations
For distance education courses, the course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply, plus other policies and considerations that come into play specifically because these courses are online.

Inappropriate online behaviour will not be tolerated. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students;
- Using obscene or offensive language online;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
-Threatening or harassing a student or instructor online;
- Discriminating against fellow students, instructors, and/or TAs;
- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security or functionality of the learning management system; and
- Sharing your username and password.

**Submission of Assignments to CrowdMark**

The Data Analysis Assignment should be submitted electronically via the online CrowdMark.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommends you save your assignments to a cloud-based file storage (e.g., Google Docs), or send to your email account, so that should something happen to your computer, the assignment could still be submitted on time or re-submitted.

It is your responsibility to submit your assignments on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that technical difficulty is not an excuse not to turn in your assignment on time. Don’t wait until the last minute as you may get behind in your work.
Late Policy

Möbius will not allow for the submission of any late submissions so please prepare accordingly. Similarly, assignments will not be accepted late to CrowdMark. Extensions will be considered for medical reasons or other extenuating circumstances. If you require an extension, discuss this with the instructor as soon as possible and well before the due date. Barring exceptional circumstances, extensions will not be granted once the due date has passed. These rules are not designed to be arbitrary, nor are they inflexible. They are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help to return marked materials to you in the shortest possible time.

Obtaining Grades and Feedback

Unofficial assessment marks will be available in the Grades tool of the course website. Your instructor will have grades posted online within 2 weeks of the submission deadline, if the assignment was submitted on time. Once your assignments are marked you can view your grades on the course website by selecting Grades from the Tools dropdown menu on the navbar. Your course will remain open to you for seven days following the last day of the final exam period.

University of Guelph degree students can access their final grade by logging into WebAdvisor (using your U of G central ID). Open Learning program students should log in to the OpenEd Student Portal to view their final grade (using the same username and password you have been using for your courses).

https://webadvisor.uoguelph.ca
https://courses.opened.uoguelph.ca/portal/logon.do?method=load

Rights and Responsibilities When Learning Online

For distance education (DE) courses, the course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply, plus other policies and considerations that come into play specifically because these courses are online.

For more information on your rights and responsibilities when learning in the online environment, visit Rights and Responsibilities.

http://opened.uoguelph.ca/student-resources/rights-and-responsibilities

University Standard Statements

University of Guelph: Undergraduate Policies
As a student of the University of Guelph, it is important for you to understand your rights and responsibilities and the academic rules and regulations that you must abide by.

If you are a registered University of Guelph Degree Student, consult the Undergraduate Calendar for the rules, regulations, curricula, programs and fees for current and previous academic years.

If you are an Open Learning Program Student, consult the Open Learning Program Calendar for information about University of Guelph administrative policies, procedures and services.

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/
http://opened.uoguelph.ca/student-resources/open-learning-program-calendar

Email Communication

University of Guelph Degree Students

As per university regulations, all students are required to check their uoguelph.ca e-mail account regularly: e-mail is the official route of communication between the University and its students.

Open Learning Program Students

Check your email account (the account you provided upon registration) regularly for important communications, as this is the primary conduit by which the Open Learning and Educational Support will notify you of events, deadlines, announcements or any other official information.

When You Cannot Meet Course Requirements

When you find yourself unable to meet an in-course requirement due to illness or compassionate reasons, please advise your course instructor in writing, with your name, ID number and email contact.

University of Guelph Degree Students

Consult the Undergraduate Calendar for information on regulations and procedures for Academic Consideration.

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Open Learning Program Students

Please refer to the Open Learning Program Calendar for information on regulations and procedures for requesting Academic Consideration.

http://opened.uoguelph.ca/student-resources/open-learning-program-calendar

Drop Date
University of Guelph Degree Students

Students will have until the last day of classes to drop courses without academic penalty. Review the Undergraduate Calendar for regulations and procedures for Dropping Courses.

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Open Learning Program Students

Please refer to the Open Learning Program Calendar.

http://opened.uoguelph.ca/student-resources/open-learning-program-calendar

Copies of Assignments

Keep paper and/or other reliable back-up copies of all assignments: you may be asked to resubmit work at any time.

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community’s shared commitment to an open and supportive learning environment.

University of Guelph Degree Students

Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Accessibility Services as soon as possible.

For more information, contact Accessibility Services at 519-824-4120 ext. 56208, email Accessibility Services or visit the Accessibility Services website.

accessibility@uoguelph.ca

https://wellness.uoguelph.ca/accessibility/

Open Learning Program Students

If you are an Open Learning program student who requires academic accommodation, please contact the Academic Assistant to the Director. Please ensure that you contact us before the end of the first week of your course (every semester) in order to avoid any delays in support. Documentation from a health professional is required for all academic accommodations. Please note that all information provided will be held in confidence.

If you require textbooks produced in an alternate format (e.g., DAISY, Braille, large print or eText), please contact the Academic Assistant to the Director at least two months prior to the course start date. If contact is not made within the suggested time frame,
support may be delayed. It is recommended that you refer to the course outline before beginning your course in order to determine the required readings.

The provision of academic accommodation is a shared responsibility between OpenEd and the student requesting accommodation. It is recognized that academic accommodations are intended to “level the playing field” for students with disabilities.

jessica.martin@uoguelph.ca

**Academic Misconduct**

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml) is detailed in the Undergraduate Calendar.

**Copyright Notice**

Content within this course is copyright protected. Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course, or have been copied under an exception or limitation in Canadian Copyright law.

The fair dealing exemption in Canada's Copyright Act permits students to reproduce short excerpts from copyright-protected materials for purposes such as research, education, private study, criticism and review, with proper attribution. Any other copying, communicating, or distribution of any content provided in this course, except as permitted by law, may be an infringement of copyright if done without proper license or the consent of the copyright owner. Examples of infringing uses of copyrighted works would include uploading materials to a commercial third party web site, or making paper or electronic reproductions of all, or a substantial part, of works such as textbooks for commercial purposes.

Students who upload to CourseLink copyrighted materials such as book chapters, journal articles, or materials taken from the Internet, must ensure that they comply with
Canadian Copyright law or with the terms of the University’s electronic resource licenses.

For more information about students’ rights and obligations with respect to copyrighted works, review Fair Dealing Guidance for Students.

http://www.lib.uoguelph.ca/sites/default/files/fair_dealing_policy_0.pdf

**Plagiarism Detection Software**

Students should be aware that faculty have the right to use software to aid in the detection of plagiarism or copying and to examine students orally on submitted work. For students found guilty of academic misconduct, serious penalties, up to and including suspension or expulsion from the University can be imposed.

**Recording of Materials**

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.