



DS 1000 (Data Science Concepts)
Section 001
Fall 2022/2023 Course Outline

1. Course Information

Course Information

Table with 4 columns: Instructor, Day/Time, Location, Contact. Row 1: Holly Steeves, MWF 8:30 - 9:30, In-person at SH-3345, Holly.steeves@uwo.ca

Calendar description

Students will learn how to visualize and analyze continuous and categorical data from various domains, using modern data science tools. Concepts of distributions, sampling, estimation, confidence intervals, experimental design, inference, correlation will be introduced in a practical, data-driven way.

Prerequisites

One or more o Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

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2. Instructor Information

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Table with 4 columns: Email, Office, Phone, Office Hours. Row 1: Holly.steeves@uwo.ca, WSC 233, 519-661-2111 x86426, MF 10:00 - 11:00 T 2:00 - 3:00

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

You can expect a response to a message to the instructor within approximately 48 hours during the work

week (during busy times, it may take a little longer). Note that messages will not be answered within the 24-hour period before exams or project deadlines. I can't guarantee responses over weekends/holidays.

### 3. Course Syllabus, Schedule, Delivery Mode

#### Calendar description

Students will learn how to visualize and analyze continuous and categorical data from various domains, using modern data science tools. Concepts of distributions, sampling, estimation, confidence intervals, experimental design, inference, correlation will be introduced in a practical, data-driven way.

#### Course Objectives

By the end of this course, a successful student will be able to:

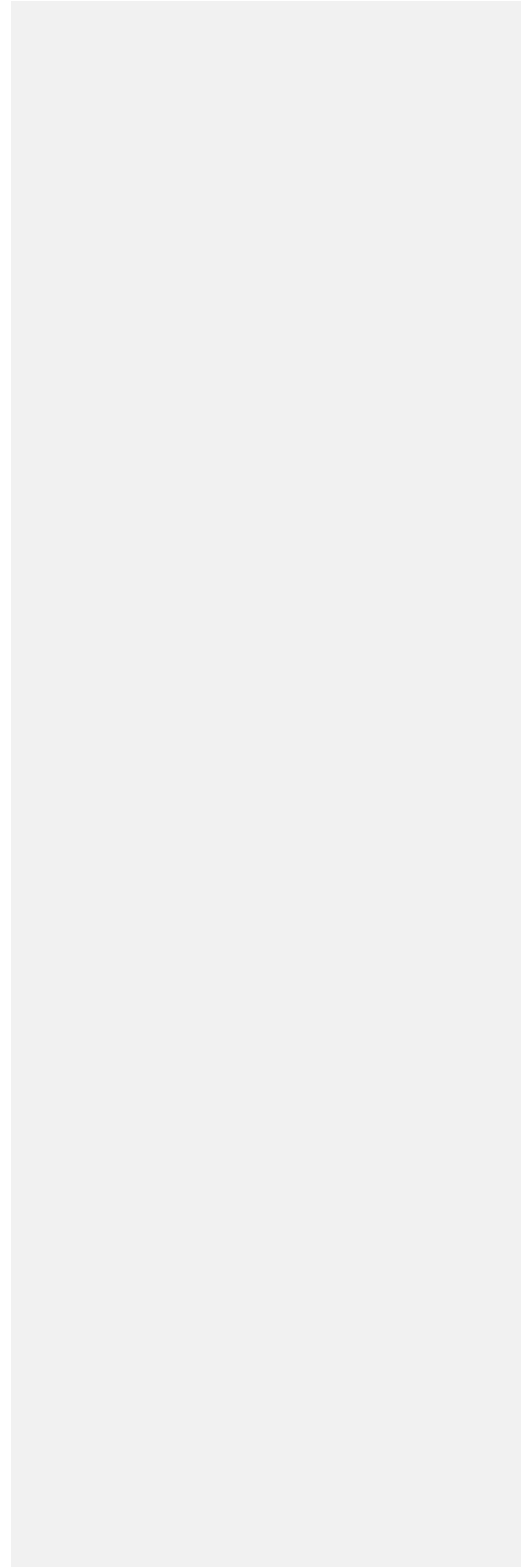
- Understand and correctly use foundational vocabulary associated with Statistics and Data Science.
- Interpret, create and critically evaluate graphical and numerical data summaries.
- Understand and appreciate probability, chance, randomness, and 'average'.
- Understand, assess, and critique the conclusions of data analyses.
- Apply concepts learned in this course to future courses, careers, and everyday life.

#### Tentative Course Schedule - Textbook: The Basic Practice of Statistics 9<sup>th</sup> Ed.

Week	Chapter	Topics	Lab Tutorial
1 Sep 5-9	1 Sections: 1.1 to 1.6	- Categorical variables (pie charts and bar plots) - Quantitative variables (histograms, stem plots, time plots)	- Introduction to Python and Jupyter notebook - Data frames, arrays, types of variables
2 Sep 12-16	2 Sections: 2.1 to 2.5	- Mean, Median - Quartiles - Five-number summary	- Basic Python commands and functions
3 Sep 19-23			

6	Oct 10-14	5 Sections: 5.1, 5.2, 5.4 to 5.8	<ul style="list-style-type: none"> <li>- Regression lines</li> <li>- Least-squares regression lines</li> <li>- Examples of software regression output</li> <li>- Caution about correlation and regression</li> <li>- Association does not imply causation</li> </ul>	<ul style="list-style-type: none"> <li>- Least-squares regression fit</li> <li>- Interpretation of result table</li> </ul>
7	Oct 17-21	6 Sections: 6.1-6.3	<ul style="list-style-type: none"> <li>- Two-way contingency table</li> <li>- Relative risk, odds ratio</li> <li>- Simpson's Paradox</li> </ul>	<ul style="list-style-type: none"> <li>- From raw data to two-way table</li> <li>- Computing conditional and marginal proportions</li> <li>- Relative risk, odds ratio</li> <li>- Mosaic plot</li> <li>- <b>Assig. 2 due Oct 21</b></li> </ul>
8	Oct 24-28	8 Sections: 8.1 to 8.7		
9	Oct 31-Nov 4			

**Key Sessional Dates**



Python and Jupyter Notebook are the main tools for laboratory tutorials. Instructions on how to install them on your own machine are available on OWL under Resources. If you need access to a computer for coursework, please contact the instructor as early as possible.

## 5. Methods of Evaluation

The overall course grade will be calculated as listed below:

### Assignments

- Assignments will be available on the course OWL page

- There will be a **2-hour in-person closed-book midterm exam, and its time will be scheduled by the Registrar's Office.**
- There will be a **3-hour in-person closed-book final exam, and its time will be scheduled by the Registrar's Office.**

### **Rounding of marks**

Across the Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks **WILL NOT** be bumped to the next grade or GPA, e.g. a 79 will **NOT** be bumped up to an 80, an 84 **WILL NOT** be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

## **6. Student Absences**

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

### **Assessments worth less than 10% of the overall course grade:**

If you are unable to submit an assignment by the due date/time, you must seek approval for the absence as soon as possible and contact your instructor immediately. Approval can be granted via the Dean's Office/Academic Counselling unit of your Home Faculty. Those **students obtaining such appropriate accommodation will have to submit their assignment via OWL messages within 24 hours of the end of the accommodation period.** Failure to submit a missed assignment within 24 hours of a valid academic accommodation period will result in a grade of 0%.

### **Assessments worth 10% or more of the overall course grade:**

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf).

The Student Medical Certificate is available at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf).

If you miss the Midterm, you must request an accommodation from Academic Counseling in your Faculty's Dean's Office. Students who obtain appropriate accommodation will have the weight of the midterm redistributed to the final exam.

### **Absences from Final Examinations**

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

## **6. Accommodation and Accessibility**

### **Religious Accommodation**

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

Clickers, specifically iClicker will be used in this class for instant feedback and non-graded assessments. Clickers will not be used for any marks towards the course.

### Professionalism & Privacy

- Western students are expected to follow the Student Code of Conduct (<https://www.uwo.ca/univsec/pdf/board/code.pdf>). Additionally, the following expectations and professional conduct apply to this course:
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed

### Copyright Statement

Please be aware that all course materials created by the instructor(s) are copyrighted and **cannot be sold/shared**. Those include materials used in assignments, tests/quizzes, midterms, and finals. Any posting/sharing of such materials in part or whole without owner's consent is considered as violation of the Copyright Act and will be considered as a scholastic offence.

## 8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

[https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html).

To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time



management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through