

### Syllabus

#### Quantitative Methods

Winter Term 2022

University of Waterloo,

Stratford School of Interactive Design and Business

Global Business and Digital Arts

#### Course Description

This course is designed to introduce quantitative data analysis, covering basic descriptive and inferential statistical techniques used in analyzing social science and user experience (UX) research data. Students are not expected to be math wizards but instead will be walked through the basics of quantitative methods to become effective data analysts. As such, emphasis in this course will be placed on the logic of quantitative methods rather than the math behind the statistic.

#### Contact

Instructor : Vivian Yang, [vivyang@uwaterloo.ca](mailto:vivyang@uwaterloo.ca)

Office Hours: online Tuesdays and Fridays 9:00- 10:00 am and by appointments

Teaching Assistants: TBA on LEARN

#### Learning Objectives

The learning objectives of this course are that students:

- are able to identify the assumptions and limits of statistical tests
- become more familiar with ways to organize and analyze data
- understand which test is appropriate to answer a particular research question
- use Microsoft Excel software to perform basic statistical analysis
- communicate research results and translate statistical jargons into meaningful English

#### Required lectures and readings

Students are required to complete the assigned video lectures and readings from the online textbook. Each week, all materials and announcements will be posted on LEARN by Mondays.

#### Required Textbook (Available online)

*Improving the User Experience through Practical Data Analytics, 2015, Paul D. Berger; Mike Fritz.*

The lectures and exercises will closely follow the textbook. Students are expected to read all assigned material to do well in the course. You can access the textbook for free online from O'Reilly:

1. Go to <https://subjectguides.uwaterloo.ca/az.php?a=o>
2. Click on " O'Reilly Higher Education"
3. Login using WatIAM credentials.
4. Search up the textbook name in the search bar "*Improving the User Experience through Practical Data Analytics*" by Paul D. Berger; Mike Fritz. It should appear as the first result.
5. Click on the search result to access the textbook.

If you prefer a hardcopy, the paperback is available from [Amazon](#) or [Elsevier](#).

### Course Software

We will use Microsoft Excel Stats ToolPack as the statistic software for this class. University of Waterloo students have free [subscriptions of the latest version of Microsoft Office suite](#) of programs, including Excel. You will need to enable the Stats ToolPack in Excel. Please refer to LEARN for additional instructions.

### Evaluations

All course deliverables will be assessed on an individual basis.

Category	Weight	Due Date
Data Analysis Project (Total 40%)		
Video Proposal	10%	Feb 18 (Friday)
Data Analysis and Poster Report	30%	April 10 (Sunday)
Exercise 1	15%	Feb 4 (Friday)
Exercise 2	15%	Mar 4 (Friday)
Exercise 3	15%	Apr 1 (Friday)
Class Participation	15%	N/A
Total	100%	

### Class Participation

Weekly surveys are required to be submitted by the end of Sundays each week. Instructions on how to finish these surveys will be announced at the beginning of the semester. Other class

activities than the weekly surveys may be regularly assigned throughout. Students' responses are evaluated based on participation, quality and efforts.

## Data Analysis Project

The best way to understand something is to experience it for yourself, which is the purpose of this individual project. The project generally involves the following steps.

1. Choose your variable(s) and identify a research question
2. Devise a plan to collect your data
3. Submit a project video proposal on LEARN and obtain the instructor's approval (**Due by February 18, Friday**)
4. Once your research question and data collection plan are approved, carry out your research:
  - a) Collect and organize data
  - b) Conduct the appropriate analysis
  - c) Compile your results in a poster report
5. Submit your final project. (**Due by April 10, Sunday**)

- **Data collection**

It is strongly encouraged to collect all your data online (e.g., online surveys, remote interviews, or from some external reliable public data source such as Statistics Canada). For example, you could conduct a survey of people's preference of online video streaming software. If you are a basketball fan, you could investigate how an external factor impacts the Raptors' performance.

You can also collect personal data from yourself or your immediate household. Some ideas for personal quantitative data collection include but are not limited to your music listening habits, sleep patterns, daily calorie intake, daily exercise activity levels, and your pet's behaviour. For example, using the music listening topic, you could propose to investigate whether there is a correlation between the time spent using the computer to time spent listening to music over the course of a week.

At least some of the data you collect should be of **quantitative** nature. Regardless of which methods you use, or data collected, we highly recommend keeping your research question feasible and straightforward in light of the current restrictions. In any circumstances, data collecting process should closely follow the COVID prevention guidance from [Public Health Ontario](#).

- **Part 1: Video Proposal**

Make a video about a research question on some variables of interest and your data collection plans. Start with a brief self-introduction; introduce yourself and why you are interested in your research question, then leading to an explanation of the variables to be included in your analysis and how you are planning to collect the data.

The idea proposed in the video will form the basis of your **Data Analysis Project**. The purpose of the video proposal is to receive early feedback from the instructor and TAs about the feasibility, scope, and merit of your research idea. You may propose more than one idea (and make a longer video) if you would like to receive feedback about which idea has more potential.

The proposal will be graded based on the merit of your proposed research idea and data collection plan using a simple three-point system: Pass, pass-with-minor-revisions, pass-with-major-revisions. Grading is at the discretion of the instructor and TAs.

- **Part 2: Data Analysis and Poster Report**

Continuing with the proposed project idea, collect, organize, and analyze your data. Summarize your methodology and findings in a research poster. The instructor will guide the poster content and format on LEARN.

- **Deliverables Submissions**

Upload your deliverable files to LEARN as a **single ZIP file**. Label the submission in the format: **firstname\_lastname\_deliverable-name**

## Exercises

Three exercises focus on the theoretical and application of stats concepts. The exercises are to be completed online using LEARN's Quiz feature. You will have plenty of time to complete the exercises asynchronously. There is **no deferred or make-up exercise**. If you miss the exercise due to illness and have valid medical documentation, the weight of the missed exercise will be shifted to the remaining exercises. Otherwise, a mark of zero will be given for the missed exercise.

## Extensions and Lateness Policy

Unless otherwise stated, **all course deliverables are due at 11:59 pm EST (Eastern Standard Time) on the due date as indicated below.**

- **Data Analysis Project**

Extensions can only be granted on an individual basis under exceptional circumstances. Deliverables handed in late without granted extensions will be penalized by a deduction of 10% per 24-hour period, or part thereof, out of the final mark received.

- **Exercises**

No late exercises will be accepted unless there are exceptional circumstances, subject to the instructor's judgement. There will be sufficient time to finish.

### Tentative Course Schedule

This is a tentative timeline. The topics and order may change based on class progress.

Week #	Week of	Topic	Chapters from the text book	Deliverables due during the week
0	Jan 3 to Jan 9	No lectures		
1	Jan 10 to Jan 16	Intro and Statistical Fundamentals	Chapter 1	
2	Jan 17 to Jan 23	Experimental research and design		
3	Jan 24 to Jan 30	Comparing two means	Chapter 2 and 3	
4	Jan 31 to Feb 6	<i>Excel session</i>		<b>Exercise 1</b> due by Feb 4 (Friday)
5	Feb 7 to 13	Binomial Data (two outcomes)	Chapter 4 and 5	
6	Feb 14 to 20	Comparing more than two means	Chapter 6, 7 and 8	<b>Video proposal</b> due by Feb 18 (Friday)
7	Feb 21 to 27	<b>Reading week (no lectures)</b>		
8	Feb 28 to Mar 6	<i>Excel session</i>		<b>Exercise 2</b> due by Mar 4 (Friday)
9	Mar 7 to 13	Relationship between two variables	Chapter 9	
10	Mar 14 to 20	Multiple regression	Chapter 10	
11	Mar 21 to 27	Binary logistic regression	Chapter 11	
12	Mar 28 to Apr 3	<i>Excel session</i>		<b>Exercise 3</b> due by Apr 1 (Friday)
13	April 4 to 10	<i>Work session</i>		<b>Data Analysis and Poster Report</b> due by April 10 (Sunday)

## Notes on Avoidance of Academic Offenses

**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. See the [Office of Academic Integrity webpage](#) 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. Check [the Office of Academic Integrity](#) for more information. 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](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

**Grievance:** A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact the department’s 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](#).

**Turnitin.com:** Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.

## Note for Students with Disabilities

[AccessAbility Services](#), located in Needles Hall, Room 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 AccessAbility Services at the beginning of each academic term.

## Mental Health Support

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health support if they are needed.

- **On Campus**

*Due to COVID-19 and campus closures, services are available only online or by phone.*

- ✓ Counselling Services: [counselling.services@uwaterloo.ca](mailto:counselling.services@uwaterloo.ca) / 519-888-4567 ext. 32655
- ✓ **MATES**: one-to-one peer support program offered by the Waterloo Undergraduate Student Association (WUSA) and Counselling Services

- **Off campus, 24/7**

- ✓ **Good2Talk**: Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- ✓ Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-4300 ext. 6880
- ✓ **Here 24/7**: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- ✓ **OK2BME**: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online on the Faculty of Arts [website](#)

Download [UWaterloo and regional mental health resources \(PDF\)](#)

Download the [WatSafe app](#) to your phone to quickly access mental health support information.