PSYB07-H3F, Data Analysis in Psychology: Course Syllabus

University of Toronto Scarborough, Fall 2021

Class schedule: September 7 – December 6, Online

People

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CI = course instructor; TA = teaching assistant

Instructor Contact

I will try to respond within 24 hours. Please try to ask content related questions to office hours or lecture breaks as I get dozens of emails per day. I ask students to use their UofT emails, as they are more secure and are governed by the University's codes of conduct. If contacting me, please include "PSYB07" somewhere in the subject line and the topic of the email.

Course Delivery

PSYB07 is an online course. While advertised as asynchronous, the course will be run with live lectures and tutorials and a recommendation to students to attend lecture and tutorial. Recordings will be made available to those who cannot attend synchronously. Lectures will be delivered via Zoom streams Wednesdays at 7:00 PM (Toronto Time). Numerous one-hour tutorials will be held at various times throughout the week following Lecture 2.

Prerequisite

There are no prerequisites for this course. Having an introductory to psychology (e.g., PSYA01 or PSYA02) or other science courses may be helpful, as many techniques we will be learning will take examples from psychology or neuroscience. However, I will try to use basic common-sense examples that don't require a nuanced understanding of these fields.

Course Description, Learning Outcome, and General Information

Course Description

In this course, we will learn theory and application techniques for various statistical tests. A focus will be on interpreting data beyond the mere results, and providing a theoretical background to learn where these tests came from. No one just sat down and came up with these equations. They all derive from earlier sources and mathematical logic. Understanding this logic, rather than purely memorizing, is the key to a good comprehension this material.

Learning Outcome

My goals for this course are threefold. First, for you to be able comprehend research data. Statistics is the language of science and the most important tool at its disposal. As you will all be either future producers or consumers of science, a statistical background will be an invaluable aid to your daily life. Second, to help inoculate yourselves against the misuse of statistics. In 1907, Mark Twain popularized the quote *"There are lies, damned lies, and statistics"*, highlighting the prevalence of their misuse. Finally, I hope you have an appreciation of statistics and math. Even if you still do not like the topic, I hope you at least realize their importance.

How to approach this course

The best approach is to <u>understand, not memorize</u>, the course material. Since the emphasis is on comprehension, you will not be asked to memorize formulae. Instead, focus on knowing how to apply appropriate tests to answer data-driven and theory-driven questions. Thus, learning statistics is like learning to cook. It is not about memorizing ingredients, but knowing how to apply them, what to add, and how to modify them to fit unique situations. We start with basic "recipes" and build on them. This does not mean you are learning categorically different tests, rather how tests change to fit new parameters. Thus, it is imperative that you keep up with the material or you may quickly fall behind. If you miss a lecture, make sure you catch up before attending the next class. To help students ensure they are keeping up with the material, basic post-lecture quizzes will be given following each class. Please reach out if you find you are struggling. Due to its cumulative nature, is very easy to fall behind in this course.

Materials

A Note on Accuracy of Course Material

I will ensure calculations and theory are accurate to the best of my ability. Like all humans, I am not infallible. If you notice a mistake anywhere in the course, please point it out and I will be sure to correct it.

Course website

PSYB07 uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at https://q.utoronto.ca. Once you have logged in to Quercus using your UTORid and password, you should see the link for PSYB07. All content will be posted through this Quercus page. This includes video streams for lectures and tutorials.

Materials

The textbook is *Bors, D. (2018). Data analysis for the social sciences: Integrating theory and practice. London, UK: SAGE Publications Ltd.* It is not mandatory, as all evaluations will follow lecture material. Still, the textbook serves as a great supplemental resource both in the course and as a future reference.

This course contains live lectures and tutorials. While lecture will be recorded, students are strongly encouraged to attend _all_ classes, both lecture and tutorial. There will also be an oral exam at the end of the course, requiring stable internet connection. Students are also recommended to use a scientific calculator to complete practice questions, quizzes, and exams. This is important, as assignments and assessments require students to submit their rough work to ensure it was not completed with the aid of software.

Since a large component of the work submitted needs to be handwritten, students are recommended to have a scanner handy or use one of the many free phone applications to scan and upload submissions. Photos taken with a cellphone camera are also acceptable, but please ensure the lighting and angle they are captured allows the submission to readable. Illegible submissions may not be graded.

Required Software

For assignments, the use of Microsoft Word is a <u>requirement</u>, as part of the assignment is responding to feedback. You can access a browser version of Word by logging into your student email on Microsoft Outlook and launching Word from the app tab. Additionally, the University provides Office licenses to all students which can be accessed here:

https://onesearch.library.utoronto.ca/ic-faq-categories/microsoft-365-proplus.

Content Schedule

The course schedule is outlined in the table below. ***PLEASE NOTE*** *that the order of lecture may change to accommodate the midterm scheduling. If that happens, an updated syllabus with the modified lecture schedule will be posted*.

Week	Date	Lecture: Topic	Readings*
1	Sep 8	L1: Introduction, terminology, and descriptives	Ch. 1-2
2	Sep 15	L2: Visualizing data, distributions	Ch. 1-2
3	Sep 22	L3: Introduction to probability	Ch. 3
4	Sep 29	L4: Probability distributions	Ch. 3
5	Oct 6	L5: Hypothesis Testing: *z* tests and *t*	Ch. 4-5
6	Oct 20	L6: Independent and paired *t* tests	Ch. 4-5
7	Oct 27	*Tentative* midterm week, no lecture	
8	Nov 3	L7: Power for *t* tests, nonparametric equivalents	Ch. 5
9	Nov 10	L8: Correlation and regression	Ch. 7
10	Nov 17	L9: Chi-squared tests	Ch. 6
11	Nov 24	L10: Introduction to ANOVA and multiple regression	Ch. 8
12	Dec 1	L11: Introduction to machine learning	

* Readings are suggested, but not mandatory. There will be substantial overlap between textbook and lecture content, though all exams will be taken out of lecture content.

Attending Virtual Lectures

Content from each lecture builds on the preceding one. Due to this hierarchical structure, lectures should be viewed in the order they are delivered. Missing one lecture without watching the recording will result in confusion for subsequent lectures. During lecture, you are invited to ask questions. If you wish ask a question vocally, please raise your hand (Zoom has a raise-hand feature). Once I acknowledge you, you may activate their microphone and speak. Please keep microphones muted when not speaking to prevent introducing audio noise into the stream. Note that misuse of the microphone system may result in being muted permanently. You may ask a question by typing it in chat, but it is much more interactive to do it vocally.

Attending Tutorials

During tutorial, TAs will answer student questions and review material from lecture. Students sign up for their tutorial sections on ACORN. There are five sections. These tutorials may not be recorded, so please attend and ask questions as they are imperative to gaining a practical understanding of the course material. Students do not have to attend the tutorial they signed up for, they can attend any and as many sections as they wish. Tutorials are *imperative* in ensuring your understanding of the course material, especially given the applied-nature of the course material. Lecture is where material is introduced, but tutorials are where it is solidified.

Attending Online Exams

Delivery details for online exams will be made available on the course website. All exams will require electronic submission of your University of Toronto Student ID. Oral exams will require active internet connection, webcam access, and a microphone. The oral will be delivered during the final exam period.

Submitted exam work will be through the appropriate Quizzes page on Quercus. Please do not email them to me or the TAs. All exams will be given appropriate submission windows for you to scan and upload material. These upload windows will be _very generous_ and so, barring any technical issues, any case of "unable to upload my work on time" will not be accommodated.

Evaluative Material

The purpose of this course is to facilitate your analysis and comprehension ability of common statistical techniques. Evaluations are designed to reflect this objective.

Assessment	Quantity	Weight	Due
Post-lecture quizzes	10	8% (1% × top 8)	The night before each lecture
Written assignments	2	20% (10% × 2)	Oct 18, Nov 8, Nov 22, Dec 6
Challenge quizzes	2	4% (2% x 2)	Oct 22 (tentative), Dec 6
Study analysis	1	3%	Oct 29
Midterm exam*	1	25%	TBA
Final and oral exam*	1	40%	During final exam period

* Synchronous evaluation, requiring University of Toronto student ID. Oral assessment will require a microphone and webcam access.

Completing Evaluative Material

Students are required to complete all graded evaluations (those listed in the above table) *INDIVIDUALLY*. It is considered an academic offense for students to work together to complete these. An academic offense includes, but is not limited to, discussing answers to questions, discussing ways to complete questions, sharing answers, completing another student's work, or having another student complete your work. All non-graded material (problem sets, practice questions, etc.) can be discussed with your peers. You are also prohibited from using any statistical analysis or spreadsheet software when completing graded material.

Post Lecture Quizzes: 8%

Despite being allocated the smallest percentage, these quizzes are probably the most important evaluations. These quizzes exist as a self-reflection on your understanding of the course material. This is to ensure that, if you fall behind in one lecture, you do not fall behind in subsequent lectures. For example, to understand t tests you need to understand z tests, which requires you to understand hypothesis testing. The more you fall behind or do not keep up with course material, the exponentially greater your confusion would be. These quizzes can capture areas of confusion, allowing you to seek help and prevent yourself from falling behind further. Quizzes will ask questions from each lecture, and will involve either a quick calculation, short answer, or other selection. Students should prepare by following along in lecture and tutorial,

asking questions when necessary, and practicing calculations. It is understandable that students will have to miss certain classes, or may struggle with the occasional lecture material, so we will only include the top 8 quizzes out of the 10 given. However, take that opportunity to improve your comprehension if you realize you are struggling with a lecture topic!

Each quiz is worth 1% of your final grade and only the top 8 of 10 will count. Again, while this is a minor contribution to your final mark, these quizzes are invaluable in ensuring you are keeping up with the material. Therefore, it is imperative that students complete these short self-evaluations. They will be posted after lecture and tutorial for that week, and should take roughly 10-15 minutes to complete. Late submissions will not be allowed. Since students may be adding or dropping the course in the first week, a quiz will not be given after the first lecture.

Written Assignments: 20%

Two writing assignments will be given during the course. Since no students' writing is perfect, the goal of these assignments is to instead evaluate the ability for students to improve their writing while thinking critically about the material. To this end, the evaluation of these assignments will be based on student's ability to consider reviewer feedback and revise their paper. Each assignment will have an initial Submission (A1-S, and A2-S), followed by a Revised submission (A1-R and A2-R). This means that students who provide a comprehensive revision of their written assignment can receive 10/10 on each assignment, even if their writing is not perfect, because they have adequately demonstrated their ability to revise and improve. More information will come on the Assignment specific module on Quercus. Assignments will be submitted through Quercus, using the University's plagiarism detection tool. For the first assignment, the initial submission is due October 18, and the revision submission is due November 8. For the second assignment, the first submission is due November 22 and the revised submission is due December 6.

Challenge Quizzes (OQ): 4%

A quiz covering material from the first and second half be due prior to each exam. Similar to post-lecture quizzes, these exist to help you review the material and address any weaknesses in understanding the course material. They offer students the ability to address these comprehension weaknesses before the assessments take place. Their due-dates may be altered depending on the scheduling of the midterm and final exam. Unlike the post-lecture quizzes, these will not be simple evaluations to ensure you are following the material. As their name suggests, they will be much more challenging and focus on a higher-conceptual understanding of the material. They will evaluate you on the ability to think *outside* what is taught in this course and apply the material to novel situations you may not have seen in lecture or tutorial.

Study Analysis: 3%

Once we learn the logic of hypothesis testing in Lecture 5, students will be introduced to reading and digesting scientific papers. You will get to choose from a pool of research papers and provide an insight into the analysis and interpretation of the data. This will require students to research a bit ahead relative to the course material.

Midterm Exam: 25%

This serves as the mid-course evaluation. I will sample evenly from all course content as part of the exam. The registrar will provide the date. Students will complete and submit the exam during this period. It will consist of calculation and short answer questions. I have requested the exam to be after Lecture 6, but that will be up to the registrar.

Final Exam: 40%

This will take place during the final exam period, after the lectures have concluded. Content will be comprehensive, with a focus on the latter half of the course. Similar to the midterm test, it will conclude a variety of short answer and calculation questions.

Part of the final exam will include an oral exam component, focusing a cumulative theoretical understanding of the course material will take place during the final exam period. This will be worth 15% of the overall 40% from the final exam. You will be paired one-on-one with a TA. During this time you will <u>need to have</u> a webcam and microphone available. You will be given four questions, and asked to choose three and answer them. Your TA can give follow-up questions as deemed necessary. These will be cumulative theoretical questions.

Extensions, Late Penalties, and Missed Assessments

We all live busy lives and sometimes it is difficult to make deadlines, even with fair notice. To aid you, all students get three free, unquestioned 72-hour through an optional Quercus quiz. The ability to request the extension expires after the deadline and late penalties will occur. For accessibility, illness, emergencies, or if you require more than 72 hours, email me with the appropriate documentation for approval. These extensions do not apply to exams or quizzes.

Submitting an assignments late, without an approved extension, accrues a 10% mark penalty per day it is late. An assignment is deemed late the moment the clock strikes midnight and accumulates late days every midnight following. So please do not wait until the last minute to complete and submit your assignment. Be cognizant of increased Quercus traffic near midnight, and possible internet connectivity issues. After three late days have past, the student will no longer be allowed to submit the assignment and it will receive a final grade of zero.

If a student misses an exam due to illness or any other valid reason, please reach out to the instructor as soon as possible. Students will be required to submit an illness self-declaration through ACORN. Missed exams will be accommodated on a case-by-case basis and may involve make-up exams, reweighing course material for that student, or alternative evaluations.

Requests for Regrading

Students should expect fair evaluation and feedback from the instructor and TAs. Students are more than welcome to request a regrade if they believe their assigned grade is incorrect or does not accurately reflect the submitted work. A student can request a regrade on any evaluation as long as they provide valid reasoning (i.e., a student cannot simply say "I feel I deserve a higher mark", and instead must justify where they believe they were unfairly penalized). I, the Course Instructor, will do the regrade, and there is no guarantee the grade will increase, it is possible that the grade may decrease. This new grade becomes the assigned grade. Requests must come in within 2 weeks of the posted grade. Any further concerns can be discussed one-on-one with the student and course instructor.

Bonus Marks

Throughout the course, bonus material may be assigned as they are deemed necessary. These do not count towards the main 100% of your final grade and are, instead, additional boosters to your final grade.

Academic Integrity

About Academic Integrity

All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments, discussing material with fellow students, and writing tests and exams. Ensure that the work you submit for grading represents your own honest efforts. Plagiarism — representing someone else's work as your own or work that you have previously submitted for marks in another class or program — is a serious offence that can result in sanctions. Speak to me or your TA for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at http://www.writing.utoronto.ca. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more

information, please see https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity and http://academicintegrity.utoronto.ca. Plagiarism is not necessary the textual copying of another's work. Using someone else's idea as your own, even if rewritten in your own words, is also a form of plagiarism.

Use of Ouriginal

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (https://uoft.me/pdt-faq).

Important Links

Definition of Academic Integrity: https://www.academicintegrity.org/fundamental-values/

University of Toronto Code of Behaviour on Academic Matters:

https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019

How to ensure Academic Integrity

Here are two easy ways to ensure you meet academic integrity

1. Turn in original work. Do not copy/paste from any external source (including websites, encyclopedias). Do not use work you have submitted in other classes. Do not reword another source without citing it as the original author's intellectual property.

2. Do not use data analyses software, spreadsheets, or any other unauthorized software.

3. All graded work, unless otherwise specified, should be completed independently. This includes assignments, quizzes, and assessments.

What Counts as Plagiarism

There are many forms of plagiarism. Many people assume plagiarism occurs when one directly copies another authors' work as their own. However, rewording another's work without proper credit is also a form of plagiarism. This is because you are essentially taking another person's ideas and making them your own. Self-plagiarism occurs when you reuse your own work without acknowledgement. Thus, all student submissions should be the student's own <u>fresh</u> and <u>original work</u>, not used in other courses. They should be the ideas of the student submitting them, and not from another student, person, or computer/AI generated idea.

Repercussions for violating Academic Integrity

Academic misconduct may receive one or both of the following, among other unlisted consequences:

1. An assigned grade of zero to any graded material in the course
2. Acceleration to the Department or other disciplinary action

Support for Students

Accessibility Services

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting the UTSC accessibility page at https://www.utsc.utoronto.ca/ability/welcome-accessability-services. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS to any student in the course.

Mental Health

As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. Everyone feels stressed now and then – it is a normal part of university life. Some days are better than others, and there is no wrong time to reach out. There are resources for every situation and every level of stress. There are many helpful resources available through your College Registrar or through Student Life (http://studentlife.utoronto.ca and http://www.studentlife.utoronto.ca/feeling-distressed). An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of available resources.

Writing Support

Developing your writing ability is a critical skill to take advantage of during your undergraduate career. A strong writing ability is crucial to communicate ideas. I often recommend students to re-read their first university writing assignment and their final university writing assignment to gauge how much they improve. The university offers writing support centers, which I encourage students to take advantage of: https://www.utsc.utoronto.ca/twc/welcome. English language support is also offered through the CTL (https://utsc.utoronto.ca/eld/welcome-ctl-english-language-development-support) and the Center for International Experience (https://www.studentlife.utoronto.ca/cie/els).

Other Support

The Center for International Experience offers support for international students (http://www.studentlife.utoronto.ca/cie). The University provides support for students with children or who have family responsibilities (https://familycare.utoronto.ca/).

Office of Academic Success

The university has a support center for students to engage in learning strategies and develop a roadmap for undergraduate success (http://www.studentlife.utoronto.ca/asc).

External Help with Statistics

Khan academy is an external source that has numerous resources pertaining to statistics: https://www.khanacademy.org/math/statistics-probability. Crash Course is an amazing YouTube series which condenses numerous topics. They have a great one on statistics: https://www.youtube.com/playlist?list=PL8dPuuaLjXtNM_Y-bUAhblSAdWRnmBUcr. Note that what we cover in this course is a small piece of the Statistics field. These external resources contain much more information than will be covered in the course and thus should not be used as study material. However, I encourage students to continue expanding their knowledgebase during and after the course. Understanding statistics is one of the most important skills one could have.

Lecture Capture by Instructor

If lecture recordings are provided, they are only for the exclusive use of enrolled students, for their personal learning. Lecture recordings are not to be shared in any way beyond enrolled students.

Privacy/FIPPA Statement

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to http://www.utoronto.ca/privacy.

Course Materials, Including Lecture Notes

Course materials are provided for the exclusive use of enrolled students. Do not share them with others. I do not want to discover that a student has put any of my materials into the public domain, has sold my materials, or has given my materials to a person or company that is using them to earn money. The University will support me in asserting and pursuing my rights, and my copyrights, in such matters.