Advanced Statistical Inference (PSYC 301)
Fall 2025

Pre-requisites: Registration in a PSYC Arts Specialization, PSYC Science Specialization, Major, or BIPS Specialization Plan and a [minimum GPA of 1.90 in PSYC 202/3.0 or STAT Options and PSYC 203/3.0] and a minimum GPA of 2.60 in PSYC at the 100 and 200-level
Number of Credits: 3.00
Learning Hours: 120 (36 Lecture, 24 Laboratory, 12 Group Learning, 12 Online Activity, 36 Private Study)
Modality: On Campus
Classroom Accessibility: see **https://www.queensu.ca/classrooms/classrooms/theological-hall#CONVOCATION-HALL**

Instructor: Dr. Leandre R. Fabrigar
E-mail: fabrigar@queensu.ca
Phone: 613-533-6492
Office Hour: Wednesday (11:30 AM - 12:30 PM or by Appointment) (Craine – Room 319)

Required Text:

Field, A. (2024). *Discovering Statistics Using IBM SPSS Statistics* (6th Edition). Thousand Oaks, CA: Sage Publications. (Queen's Bookstore: $271.35 New; $167.99 Digital; Available at Queen's Library)

Required Statistical Software (SPSS):

Statistical analyses in the course will be conducted using SPSS. SPSS is available to all Queen's students by logging into the Queen's Software Center. On this site, students can access SPSS 29 and the License Key. Students can go directly to the SPSS's info/download website with this direct link (NetID login required): https://queensuca.sharepoint.com/sites/software-centre/SitePages/SPSS.aspx

Course Description:

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This course is designed to provide students with an introduction to basic inferential statistics as they are used in psychology and related disciplines. Course lectures will provide students with a basic conceptual introduction to key statistical concepts in inferential statistics. Lectures will also provide a conceptual introduction to commonly used statistical procedures such as *t* tests, One-Way ANOVA, Factorial ANOVA, correlation, and simple regression. Course labs will provide students with hands-on instruction in how to conduct and interpret statistical analyses using IBM SPSS Statistics.

Course Learning Outcomes:

1) Understand conceptual logic of statistical hypothesis testing

2) Understand conceptual logic underlying t-tests, one-way ANOVA, factorial ANOVA, correlation, and simple regression

3) Master implementation and interpretation of analyses using t-tests, one-way ANOVA, factorial ANOVA, correlation, and simple regression

Course Outline

Dates	Topic	Readings
Week 1 (Sept 2, 4)	**Course Overview** **Making Claims with Statistics** -Statistics as Principled Arguments -Using Inferential Statistics to Distinguish Among Claims -Systematic versus Chance Explanations -The Language and Limitations of Null Hypothesis Testing -The Quality of Statistical Evidence: MAGIC	Ch. 1-2
Week 2 (Sept. 9, 11)	**Elementary Arguments and the Role of Chance** -Random Sampling Processes as Explanation -Known Causes as Explanation for Departure from Randomness -The Independent Sample *t* Test -Setting Alpha: One-Tailed, Two-Tailed, and "Lopsided" Tests -Setting Beta: Power -The Repeated Measures *t* Test	Ch. 10
Week 3 (Sept. 16, 18)	**Elementary Arguments and the Role of Chance (continued)** -Random Sampling Processes as Explanation -Known Causes as Explanation for Departure from Randomness -The Independent Sample *t* Test -Setting Alpha: One-Tailed, Two-Tailed, and "Lopsided" Tests -Setting Beta: Power -The Repeated Measures *t* Test	Ch. 10
Week 4 (Sept. 23, 25)	**Magnitude of Effects** -Probability Measures: The *p* value and Bayesian Measures -Effect Sizes: Raw Effect Sizes and Standardized Effect Sizes -Interpreting Effect Sizes -Confidence Intervals	Ch. 3
Week 5 (Sept. 30, Oct. 2) **Note: No Tuesday Classes**	**More Complex Hypotheses: Multiple Levels of IVs** -One-Way ANOVA (Between-Subjects) -Post-hoc comparisons and Family-Wise Error in ANOVA -Power and effect size in ANOVA	Ch. 12, 15

	-One-Way ANOVA (Repeated Measures) -Repeated Measures ANOVA post hoc comparisons, power, and effect sizes **LAB 1 Due (October 5, 11:59 PM)**	
Week 6 (Oct. 7, 9)	**More Complex Hypotheses: Multiple Levels of IVs (Continued)** -One-Way ANOVA (Between-Subjects) -Post-hoc comparisons and Family-Wise Error in ANOVA -Power and effect size in ANOVA -One-Way ANOVA (Repeated Measures) -Repeated Measures ANOVA post hoc comparisons, power, and effect sizes	Ch. 12, 15
Fall Reading Week Oct. 13-17)	**No Class**	
Week 7 (Oct. 21, 23)	**Considering Data "Fishiness"** -Assumptions of the independent samples *t* Test and the Between-Subjects ANOVA -Assumptions of the repeated measures *t* Test and the Repeated Measures ANOVA -Evaluating assumptions and responses to assumption violations -Related data considerations: scales of measurement and outliers **Midterm Exam (October 23, locations to be announced)**	Ch. 6
Week 8 (Oct. 28, 30)	**More Complex Hypotheses: Two IVs** -The logic of multiple IVs -Interactions: Testing Moderation -The two-factor ANOVA (Between-Subjects) -Follow up comparisons in the two-factor ANOVA -Power and effect size in the two-factor ANOVA -Assumptions in the two-factor ANOVA	Ch. 14
Week 9 (Nov. 4, 6)	**More Complex Hypotheses: Two IVs (Continued)** -The logic of multiple IVs -Interactions: Testing Moderation -The two-factor ANOVA (Between-Subjects) -Follow up comparisons in the two-factor ANOVA -Power and effect size in the two-factor ANOVA -Assumptions in the two-factor ANOVA	Ch. 14
Week 10 (Nov. 11, 13)	**Hypotheses with Continuous Variables: Correlation and Regression**	Ch. 8, 9

	-Characterizing relationships between continuous variables -The Pearson correlation coefficient -Understanding and interpreting correlations -Alternative measures of association -Simple regression and prediction -Standard error of estimate -Hypotheses for Regression -Standard and Unstandardized Solutions -Hypotheses for Regression	
Week 11 (Nov. 18, 20)	**Hypotheses with Continuous Variables: Correlation and Regression (Continued)** -Characterizing relationships between continuous variables -The Pearson correlation coefficient -Understanding and interpreting correlations -Alternative measures of association -Simple regression and prediction -Standard error of estimate	Ch. 8, 9
Week 12 (Nov. 25, 27, Dec. 2)	**MAGIC: Further Considerations** -Articulation: Ticks and buts -Generality -Interestingness -Credibility -MAGIC considered in totality **No Class (November 27)** **LAB 2 Due (November 30, 11:59 PM)**	None

Final Exam (December 5-20)

Assessments

Exams (Description):

There will be two in-person exams. These exams will be a mixture of short answer, long answer, and essay questions. The midterm exam will include material covered in approximately the first half of the term. The final exam will cover material throughout the entire term, although a greater emphasis will be placed on material covered post-midterm. The final exam will be scheduled during the exam period at the end of the Fall term. The emphasis of exam questions will be on material covered in lecture, although some questions may be drawn exclusively from the text. The midterm will be weighted 34% of the total course mark and the final exam will be weighted 36% of the total course mark. It is expected that students will write both exams. If there is a valid medical reason or other important life circumstance that requires a student to miss the midterm exam, the general policy will be to proportionally prorate the midterm exam to the final exam and the remaining lab assignment. Exams are an essential component of the course and all students are required to complete at least one exam.

Lab Assignments (Description):

Interspersed throughout the term will be 2 lab assignments. These lab assignments will focus on providing you with hands-on experience in conducting statistical analyses using SPSS. Lab assignments will be posted in onQ for download 9 days prior to their due date. Lab assignments will be submitted for marking in onQ. The first lab assignment will be weighted 13% of your total course mark and second lab assignment will be weighted 17% of your total course mark. It is expected that students will complete both lab assignments. If there is a valid medical reason or other important life circumstance that requires a student to miss submitting an assignment, the general policy will be to proportionately prorate the lab assignment to the yet to be completed exams and assignment. If special accommodations permit the submission of a late assignment, the maximum possible extension will be limited by the date at which feedback on that assignment will be provided to the class (approximately two weeks after the original submission deadline). In other words, no submissions of assignments will be permitted after feedback on that assignment has been distributed to the class. It is course policy that answers on lab assignments submitted by students will be **solely their own work** and that students will not discuss the content of lab assignments with other people (or with AI) prior to submission of their work or with a student who has yet to submit the lab assignment. Any questions regarding lab assignments should be directed to the instructor or one of the course teaching assistants. All students will be assigned to lab sections. You will have a teaching assistant (TA) responsible for your lab section. This TA will hold a weekly in-person lab session and a weekly virtual office hour at which you can ask any questions you might have regarding a pending lab assignment. Virtual office hours will be hosted in Teams. This TA will also mark your lab assignments and provide you with feedback regarding your performance on the assignments. Lab assignments are an essential component of the course and all students are required to complete at least one lab assignment.

Grading: Lab Assignment 1 (13% of course; learning outcomes 1, 2, and 3)
Midterm Exam (34% of course; learning outcomes 1, 2, and 3)
Lab Assignment 2 (17% of course; learning outcomes 1, 2, and 3)
Final Exam (36% of course; learning outcomes 1, 2, and 3)

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queens Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Queen's Policy Statement on Academic Integrity

Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge and to share the ideas and knowledge that emerge from a range of intellectual pursuits. Each core value of academic integrity, as defined in the Senate Academic Integrity Policy, gives rise to and supports the next.

Honesty appears in presenting one's own academic work, whether in the context of an examination, written assignment, laboratory or seminar presentation. It is in researching one's own work for course assignments, acknowledging dependence on the ideas or words of another and in distinguishing one's own ideas and thoughts from other sources. It is also present in faithfully reporting laboratory results even when they do not conform to an original hypothesis. Further, honesty is present in truthfully communicating in written and/or oral exchanges with instructors, peers and other individuals (e.g. teaching assistants, proctors, university staff and/or university administrators).

Trust exists in an environment in which one's own ideas can be expressed without fear of ridicule or fear that someone else will take credit for them.

Fairness appears in the proper and full acknowledgement of the contributions of collaborators in group projects and in the full participation of partners in collaborative projects.

Respect, in a general sense, is part of an intellectual community that recognizes the participatory nature of the learning process and honours and respects a wide range of opinions and ideas. However, "respect" appears in a very particular sense when students attend class, pay attention, contribute to discussion and submit papers on time; instructors "show respect by taking students' ideas seriously, by recognizing them as individuals, helping them develop their ideas, providing full and honest feedback on their work, and valuing their perspectives and their goals" ("The Fundamental Values of Academic Integrity", 3rd Edition, p. 8).

Ultimately, responsibility is both personal and collective and engages students, administrators, faculty and staff in creating and maintaining a learning environment supported by and supporting academic integrity.

Courage differs from the preceding values by being more a quality or capacity of character – "the capacity to act in accordance with one's values despite fear" ("The Fundamental Values of Academic Integrity", 3rd edition, p. 10). Courage is displayed by students who make choices and integrous decisions that are followed by action, even in the face of peer pressure to cheat, copy another's material, provide their own work to others to facilitate cheating, or otherwise represent themselves dishonestly. Students also display courage by acknowledging prior wrongdoing and taking proactive measures to rectify any associated negative impact.

All of these values are not merely abstract but are expressed in and reinforced by the University's policies and practices.

Turnitin Statement

This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarized text in this course. Data

from submissions is also collected and analyzed by Turnitin for detecting Artificial Intelligence (AI)-generated text. These results are not reported to your instructor at this time but could be in the future. Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. The similarity report generated after an assignment file is submitted produces a similarity score for each assignment. A similarity score is the percentage of writing that is similar to content found on the internet or the Turnitin extensive database of content. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

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Accommodations for Disabilities

Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the QSAS website to learn more about academic accommodations or start the registration process with QSAS by clicking ***Access Ventus*** button at **Ventus | Accessibility Services | Queen's (queensu.ca)**

VENTUS is an online portal that connects students, instructors, Queen's Student Accessibility Services, the Exam's Office and other support services in the process to request, assess, and implement academic accommodations.

To learn more go to: https://www.queensu.ca/ventus-support/students/visual-guide-ventus-students

Academic Consideration for Students in Extenuating Circumstances

Academic Consideration is a process for the University community to provide a compassionate response to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or

impede a student's ability to complete their academics. This may include but is not limited to any extenuating circumstance (illness, bereavement, traumatic event, injury, family emergency, etc.) which is short-lived, begins within the term, and will not last longer than 12 weeks - see Academic Consideration webpage for details (https://www.queensu.ca/artsci/undergraduate/student-services/academic-consideration)

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on Academic Consideration in Extenuating Circumstances and submit a request via the Academic Consideration Request Portal. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration. While we encourage instructors to accommodate, each instructor has discretion in deciding whether or how to apply the Academic Consideration. For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's Academic Consideration website. ASO courses include links to information on Academic Consideration on your Course Homepage in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant. For more information, please see the Senate Policy on Academic Consideration for Students in Extenuating Circumstances.

If you need to request academic consideration for this course, you will be required to provide your request to the following name and email address to ensure it reaches our team accordingly:

Course Coordinator Name: Tara Karasewich
Course Coordinator email address: psyaccom@queensu.ca

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their Course Coordinator as soon as possible once Consideration has been verified. Any delay in contact may limit the Consideration options available.

Please follow up with Tara Karasewich using email (psyaccom@queensu.ca) within 2 days of receiving verification of your Consideration request.

Timing of Final Examinations

Once the exam schedule has been finalized, the exam date will be posted on your SOLUS account. The exam dates for each term are listed on the Faculty of Arts and Science webpage under "Important Dates." Student exam schedules for the Fall Term are posted on SOLUS immediately prior to Thanksgiving and on the Friday before Reading Week for the Winter Term. Students should **delay finalizing any travel plans until after the examination schedule has been posted**. Exams will **not be moved or deferred** to accommodate employment, travel/holiday plans or flight reservations. For information regarding what is considered extenuating circumstances and qualifications for Academic Consideration, please visit the Faculty of Arts and Science's Academic Consideration webpage**.**

If you are unable to attend an exam and receive approval for a deferred proctored exam, a further deferral of that exam will not be accommodated.

Weekly Instructor Office Hours:

The instructor will hold a weekly office hour session each week. The instructor will be in his office during this time. During that time, the instructor will answer any questions you might have regarding lecture material and the course more generally.

Teaching Assistants, Lab Sections, and Lab Office Hours:

Krista Jones (Head TA)
Email: kmj7@queensu.ca
Lab Section: A (002) (Wednesday: 3:30 PM – 5:30 PM)
Office Hour: Wednesday (2:00 PM - 3:00 PM)

Keanna Bamdad Rowchan
Email: vdt2@queensu.ca
Lab Section: G (008) (Tuesday: 2:30 PM – 4:30 PM)
Office Hour: Monday (1:00 PM – 2:00 PM)

Louis Chitiz:
Email: lssc1@queensu.ca
Lab Section: E (006) (Thursday: 2:30 PM – 4:30 PM)
Office Hour: Monday (1:00 PM – 2:00 PM)

Maxine Parker
Email: krv2@queensu.ca
Lab Section: B (003) (Wednesday: 6:30 PM – 8:30 PM)
Office Hour: Thursday (11:00 AM – 12:00 PM)

Carina Pham
Email: cp136@queensu.ca
Lab Section: C (004) (Friday: 3:30 PM – 5:30 PM)
Office Hour: Friday (5:30 PM – 6:30 PM)

Charlie Shen
Email: ms370@queensu.ca
Lab Section: F (007) (Friday: 11:30 AM – 1:30 PM)
Office Hour: Thursday (1:30 PM – 2:30 PM)

Angele Wen
Email: xg36@queensu.ca
Lab Section: D (005) (Thursday: 6:30 PM – 8:30 PM)
Office Hour: Monday (11:00 AM – 12:00 PM)

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from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights.