PSYC 302: Advanced Research Methods
Queen's University - Winter 2019
Wednesday 10:00 – 11:20 Botterell B143
Friday 8:30 – 9:50 Botterell B143

Instructor: Dr. Tom Hollenstein (tom.hollenstein@queensu.ca) Craine 220
Coordinator TA: Kalee De France (11kd22@queensu.ca)
Head Lab TA: Simone Cunningham (0scc6@queensu.ca)

Lab Sections (Humphrey 219)
Monday 8:30-11:30am Lab section 005: Tina Mihajlovic (valentina.mihajlovic@queensu.ca)
Tuesday 8:30-11:30am lab section 002: Abi Muere (abigail.muere@queensu.ca)
Tuesday 11:30am-2:30pm lab section 003: Abi Muere (abigail.muere@queensu.ca)
Tuesday 2:30-5:30pm Lab section 004: Kalee De France (11kd22@queensu.ca)

Required Software: SPSS 24

Required Text:
Field, A., (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). California: Sage
Publications.
Howitt, D., & Cramer, D., (2017). *Introduction to SPSS in Psychology* (7th ed.). United
Kingdom: Pearson Education.

Recommended Texts:
Abelson, R. P. (1995). *Statistics as Principled Argument*. Hillsdale, NJ: Laurence Earlbaum.
Pinker, S. (2014). *The Sense of Style: The Thinking Person's Guide to Writing in the 21st
Century*. New York: Penguin

Great Resource:
Tabachnick, B. G. & Fidell, L. S. (2012). *Using Multivariate Statistics*. New York: Pearson

Course Description.
The primary purpose of this course is to prepare you to do an undergraduate thesis project
in PSYC501. To do this, you will need to know how to write a proposal, one of the most
important forms of scientific communication. To know how to write a proposal, you will need to
know how to connect theory with research questions with hypotheses with study design and
measures with statistical tests. Statistically, we will cover the **concepts**, **procedures**, and
interpretations of several multivariate methods.

Learning Objectives
By the end of the course you will be able to:
1. Comprehend the basics of multivariate statistical methods
2. Utilize statistical resources to understand variations and extensions of these methods
3. Conceptually link research questions to appropriate methods
4. Write a coherent research proposal

I assume you already have a good grasp of univariate methods (e.g., t-tests, correlations) and issues so that we may delve into the issues that arise when you need to analyze two or more dependent and/or independent variables. After covering the basics of data cleaning and reduction, we will cover each of the three major multivariate methods: factor analysis, MANOVA, and regression. These three are mathematically related to each other and most other techniques can be understood as variations of these three. Weekly labs will focus on SPSS procedures as well as clarify issues from lecture and the homeworks.

Although statistics are based on mathematical formulas that represent the relationships among variables, the intent of this course is to focus on statistics as a means of principled argument (Abelson, 1995). We use statistics to make inferences about the true nature of the world, to answer research questions, to test theories. Hence, the goals of the course are to make sure that you walk away understanding the **conceptual underpinnings** of each technique, the SPSS **procedures** necessary to conduct these analyses, and the skills to be able to critically **interpret** your own results and the claims of the research you encounter throughout your careers. Thus, this not a course of memorization but training in how to be an effective researcher.

A few other things for your consideration:
1. The range of expertise in the class is broad. I will aim for the middle level. Thus, advanced students may be interested in more detail and novice students may struggle a bit. That is the nature of such a course as this. However, I have always felt like I could take one introductory stats course each year and still get something out of it. Which leads me to…
2. Redundancy. The absolutely best way to learn statistics is through redundancy, a repetition of the same ideas, multiple presentations of the same material, re-experiencing a technique in different contexts, the reiteration of crucial details, and practice, practice, practice. To this end, I will emphasize what is shared among the techniques as well as try to present the information in several ways, when possible (i.e., equations, graphs, examples). However,
3. I am not going to be able to impart to you absolutely everything about multivariate statistics in this course for several reasons: (a) not enough time – each technique could take 13 weeks on its own; (b) each research question and data set can present relatively unique issues for analysis; (c) some issues are still hotly debated among the statistical intelligentsia; and (d) I simply don't know absolutely everything (my omniscience is less than complete but I do enjoy the challenge). However, this is true of any course and instructor. What I *will* be able to give you are the fundamentals so that when you need to run a complicated analysis next year, you know where to look for a refresher, or be able to understand how to interpret the results, or at least know how to ask questions of a statistician. Thus, we will need to be able to speak a…
4. mathematical language. There are about 20 symbols and a few labeling conventions we require in order to efficiently communicate about and manipulate multivariate data. Yes, this really is necessary. If you think you are not mathematically inclined, then think about this as a language with very few words. The goal is to get you *thinking* "multivariately". Still, no matter what I and the TAs do, some of you will be…
5. anxious. Statistics has a bad rap. As a result, many people approach it with fear and loathing. I have seen many students dig in their heels and put more effort into fretting, resisting, avoiding, or blaming than just trying to learn. If this describes you in any way, I

implore you to suspend your apprehensions, breathe deeply, <u>come see me or your TA</u>, look for alternate sources of information, ask questions, and keep at it. I promise, multivariate statistics are good for you.

Course Requirements.

Registered students are expected to attend every class and lab. Course texts are for your edification. The more you read, the better you will do in the course; the less you read, the worse you will do. The two SPSS books are required in that between the two you will be able to understand how to execute the statistical techniques in the labs. You are expected to read the relevant chapters before lab section on that topic. The other readings are very important resources and ones that I recommend to everyone doing psychology research. Abelson's perspective in Statistics as Principled Argument is dead on and will be something to refer to even after the course is done. Pinker's expertise as a language researcher and writer has culminated in his excellent book about writing, The Sense of Style. If you read these two books I can guarantee that your assignments will be better than they would have been otherwise. However, we will not be policing your completion of any of these readings. Research is not about policing or memorizing, but asking questions, reasoning, and testing. These texts are suggested for anyone who is serious about that end. Finally, I have listed my favourite multivariate text by Tabachnik and Fidell. I only suggested it as a resource, perhaps mostly for the future, for anyone pursuing multivariate research in earnest. It is a very clearly written text. I still refer to it from time to time.

Lectures. You are required to attend all lectures as these will provide the background necessary to succeed in lab, with homeworks, and writing proposals. Twelve times throughout the term you will complete an in class Top Hat response. These will be opportunities for you to articulate your expectations, relate the material to other classes and research areas in psychology, assess your comprehension of the readings, or ask a specific question. This is helpful for me to understand what you are comprehending and for you to monitor your own progress. You will not be graded on quality or content but will receive 4 points each for 10 of the 12 (i.e., you can miss two), no exceptions. These may occur on any of the 20 lecture days after the first class, except for reading week, Feb. 13 (501 info day), March 20 and March 22.

Homework. There will be 4 homework assignments, 30 points each. Each assignment will come with a data set (also on onQ) with several instructions for analysis. You must submit an **electronic copy** via Turnitin BEFORE the start of lecture on the day it is due (e.g., if it is due on Wednesday and received after 9:59am, it is late and will be marked down). More details about the homework procedures will be discussed during lab.

Lab Quizzes. During lab meetings you will have a short quiz to assess your comprehension of **the material covered for that day**. Out of 11 quizzes in total, only the best 8 worth 10 points each will count toward your final grade.

Proposals. You will be given two opportunities to practice proposal writing in order to prepare you for the final assignment, a 5 page proposal. Proposal 1 will be one single-spaced page on any question related to psychology containing: (1) a clearly stated aim or objective and/or research question (2) justification of a clearly stated hypothesis (3) appropriate design and measures and (4) appropriate statistics to test that hypothesis. You will get 5 points for adhering

to each of those 4 criteria for a total of 20 points. Each student will then randomly be assigned one peer's proposal for review. Peers will provide feedback within 1 week on each of the four points above. You will not receive points for submitting the peer feedback BUT you will be penalized 20 points for not submitting it by the deadline. Proposal 2 will be the same process except that the statistics must be multivariate. You can choose the same research question as Proposal 1 or a different one. Again, 5 points for adhering to each of the 4 criteria for a total of 20 points, and minus 20 points for not submitting the peer critique on time. Your final proposal will be a five page, double-spaced proposal, which will be graded by similar but more detailed criteria (rubric will be posted on onQ) but the TAs will apply letter grades. We will spend at least three lectures covering the art of proposal writing and there will be research proposals of various sizes, lengths, and purposes for you to peruse. The only way to learn how to write a particular form is to read that form – I am guessing that almost none of you have ever read a research proposal.

All written assignments will be submitted to TURNITIN. Plagiarism will not be tolerated.

Grading

In lecture Top Hat responses (10 x 4 points each) =	40	10%
Homeworks (4 x 30 points each) =	120	30%
Lab Quizzes (8 x 10 points each) =	80	20%
Proposal 1 =	20*	5%
Proposal 2 =	20*	5%
Final Proposal =	120	30%
	Total = 400 points	100%

*Note: -20 points if you do not submit peer feedback on Proposals 1 or 2 by deadline.

Electronic Considerations.
        The course materials will be distributed through onQ. Please log in before the second class to make sure that you have no problems with access.
        We will be using SPSS for all analyses in this course. Currently, Queen's supports version 24. Versions 20 through 24 will perform all the analyses required. The lab in 219 has copies on each computer for you to use. However, getting the student version for yourself is required for the course.

EMAIL
        If your question is about course content, then please use the onQ forum so that other students can see the answers and join the discussion. If you have a question or problem that is specific to only you, please email your lab TA or lecture TA *first*.

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Course Schedule

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week	Day	Date	Topic	Reading	Due
1	W	Jan. 9	Orientation		
	F	Jan. 11	The Basics & Overview	Field 1-3	
		Lab 1	*Orientation*		
2	W	Jan. 16	The Art of the Proposal I		
	F	Jan. 18	Data Management	Field 5-6	
		Lab 2	*SPSS Basics*	*H&C Parts 1 & 6; Field 4*	Quiz 1
3	W	Jan. 23	Data Reduction I	Field 601-609	Proposal 1
	F	Jan. 25	Data Reduction II	Field 569-601	
		Lab 3	*Messy Data*	*H&C Part 2*	Quiz 2
4	W	Jan. 30	Data Reduction III	Field 569-601	Peer feedback
	F	Feb. 1	The Art of the Proposal II		
		Lab 4	*Data Reduction*	*H&C Ch. 27-28*	Quiz 3
5	W	Feb. 6	GLM and CC intro	Field 12	
	F	Feb. 8	ANCOVA	Field 13-14	
		Lab 5	*Factor Analysis*	*H&C Ch. 27-28*	Quiz 4
6	W	Feb. 13	Considering a thesis? 501 info		HW 1
	F	Feb. 15	MANOVA	Field 17	
		Lab 6	*ANCOVA & GLM*	*H&C Ch. 24*	Quiz 5
7		**FEBRUARY 20 -24 READING WEEK NO CLASSES**			
8	W	Feb. 27	MANOVA and DFA	Field 17	
	F	Mar. 1	Repeated Measures	Field 15	Proposal 2
		Lab 7	*MANOVA*	*H&C Ch 25*	Quiz 6
9	W	Mar. 6	Mixed Models	Field 16	
	F	Mar. 8	Multiple Regression	Field 9	Peer Feedback
		Lab 8	*DFA*		Quiz 7
10	W	Mar. 13	The Art of the Proposal III		HW 2
	F	Mar. 15	Multiple Regression	Field 9	
		Lab 9	*Repeated-measures*	*H&C 22*	Quiz 8
11	W	Mar. 20	Guest lecture		
	F	Mar. 22	No class		
		Lab 10	*Multiple Regression*	*H&C 29,30,32*	Quiz 9
12	W	Mar. 27	Multiple Regression	Field 11	HW 3
	F	Mar. 29	PROCESS macro	Field 11	
		Lab 11	*Mediation*	*H&C Ch 31*	Quiz 10
13	W	Apr. 3	Logistic Regression	Field 20	
	F	April 5	Multilevel Modeling	Field 21	HW 4
		Lab 12	*Logistic Regression*		Quiz 11
	M	**April 15**	***FINAL PROPOSAL DUE***		FINAL

GRADING METHOD 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 Queen's Official Grade Conversion Scale:

Assignment Mark	Numerical Value for Calculation of Final Mark
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

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	53-55
D-	50-52
F	49 and below

Turnitin

Queen's University has partnered with the third-party application Turnitin to help maintain our standards of excellence in academic integrity. Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. Submitted files are compared against an extensive database of content, and Turnitin produces a similarity report and a similarity score for each assignment. A similarity score is the percentage of a document that is similar to content held within the database. 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. See also privacy statement at: http://turnitin.com/en_us/about-us/privacy

Top Hat

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An email invitation was sent to you by email, but if don't receive this email, you can register by simply visiting our course website: https://app.tophat.com/e/841114

Note: our Course Join Code is **841114**

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

Disability Accommodations Statement

Queen's University is committed to achieving full accessibility for people with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016 (see
https://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/ACADACCOMMPOLICY2016.pdf). If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at:
http://www.queensu.ca/studentwellness/accessibility-services/

Extenuating Circumstances

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time, not to exceed three months. Students receiving academic consideration must meet all essential requirements of a course. The Senate Policy on Academic Consideration for Students in Extenuating Circumstances was approved at Senate in April, 2017 (see
http://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/Academic%20Considerations%20for%20Extenuating%20Circumstances%20Policy%20Final.pdf) Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with re-quests for academic consideration for students facing extenuating circumstances. Arts and Science under-graduate students can find the Faculty of Arts and Science protocol and the portal where a request can be submitted at: http://www.queensu.ca/artsci/accommodations. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

If you need to request academic consideration for this course, you will be required to provide the name and email address of the instructor/coordinator. Please use the following:
Instructor/Coordinator Name: Tom Hollenstein
Instructor/Coordinator email address: Tom.Hollenstein@Queensu.ca

Academic Integrity

Academic Integrity is constituted by the six core fundamental values of honesty, trust, fairness, respect, responsibility and courage (see www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities
http://www.queensu.ca/secretariat/policies/senate/report-principles-and-priorities).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic

Regulation 1 http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations/regulation-1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.