PSYC 302: Advanced Research Methods
Queen's University - Winter 2017
Monday 10:00 – 11:20 Biosci 1102
Wednesday 8:30 – 9:50 Biosci 1102

Instructor: Dr. Tom Hollenstein (tom.hollenstein@queensu.ca) Craine 220
Office Hours by appointment
TAs:
Coordinator TA: Hannah Taalman (hannah.taalman@queensu.ca) office hours Fri. 11-12
Botteroll 257
Head Lab TA: Sara Furlano (7rf@queensu.ca)
Monday 5:30pm Lab section 002: Abi Muere (abi.muere@alumni.utoronto.ca)
Tuesday 8:30am Lab section 005: Tanya Tran (tanya.tran@queensu.ca)
Tuesday 2:30 pm lab section 003: Kalee DeFrance (11kd22@queensu.ca)
Tuesday 5:30pm lab section 005: Alexandra Tighe (alexandra.tighe@queensu.ca)

Required Software: SPSS Student Version 6 month license

Required Text:
Field, A., (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.). California: Sage Publications.
Howitt, D., & Cramer, D., (2014). *Introduction to SPSS in Psychology* (6th 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

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I assume you already have a good grasp of univariate methods 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,

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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, come see me or your TA, 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.

Homework. There will be 4 homework assignments, but only the top 3 grades from these homeworks will be included to calculate your final grade. Thus, you may skip one homework assignment entirely. However, I strongly suggest you complete all the assignments to maximize your learning and then only the lowest grade of the 4 will be dropped.

Each assignment will come with a data set (also on onQ) with several instructions for analysis. You must submit an **electronic copy** to the instructor BEFORE the start of your lab section. More details about the homework procedures will be discussed during the first lab.

Lab Quizzes. During most lab meetings you will have a short quiz to assess your comprehension of the material covered for that day. Out of 10 quizzes in total, only 8 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 100% for just submitting Proposal 1 on time, 0% for late or not submitted. 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 get 100% for submitting feedback, 0% for not submitting. 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. Your final proposal will be a five page, double-spaced proposal, which will be graded by the same criteria but the TAs will

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apply letter grades. We will spend at least three lectures covering the art of proposal writing and there will be a repository of 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

Homeworks (3 x 30 points each)	90	24%
Lab Quizzes (8 x 10 points each)	80	21%
Proposal 1	20	~5%
Proposal 1 feedback	20	~5%
Proposal 2	20	~5%
Proposal 2 feedback	20	~5%
Final Proposal	125	33%
	Total = 375 points	100%

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 you have a question or problem, please email your TA *first*. 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.

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Course Schedule

week	Day	Date	Topic	Reading	Due
1	M	Jan. 9	Orientation		
	W	Jan. 11	The Basics & Overview	Field 1-2	
		Lab	*Orientation*		
2	M	Jan. 16	Data Management		
	W	Jan. 18	The Art of the Proposal I	Field 4	
		Lab	*SPSS Basics*	*H&C Parts 1 & 7; Field 3*	Quiz 1
3	M	Jan. 23	Data Reduction I	Field 706-716	Proposal 1
	W	Jan. 25	Data Reduction II	Field 665-706	
		Lab	*Messy Data*	*H&C Part 2*	Quiz 2
4	M	Jan. 30	Data Reduction III	Field 665-706	Peer feedback
	W	Feb. 1	The Art of the Proposal II		
		Lab	*Data Reduction & Factor Analysis*	*H&C Ch. 31-32*	Quiz 3
5	M	Feb. 6	GLM and CC intro	Field 11	
	W	Feb. 8	Considering a thesis? 501 info		
		Lab	*ANCOVA & GLM*	*H&C Ch. 31*	Quiz 4
6	M	Feb. 13	ANCOVA	Field 12	
	W	Feb. 15	MANOVA	Field 16	
		Lab	*MANOVA*	*H&C Ch 28*	HW 1 Quiz 5
7	**FEBRUARY 20 -24 READING WEEK NO CLASSES**				
8	M	Feb. 27	MANOVA and DFA	Field 16	
	W	Mar. 1	Repeated Measures	Field 14	Proposal 2
		Lab	*DFA and MANOVA*	H&C Ch 29	Quiz 6
9	M	Mar. 6	Mixed Models	Field 15	
	W	Mar. 8	Multiple Regression	Field 8	Peer Feedback
		Lab	*Repeated-measures*	H&C 25	HW 2 Quiz 7
10	M	Mar. 13	The Art of the Proposal III		
	W	Mar. 15	Multiple Regression	Field 8	
		Lab	*Multiple Regression*	H&C 33,34,36	Quiz 8
11	M	Mar. 20	Multiple Regression	Field 10	
	W	Mar. 22	PROCESS macro	Field 10	
		Lab	*Mediation*	H&C Ch 35	HW 3 Quiz 9
12	M	Mar. 27	Logistic Regression	Field 19	
	W	Mar. 29	SEM/MLM	Field 20	
		Lab	*Logistic Regression*	H&C Chs 40	Quiz 10
13	M	Apr. 3	Grad school info		
	W	April 5	Review		
		Lab	*Review*		HW 4
	Th	**April 13**	***FINAL PROPOSAL DUE***		FINAL

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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

Academic Integrity. Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see www.academicintegrity.org). These values are central to building, nurturing, and sustaining 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/senateandtrustees/principlespriorities.html).

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 on the Arts and Science Calendar (see Academic Regulation 1 at 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 that contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

Discriminatory, rude, threatening, harassing, disruptive, distracting, and inappropriate behavior or language will not be tolerated in class or in laboratories regardless of the context in which such actions occur (i.e., in person, in email, on Moodle, etc.). Students are responsible for familiarizing themselves with the regulation concerning academic misconduct. Information on misconduct in an academic or non-academic setting is available in the Arts and Science Calendar (see Academic Regulation 17 at http://www.queensu.ca/artsci/academic-calendars/ regulations/academic-regulations/regulation-17). Actions that contravene the regulation on misconduct carry sanctions that can range from a statement of apology, loss of grades, failure of a course, or requirement to withdraw from the university.

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