SYLLABUS (FALL 2016)

PSYC 532: *General Linear Model (Univariate)*
Instructor: *Dr. John Sakaluk (sakaluk@uvic.ca)*
Days/Time: *Tuesday/Friday: 1:00PM – 2:20PM*
Office/Office Hours: Cornett A240/Thursdays 2:30PM-3:30PM (or by appointment)

Required Texts:

1. Navarro, D. (2015). *Learning statistics with R: A tutorial for psychology students and other beginners (version 0.5)*.

- *The book can either be downloaded for free (legally), or, if you prefer a hardcopy, you can purchase one rather cheaply (~$40 currently)*

2. Assorted assigned readings from articles/chapters

- *In addition to your textbook, I will post periodic readings from important articles/textbook chapters. Content from these readings is fair-game for tests.*

Recommended Supplemental Texts:

1. Chang, W. (2013). *R graphics cookbook*. Sebastopal, CA: O'Reilly Media, Inc.
2. Teetor, P. (2011). *R cookbook*. Sebastopal, CA: O'Reilly Media, Inc.

- *If I am successful in convincing you to "throw in" with R, then these two books will become everyday go-to resources for you. Much of their content can be found with a quick google if you are in a jam, but in my experience, the ~$75 to own both is well-worth the investment to be able to have them on-hand.*

Required Software:

1. *R*: http://cran.stat.sfu.ca

- *R* is the primary data-analysis software we will be using for the course. It is free, and works on both Windows and Mac computers. There will be computers in our classroom (a computer lab) with all necessary software already installed, but if you would prefer to work on your own laptop, click the appropriate "Download and Install R" link, depending on your operating system, and the install the software from the downloaded file.

2. *R Studio*: https://www.rstudio.com/products/rstudio/download2/

- While *R* will be our primary statistics workhorse, it is not a very pretty program. *R Studio* is a free (and Windows-/Mac-friendly) supplemental program, that dresses *R* up a bit to make it more user-friendly and functional. Again, our lab computers will have it installed, but if you plan to work from your own computer, definitely download and install it.

Recommended Software:

1. *G*Power: http://www.gpower.hhu.de/en.html*

- Another free program that is Windows- and Mac-friendly (see a theme here?...). Don't worry about understanding what "power" is right now, but this is a program that is very

helpful for performing power-related calculations.

Required Equipment
You will need a non-graphing scientific calculator for hand-calculations. Other calculating devices (e.g., smartphones, graphing calculators) **will not be permitted for use during tests.**

Course Description
Psychologists of all description—social, clinical, cognitive, developmental, and others—must possess a sufficient mastery of statistics, for the purposes of conducting their own research, and evaluating others'. The *general linear model* encapsulates a broad array of data analysis techniques, and is typically considered the foundation of statistical training for psychologists. In our class, you will be learning to understand these analyses—and other important statistical principles—conceptually, as well as learning how to conduct, interpret, and report these analyses yourself.

Evaluation and Grading Policy

Item	Date	Points	% of Grade
Data Camp R Tutorial	***September 30***	***67***	***10***
Lab Assignment 1[a]	Fri, October 7	25	3.75
Lab Assignment 2[a]	Tues, October 18	25	3.75
Lab Assignment 3[a]	Fri, October 28	25	3.75
Lab Assignment 4[a]	Fri, November 4	25	3.75
Lab Assignment 5[a]	Tues, November 15	25	3.75
Lab Assignment 6[a]	Tues, November 22	25	3.75
Lab Assignment 7[a]	Fri, November 25	25	3.75
Lab Assignment 8[a]	Fri, December 2	25	3.75
Lab Assignments		**200**	**30**
Test 1	Tues, October 4	100	15
Test 2	Tues, October 25	100	15
Test 3	Tues, November 8	100	15
Test 4	Fri, December 2	100	15
Tests		**400**	**60**
Total		**667**	**100**

[a] See description of "SPSS penalty" in Lab Assignments

The final letter grade in the course will be based on total percent score rounded to the third decimal point as shown: Final grades that end with a decimal point of 0.5 or above will be rounded to the next higher whole number, and grades that end with a decimal point below 0.5 will be rounded to the next lower whole number. For example 89.5 to 89.9 is rounded up to 90% (A+), whereas 89.4 is rounded down to 89% (A).

A+ = 90 – 100	B+ = 77 – 79	C+ = 65 - 69	F = 0 - 49
A = 85 - 89	B = 73 – 76	C = 60 – 64	
A- = 80 - 84	B- = 70 – 72	D = 50 - 59	

Students are expected to familiarize themselves with the Important Course Policy Information (attached).

Data Camp R Tutorial (10%)
As many students will likely be mostly—if not totally—unfamiliar with using R, one of the first priorities of the class will be to get students comfortable with *R* syntax. Data Camp offers an easy-to use online tutorial that will help to expose students to basics of *R* syntax and programming. The tutorial covers working with *variables*, *vectors*, *matrices, factors, data frames,* and *lists*—all common elements of *R* syntax that should serve you well to be familiar with, both for this class, and well beyond. In total, the tutorial should take approximately 4 hours to finish.

Lab Assignments (30%)
There will be eight lab assignments to complete throughout the semester, due (generally) a week after they are assigned. **Assignments must be handed in during class; email submissions are not allowed**. Specific requirements for each lab assignment will be outlined in separate documents. However, they will generally require you to apply the analytic techniques learned during class to provided data, interpret these analyses, and write up a brief scientific report (~1-2 pages) of the analysis, akin to what would normally be presented in the "Results" section of a scholarly article.

As a major focus of the course is to expose you to *R*, I want students to complete these assignments using *R*. However, there is a normal learning curve to *R*, and sometimes you might find it takes more time and practice to fully understand how to apply a particular technique, than what you can afford for a particular assignment. Anticipating this possibility, lab assignments completed with SPSS, or some alternative statistical analysis software, will be accepted, but will be subject to an **SPSS Penalty** of 5 pts per assignment (resulting in a maximum possible grade of 20/25 for a given assignment).

Tests (60%)
There will be four tests (worth 15% each), covering the units of: (1) introduction/correlation; (2) simple regression models; (3) advanced regression models; and (4) t-tests/ANOVAs. Tests will consist of multiple choice, short-answer, calculation, and interpretation-based questions. **You will not be asked to produced original *R* syntax on any test**, **though questions testing your understanding of what certain commands do will be considered fair-game.** Calculators should be brought to class; no replacements will be provided.

Students who miss an in-class test well receive a mark of zero unless they have a case of documented illness or family emergency. Tests are to be made up within a week, if possible, otherwise a test will be dropped from a student's grading scheme, and the other tests will be weighted more heavily.

Tentative Schedule of Dates*

**Topics/dates subject to change at my discretion pending class progress*

Week/Day		Date	Topic(s)	Reminders
1	Friday	September 9	Course introduction	
2	Tuesday	September 13	GLM "Big Pictures", Fundamentals, and Introduction to *R*	• *Dienes (2008), Chapter 3: Neyman, Pearson, and Hypothesis Testing* • *Interpreting Confidence Intervals* • *Understanding Statistical Power and Significance Testing*
	Friday	September 16	Error-Control, Power, and Replicability	• *Simmons et al. (2011): False-positive psychology…* • *Bakker et al., (2016): Researchers' intuitions about power…* • *Open Science Collaboration (2015): Estimating the reproducibility of psychological science*
3	Tuesday	September 20	Correlations (Conceptual)	• *Navarro (2015) section 5.7 (pp. 139-151): Correlations* • *Navarro (2015) section 15.6 (pp. 472-474): Testing the Significance of a Correlation* • *Guess the Correlation* • *Interpreting Correlations*
	Friday	September 23	**Away @ Conference**	
4	Tuesday	September 27	Correlations (Testing by Hand)	
	Friday	September 30	Correlations (Testing and Plotting in R)	• **Data Camp *R* Tutorial due**
5	Tuesday	October 4	**TEST #1 (Weeks 2-4)**	
	Friday	October 7	Bivariate Regression Models (Conceptual)	• **Lab Assignment 1 due** • *Navarro (2015): section 15-15.2.2 (pp. 459-463):* • *Navarro (2015): section 15.4-15.5.3 (pp. 466-471)* • *Navarro (2015): section 15.7-15.7.2 (pp. 474-476)*
6	Tuesday	October 11	Bivariate Regression Models (Testing by Hand)	

	Friday	October 14	Bivariate Regression Models (Testing and Plotting in R)	• *Navarro (2015): section 15.8-15.9.6 (pp. 476-491)*
7	Tuesday	October 18	Multiple Regression and Hierarchical Regression Models (Conceptual)	• **Lab Assignment 2 due** • *Navarro (2015): section 15.3-15.3.2 (pp. 463-466)* • *Navarro (2015): section 15.10-15.10.4 (pp. 492-497)*
	Friday	October 21	Multiple Regression (Testing and Plotting in R)	
8	Tuesday	October 25	**Test #2 (Weeks 5-8)**	
	Friday	October 28	Nonlinear, Mediation, Moderation, and Conditional Process Models (Conceptual)	• **Lab Assignment 3 due** • *Hayes (2013) Chapter 4: The Simple Mediation Model* • *Hayes (2013) Chapter 7: Fundamentals of Moderation Analysis*
9	Tuesday	November 1	Nonlinear, Mediation, Moderation, and Conditional Process Models (Testing and Plotting in R)	• *Hayes (2013) Chapter 5: Multiple Mediator Models* • *Bullock et al. (2010): Yes, But What's the Mechanism…* • *Hayes (2013) Chapter 7: Extending Moderation Analysis Principles*
	Friday	November 4	Regression Models with Categorical Predictors (Conceptual and Plotting in R)	• **Lab Assignment 4 due** • *West et al., (1996): Analyzing categorical by continuous variable interactions*
10	Tuesday	November 8	**Test #3 (Weeks 9-11)**	
	Friday	November 11	**READING WEEK**	
11	Tuesday	November 15	*t*-tests (Conceptual and testing/plotting by hand/in R)	• **Lab Assignment 5 due** • *Navarro (2015), Chapter 13: Comparing Two Means (pp. 381-424)* • *Lakens (2013): Calculating and reporting effect sizes…*
	Friday	November 18	**Away @ Conference**	

12	Tuesday	November 22	One-Way Analysis of Variance (Conceptual and testing by hand/in R)	• **Lab Assignment 6 due** • *Navarro (2015), Chapter 14: Comparing Several Means (one-way ANOVA) (pp. 427-456)*
	Friday	November 25	Repeated-Measured and Mixed ANVOA Interactions, and Analysis of Covariance (Conceptual)	• **Lab Assignment 7 due**
13	Tuesday	November 29	Repeated-Measured and Mixed ANVOA Interactions, and Analysis of Covariance (Testing and plotting in R)	• *Navarro (2015), Chapter 16: Factorial ANOVA (pp. 499-553)*
	Friday	December 2	**Test #4 (Weeks 12-13)** • **Lab Assignment 8 due**	

UNIVERSITY OF VICTORIA
Department of Psychology

Important Course Policy Information

Commitment to Inclusivity and Diversity

The University of Victoria is committed to promoting, providing and protecting a positive and supportive and safe learning and working environment for all its members.

Policy on Academic Integrity including Plagiarism and Cheating

The Department of Psychology fully endorses and intends to enforce rigorously the Senate Policy on Academic integrity (http://web.uvic.ca/calendar2016-09/undergrad/info/regulations/academic-integrity.html , p. 55-58, UVic Calendar 2016‑17). It is of utmost importance that students who do their work honestly be protected from those who do not. Because this policy is in place to ensure that students carry out and benefit from the learning activities assigned in each course, it is expected that students will cooperate in its implementation.

The offences defined by the policy can be summarized briefly as follows:

1. **Plagiarism**. You must make sure that the work you submit is your work and not someone else's. There are proper procedures for citing the works of others. The student is responsible for being aware of and using these procedures.

2. **Multiple Submission**. Only under exceptional circumstances may a work submitted to fulfill an academic requirement be used to satisfy another similar requirement. The student is responsible for clarifying this with the instructor(s) involved.

3. **Falsifying Materials Subject to Academic Evaluation**. This includes falsification of data, use of commercially prepared essays, using information from the Internet without proper citation, citing sources from which material is not actually obtained, etc.

4. **Cheating on Assignments, Tests, and Examinations**. You may not copy the work of others in or out of class; you may not give your work to others for the purpose of copying; you may not use unauthorized material or equipment during examinations or tests; and you may not impersonate or allow yourself to be impersonated by another at an examination. The Department of Psychology has a policy of not making old examinations available for study purposes. Therefore, use of old exams without the express written permission of the instructor constitutes cheating by the user, and abetting of cheating by the person who provided the exam.

5. **Being an Accessory to Offences**. This means that helping another student to cheat (for

instance, by showing or communicating to them answers to an assignment, or by allowing them to view answers on an exam) is an academic offence.

Instructors are expected to make every effort to prevent cheating and plagiarism. This may include the assignment of seating for examinations, asking students to move during examinations, requests to see student identification cards, and other measures as appropriate. Instructors also have available to them a variety of tools and procedures to check for Internet and electronic media-based cheating. In instances of suspected or actual plagiarism or cheating, instructors, following prescribed procedures, are authorized to take steps consistent with the degree of the offence. These measures will range from a zero on the test or assignment or a failing grade for the course, probation within a program to temporary or even permanent suspension from the University.

Rights of Appeal are described in the Policy on Academic Integrity in the University calendar (on p. 55-58 in 2016-17).

The definitive source for information on Academic Integrity is the University Calendar (p. 55-58 in 2016-17) (http://web.uvic.ca/calendar2016-09/undergrad/info/regulations/academic-integrity.html)

Other useful resources on Plagiarism and Cheating include:

1. The Learning Skills program: http://www.coun.uvic.ca/learning/index.html
2. The Ombudsperson's office: http://www.uvss.uvic.ca/ombudsperson/pubsguides/plagiarism.pdf