## ANALYSIS OF BEHAVIOURAL DATA
## Dr. Linda Scratchley

**Course Information**

| | |
|---|---|
| Section 3: | Mondays, Wednesdays, and Fridays 12:00 – 12:50 p.m. in AERL 120 |
| Section 4: | Mondays, Wednesdays, and Fridays 1:00 – 1:50 p.m. in AERL 120 |
| Section 5: | Mondays, Wednesdays, and Fridays 2:00 – 2:50 p.m. in AERL 120 |
| Website: | https://canvas.ubc.ca/  (Please **do not** email me using Canvas) |

**Instructor**

| | |
|---|---|
| Name: | Linda Scratchley |
| Office: | Kenny 2524 |
| Email: | Lscratchley@psych.ubc.ca |
| Office Hour: | Fridays 3:15 – 4:15 p.m. |

**Teaching Assistants and Fellows**

| | | | |
|---|---|---|---|
| Name: | Gabe Smith | Name: | Debra Bercovici |
| Office: | Kenny 3020 | Office: | Kenny 3506 |
| Email: | gksmith@psych.ubc.ca | Email: | debrabercovici@psych.ubc.ca |
| Office Hour: | Mondays 11:00 a.m. – 12:00 p.m. | Office Hour: | Mondays 3:00 – 4:00 pm |
| Name: | Pavel Kozik | Name: | Rachele Benjamin |
| Office: | Kenny 1007 | Office: | Kenny 1113 |
| Email: | pavelkozik@psych.ubc.ca | Email: | rachele.benjamin@psych.ubc.ca |
| Office Hour: | Tuesdays 3:30 – 4:30 p.m. | Office Hour: | Wednesdays 11:00 am – 12:00 p.m. |
| Name: | Victoria Michalowski | Name: | Brent Stewart |
| Office: | Kenny 1007 | Office: | Kenny 1604 |
| Email: | vimic@psych.ubc.ca | Email: | brent.stewart@psych.ubc.ca |
| Office Hour: | Wednesdays 3:00 – 4:00 p.m. | Office Hour: | Thursdays 9:30 – 10:30 a.m. |

**Required Materials**

1. King, B. M., Rosopa, P. J., & Minium, E. W. (2016). *Statistical Reasoning in the Behavioral Sciences* (BC Custom Edition). Hoboken, NJ: Wiley.  Please put pages 376 - 416 of the textbook appendices in a separate binder and bring them to class and to exams.  I will hand out a formula sheet in class that you should also put into this binder and bring to class and to exams.

2. You will need a calculator for this course.  I recommend buying the cheapest <u>nonprogrammable</u> scientific calculator that you can find. Graphing calculators are not permitted.

3. Francis, G. & Neath, I. (2014) *CogLab Online with Access Code Version 5.0*.  Purchase directly from the publisher by going to www.nelsonbrain.com/webapp/wcs/stores/servlet/en/micrositesca/UBC-PSYC218, and clicking "Add to cart" to purchase. To register in our PSYC 218 sec. 3, 4 & 5 course on Coglab, please follow the instructions on the last page of this outline (also posted on Canvas).

4. Cuttler, C. (2014) A Student Guide to SPSS (2ⁿᵈ edition). This lab guide comes bundled with an access code for a download of SPSS 22 (or 24).  Print copies of this lab guide are available at the bookstore, or you can purchase the e-book directly from the publisher at http://www.kendallhunt.com/cuttler/. If you purchase directly from the publisher, note that you <u>must</u> purchase the e-book package, <u>not</u> the print package.  For SPSS problems, consult the SPSS Installation Troubleshooting Guide posted on Canvas.

SPSS can be accessed on the computers in Buchanan B101 or Koerner Library room 218A.  Note that Buchanan B101 often in use for classes. The room schedule can be found at http://isit.arts.ubc.ca/buchanan-b101-drop-in-and-teaching-lab/. Make sure that you are registered with Coglab prior to the first Coglab experiment being due, and make sure that you have access to SPSS prior to the first in-class SPSS demo; late deductions will not be cancelled because you had trouble registering with Coglab or loading SPSS.

## Course Objectives

This course is designed to provide you with a basic understanding of how to analyze research data by hand and using computer software. Topics covered include an introduction to the most frequently used descriptive statistics (e.g., central tendency, variability, correlation) and an introduction to the most frequently used inferential statistics (e.g., t-test, confidence intervals,  ANOVA). By the end of the course you should have a good conceptual understanding of how and why we use these statistics.

## Learning Outcomes

Upon completion of this course, students will be able to meet the following minimal requirements:
1. Distinguish between descriptive and inferential statistics
2. Discriminate various distribution shapes and predict the shape of a distribution for a given variable
3. Draw the normal distribution and identify its key features
4. Distinguish between a distribution of raw scores and a distribution of statistics
5. Calculate by hand a variety of statistics commonly used in psychology, such as means, variance, correlation, regression, z-scores, t-tests, and ANOVA.
6. Identify the relationships among major statistical concepts (e.g., alpha, confidence intervals, effect size, power, variability, sample size)
7. Choose and apply the appropriate statistic to analyze a dataset, when provided with a study design and a researcher's purpose
8. Generate a conclusion for a research hypothesis based on the analysis of data
9. Recognize the logic underlying the statistical analyses
10. Evaluate statistical procedures and conclusions found in a variety of media

## Lectures, Readings, Assignments and Chapter Problems

Attendance at lectures is essential for students who wish to do well in the course. If you miss a class, you are responsible for getting the solutions to in-class example problems from another student.  I also advise you to ask someone who was in class to teach you the work we did—this benefits both of you.  You cannot memorize the material for this course; you must understand it.  To aid in this understanding, there are problems for you to work on at the end of each chapter of the textbook. **The answers are provided in the Appendix, with the answers to odd-numbered problems starting on page 339 and the answers to even-numbered problems starting on page 353.**  IN ORDER TO BE SUCCESSFUL IN THIS COURSE, YOU MUST WORK ON THESE CHAPTER PROBLEMS. If you are not prepared to spend time on the practice problems, please drop the course now and take it when you have more time. You are responsible for all lecture material, textbook material and lab assignments.

## Evaluation

Four examinations will be given throughout the course, accounting for 73% of your final grade (18% for each midterm and 19% for the final exam).  You will be required to complete 6 lab assignments on your own time.  The lab assignments have been amalgamated into two bundles.  The lab component will account for 24% of your final grade (4% per lab assignment or 12% per 3-lab bundle).  The remaining 3% of your grade will be based on a research experience component (REC) which involves spending three hours participating in psychology studies through the Department of Psychology's Human Subject Pool (HSP) system (1% per hour).  The weighted sum of the four exams, two lab assignment bundles, and research experience component will constitute your Psychology 218 course grade.

| Assignment | Percent | Due Date | Topic |
|---|---|---|---|
| Midterm 1 | 18% | Jan. 23 | Chapters 1-6 |
| Midterm 2 | 18% | Feb. 13 | Chapters 7-9 |
| Assignment 1-2-3 | 12% | Feb. 27 in class | Descriptive Statistics, Correlation and Regression |
| Midterm 3 | 18% | Mar. 15 | Chapters 11-14 |
| Assignment 4-5-6 | 12% | Apr. 1 in class | Testing Hypotheses About Means and Correlations |
| Final Exam | 19% | TBA | Chapters 15-18 |
| Research Experience | 3% | Prior to last class | Various |

**Examinations**
Examinations will be entirely multiple choice.  The exams will not be cumulative, although the material from each subsequent section of the course is built upon the material from the previous sections.   The exam grades will be posted on Canvas.

**Lab Component**
In order to simplify the number of due dates you have to keep track of, I have bundled the six lab assignments into two sets, one set relates to descriptive statistics and the other set relates to inferential statistics. To provide the data that will be analyzed in the assignment bundles, you will have to complete five short CogLab experiments and one survey on your own time. The CogLab experiments and survey each require 10-30 minutes to complete. You will automatically lose 1/12 (8.33%) of your bundled assignment grade (i.e., 1% of your total course grade) for each experiment or survey that you do not complete by the due date and time! The due dates and times are listed at the end of the syllabus. You will not be able to make up marks lost because of your failure to complete a CogLab experiment or survey on time. The purpose of the CogLab experiments and survey is to have you generate the data that you will summarize/analyze for your assignments. Our hope is that you will gain a deeper understanding of the data by being involved in the experiments and surveys, making the analyses more relevant and meaningful to you. You are only required to complete the experiments by the due date and times listed at the end of the course syllabus; you are not required to answer the questions in the CogLab manual.

The lab assignments are intended to complement the lectures by giving you practical experience with both analyzing data using SPSS software and reporting results. Two times throughout the course, a team of three teaching fellows will come to class to provide a 30-minute demonstration of some of the functions of SPSS. Following each demonstration you will be given an assignment bundle to complete on your own time (assignments will be posted on Canvas). The assignments will require you to analyze the data your class generates by participating in the CogLab experiments and survey. You will have about two weeks to complete each of the assignment bundles, and you will lose 1/24 (4.17%) of your bundled assignment grade (i.e., 0.5% of your total course grade) for each day your assignment bundle is late.

**Lab assignments are to be completed independently. You are encouraged to meet with your teaching fellows during their office hours or tutorials if you require assistance with the assignments. While you may ask your teaching fellows or peers for guidance (e.g., how do I get SPSS to select cases), you are required to complete the analyses and write ups on your own.**

**Research Experience Component (REC)**
You can locate and sign up for studies by going to https://ubc-psych.sona-systems.com.  If you don't already have a user account you will first need to request an HSP user account on that webpage. Once you have an account and have logged into it, you will be able to browse through all of the studies that you can participate in, sign up for studies and confirm your accumulated credits. The subject pool typically closes the last week of class so you are strongly urged to participate and confirm your accumulated credits *before* the last week of class. Once the subject pool closes, you will have no opportunity to make up any unacquired credits.

Because introducing you to research is an important part of this course, the REC is required. However, as an alternative to participation in subject pool studies, you may choose to fulfill the REC by completing three library writing projects. If

you choose to complete library writing projects, in which you read and summarize a research article, each article summary counts as one hour of research participation (1 credit). Article summaries must be submitted no later than the last day of classes for the term.

Detailed instructions on how to use the HSP system and how to complete the library writing projects can be found in the guide entitled "Subject Pool Info for Participants" available through the psychology department website at https://psych.ubc.ca/undergraduate/human-subject-pool/. Please carefully read and adhere to the instructions in the guide.

**Academic Misconduct**
Lab assignments are to be completed independently. You may discuss and debate assignment challenges with your teaching fellows and your peers. However, you are required to complete the analyses and write ups on your own. Providing or receiving answers to lab assignment questions (or writing the answers in collaboration with another student) is considered cheating, and collaborators will receive grades of 0.

**Psychology Department's Position on Academic Misconduct**
Cheating, plagiarism, and other forms of academic misconduct are very serious concerns of the University, and the Department of Psychology has taken steps to alleviate them. In the first place, the Department has implemented software that, can reliably detect cheating on multiple-choice exams by analyzing the patterns of students' responses.

In all cases of suspected academic misconduct, the parties involved will be pursued to the fullest extent dictated by the guidelines of the University. Strong evidence of cheating or plagiarism may result in a 0 credit for the work in question. According to the University Act (section 61), the President of UBC has the right to impose harsher penalties including a failing grade for the course, suspension from the University, cancellation of scholarships, or a notation added to a student's transcript.

**Psychology Department's Policy on Grade Distributions and Scaling**
In order to reduce grade inflation and maintain equity across multiple course sections, all psychology courses are required to comply with departmental norms regarding grade distributions. According to departmental norms, the mean grade for this class is 67 for a good class, 65 for an average class, and 63 for a weak class, with a standard deviation of 14. Scaling may be used in order to comply with these norms; grades may be scaled up or down as necessary by the instructor or department.

**Missed Midterm**
If you know you are going to be away on an exam date, notify the instructor well in advance so that alternative arrangements can be made.  If you miss a midterm due to illness, contact the instructor before the exam or on the day of the exam. Failure to immediately notify the instructor that you missed the exam may result in a grade of 0 with no opportunity to write a make-up.   You must have a note from your doctor confirming that you were sick on the day of the exam. You will not be permitted to write the exam without this note. If you miss an exam for a reason other than illness, some appropriate form of documentation for your absence must be provided, and a decision about how to proceed will be made on a case by case basis.

**Tutoring Pool**
Information about the PSYC 218 tutoring pool is posted on Canvas.  If you think that you would benefit from tutoring, start the process early (well in advance of midterm or final exams).

| Dates | Topics | Ch. | Lab Events and Due Date |
|---|---|---|---|
| Jan. 2 | Review Course Outline | 1,2,3 | |
| Jan. 4/7 | Central Tendency | 4 | |
| Jan. 9/11 | Variability and Standard (z) Scores | 5 | |
| Jan. 14/16/18 | Standard Scores and the Normal Curve | 6 | |
| Jan. 21 | Correlation | 7 | Jan. 21: CogLab "Stroop" due at 8 a.m. |
| **Jan. 23** | **Midterm 1** | **1-6** | |
| Jan. 25/28 | Correlation | 7 | Jan. 25: Survey due at 8 a.m. https://tinyurl.com/scratchley2019 Jan. 28: CogLab "Memory Span" due at 8 a.m. |
| Jan. 30 Feb. 1/4 | Prediction | 8 | |
| Feb. 6 | Interpretive Aspects of Correlation and Regression | 9 | |
| Feb. 8 | Random Sampling & Sampling Distributions | 11 | Feb. 8: SPSS Demo 1-2-3 |
| Feb. 11 | Testing Hypotheses About Single Means (z and t) | 12 | |
| **Feb. 13** | **Midterm 2** | **7-9** | |
| Feb. 15 | Testing Hypotheses About Single Means (z and t) | 12 | Feb. 15: CogLab "Change Detection" due at 8 a.m. |
| Feb. 18-22 | **Reading Break** | | **NO CLASSES** |
| Feb. 25 | Testing Hypotheses About Single Means (z and t) | 12 | |
| Feb. 27 | Effect Size, Type I and Type II Errors and Power | 13 | **Feb. 27: Assignment 1-2-3 due in class** |
| Mar. 1/4/6/8 | Testing Hypotheses About the Differences Between Two Independent Groups | 14 | Mar. 1: CogLab "Risky Decisions" due at 8 a.m. Mar. 6: CogLab "False Memory" due at 8 a.m. |
| Mar. 11/13 | Testing for a Difference Between Two Dependent (Correlated) Groups | 15 | |
| **Mar. 15** | **Midterm 3** | **11-14** | |
| Mar. 18 | Testing for a Difference Between Two Dependent (Correlated) Groups | 15 | Mar. 18: SPSS Demo 4-5-6 |
| Mar. 20/22 | Inference About Correlation Coefficients | 16 | |
| Mar. 25/27 | Confidence Intervals | 17 | |
| Mar. 29 April 1/3 | One-Way Analysis of Variance | 18 | **Apr. 1: Assignment 4-5-6 due in class** |
| **TBA** | | | **Stats Consulting Day: Practice for Final Exam** |
| **TBA** | | **15-18** | **FINAL EXAM** |

## Instructions for Getting Started with CogLab 5

These instructions describe how students in the class PSYC 218 for instructor Dr. Linda Scratchley at University of British Columbia create their individual accounts. Students in other classes will follow similar directions, but the login information and passwords will be different.

1. Open your Web browser and go to https://coglab.cengage.com/help/register.shtml
2. Towards the bottom of the page is a form that asks for three pieces of information. If you do not see the form, your Web browser probably has JavaScript disabled. Please enable JavaScript and re-load the page to continue.
3. Enter the requested information:
   o In the Group Name text field, enter the Group ID **Scratchley2019**
   o In the Group Password text field, enter **statistics**
   o In the Registration Code text field, enter the registration code that you purchased electronically (sometimes this is also called an e-Pin). A CogLab5 code is made up of 16 letters and numbers, and will look something like this: sjkq8b632dvhd4u0.  Do not purchase used CogLab registration codes! If the registration code has already been used, it will not work for you. Each valid registration code can be used only once.
4. After filling in all the text fields, click or tap on the Start Registration button.
5. Your Web browser will connect with the CogLab server to verify your information. If the information is correct, a new window will appear. The first line, highlighted in yellow, is your User ID. You should *write this down* because you will need to access CogLab.
6. The second line is your registration code.
7. The next two lines ask for your first name and your last (family) name.
8. Next, enter a password. You'll use this when you login. The password must be at least 8 characters long. It is best not to enter a password you use on other web sites. The next line asks you to re-enter the password.
9. The next two lines ask for your email address and then confirmation of this address. This email address will be used if you forget your password.
10. Next, enter a security question and answer. Make sure to use a question that only you can answer correctly. Also, remember whether you use uppercase or lowercase letters in your answer: you'll need to enter your answer exactly the same if you forget your password.
11. If necessary, select your keyboard layout (for keyboard help, see https://coglab.cengage.com/info/keyboards.shtml).
12. Finally, decide if you want CogLab to remember you so that you don't need to login each time. If not, uncheck the box next to Remember Me.
13. After filling in all the text fields, click or tap on the Complete Registration button.

Your CogLab account is now ready to go! To start doing labs, just click or tap on the Labs menu and select the lab. When you are finished, you'll be asked if you'd like to contribute your data to the global data set. Submitting your data to the global data set is entirely optional. There is no way to tell whether a particular individual has submitted his/her data. At the end of each lab, a message will appear saying "End of lab... Sending to server..." and then you will see your results. Once you see your results, you know that your data have been saved. On this page, you'll also be able to see your trial-by-trial data, the group data for your class, and the global data.

You can access details about your account, and view your data, data from your group, and data from around the world by selecting Access Account from the Home menu.