a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

16Introduction to Data Analysis
PSYO 271-Sec. 101, Winter Term 2, 2017/18
Tuesday/Thursday 12:30-14:00

INSTRUCTOR: Jan Cioe, Ph.D. [UWO], M.A. [UWO], M.Phil. [Cantab], Hon. B.A. [U of T], R.Psych.

OFFICE: ASC285 / EME4161

CONTACT: 250-807-8732 (office); jan.cioe@ubc.ca;
250-763-1225 (home)

OFFICE HOURS: Tuesday & Thursday 11:00-12:00; 14:00-14:30 [if no meetings]; Wednesday 16:30-17:00. If these times are not convenient, others can be arranged.

TEXTBOOK: McCall, R. B. (2001). *Fundamental statistics for behavioral sciences* (8th ed.). Belmont, CA: Wadsworth/ Thomson Learning.

TEACHING ASSISTANTS [TAs]:

Stefanie Ciszewski, B.A. [Ottawa], M.A. [New Brunswick], Clinical Psychology M.A. Student
Contact info: stefanie.ciszewski@gmail.com

Katherine Rose, B.A. (Hon.) [Memorial], Psychological Science M.A. Student [UBCO]
Contact info: katherinerose@alumni.ubc.ca

Anastasia Skobkareva, Undergraduate B.Sc. Student [UBCO]
Contact info: anastasia.skob@gmail.com

I will post the availability of the Teaching Assistants for this course along with the Supplementary Learning contact.

LEARNING OBJECTIVES

The goal of this course is to provide students with an understanding of the basic principles of behavioural data analysis in the context of the research methods and designs of Psychology.

Students should be prepared to spend ***a minimum*** of 6 hours per week on learning the course content outside of regular class time (e.g., reading assigned course materials; doing the homework assignments; preparing for the unit quizzes and term exam). The final exam will require more time given that it is cumulative in nature.

LEARNING OUTCOMES

Higher-order Outcomes

By the end of the course, students are expected to be able to

- Have a complete enough understanding of both descriptive and inferential statistics so that they will be able to perform common statistical procedures and answer questions on the underlying theory.
- Develop and express an understanding of the role of probability and statistics within psychological research that includes the ability to discuss their basic concepts and practical applications.
- Differentiate between statistical tests in order to choose the appropriate test and answer specific research questions.

Lower-order Outcomes

These learning outcomes include the ability to do the following tasks:

- Differentiate between descriptive and inferential statistics
- Explain measurement, measurement scales, variables, constants, and measurement error as they relate to statistical analysis
- Apply and interpret appropriate graphing/summarizing procedures associated with various kinds of data
- Calculate measures of central tendency and variability, and discuss the advantages and disadvantages of each of the techniques considered
- Explain and interpret resistant indicators
- Calculate and explain percentile points and percentile ranks
- Articulate the effects of scale changes on the mean and standard deviation/ variance
- Explain the nature of *z* scores and how to calculate them
- Know the theory behind the formulae for the mean, standard deviation [variance], percentile, and *z*; this includes being apply to apply these formulae from memory
- Explain the nature of the normal distribution and standard normal curve in relation to calculating probability, proportion, area, and percentile [and vice versa]
- Explain the principles underlying the application of probability to hypothesis testing and sampling distributions, including the Central Limit Theorem
- Differentiate between statistical tests in order to perform (a) single-sample, independent-sample, and correlated *t* tests; (b) correlation coefficients, equations of a regression line, and related statistical concepts; and (c) confidence intervals.
- Explain the nature of decision error and power in hypothesis testing
- Identify the assumptions that underlie the various statistical tests discussed in the course
- Discuss the limitations of hypothesis testing and the alternative approaches
- Explain how the results from an Analysis of Variance can be used to interpret factorial designs

See also the handout Topics of P271 – Final Exam for a more detailed listing of topics covered in the course.

LEARNING MANAGEMENT SYSTEM – CANVAS [not Connect]

This class will be using the replacement [i.e., Canvas] for the learning management system – Blackboard Connect – that most other classes are currently using. All classes at UBC will be going to Canvas by September, 2018 so you will be ahead of the wave.

Material that I want you to have will be available on Canvas, as will your grades. You can find the student help site that has FAQs, help desk contact, and online video resources at https://community.canvaslms.com/docs/DOC-4121 and at http://students.canvas.ubc.ca

Where to find help with Canvas

- Online at **students.canvas.ubc.ca**
- Over the phone at **250-807-9611**

Study guides and strategies which may aid you in various aspects of this course (and others) are also available on the web at http://www.studygs.net/ .

CANVAS REGISTRATION OF i>clicker

You are required to purchase an i>clicker remote for in-class participation. The i>clicker is a response system that allows you to respond to questions I pose during class, and you will be graded on that feedback. In order to receive this credit, you need to register your i>clicker remote online ***before*** the second class (i.e., before 12:30 on January 9th).

Please register your clicker through the Canvas course website for PSYO 271. On the home page, you will find an i>Clicker Remote Registration link on the extreme left. Click on this link to access the registration form. Type in your Remote ID; the Remote ID is the series of numbers and sometimes letters found on the bottom back of your i>clicker remote right below the bar code. If you cannot read the ID number, there is a workstation in the Library that will retrieve illegible clicker IDs. I expect to use the i>clicker in every class, so please bring them with you—you are responsible for having it when you need it.

You must register your clicker in Canvas using the link—if you had a registered clicker in Connect, you will still need to register it in Canvas because these are separate databases. If you have clickers that you are no longer using, please remove them.

COMMUNICATIONS

I will be relying heavily on Canvas and email to communicate with you, so you will need access to the internet [the Library has computers for general student use].

Please send emails to me at jan.cioe@ubc.ca so that I can use the *Reply* function from your email.

FORMAT

This course will be taught primarily using a participatory lecture method in combination with a mastery learning approach. I will also be using response clickers during the lecture to monitor your comprehension of the material; ***these quizzes will be graded*** and contribute to your final mark. Given the cumulative nature of the course (i.e., later concepts are built on earlier ones), it

is very important that the readings be done according to the schedule. Given that the assigned problems are associated with the specific content of the day, the problems are ***due one week after the date assigned***. This does **not** preclude reading or working ahead, but it does mean that the appropriate material **must** be read prior to the corresponding class. Attendance at the lectures is expected; students, in the past, have experienced considerable difficulty in this course when classes have been missed. If you have to miss a class, you should access the podcasts of my lectures. The Teaching Assistants [TAs] and I will help you if you have any problems understanding the material. I am, of course, available to answer any questions you might have during my office hours or after class. If my posted office hours are not convenient, we can arrange for suitable alternative times.

MASTERY LEARNING

This course has been designed using the principles of mastery learning. In essence, this model is based on the belief that just about everyone can learn the material if given sufficient time and assistance. Although I cannot offer you unlimited time, I have adjusted the deadlines to give you some flexibility in how long you can work on a unit. I have, however, tried to build in a system which can provide you with the assistance you need—***if you are willing to use it***.

Since the concepts of statistics and their associated methods are central to Psychology as a science, I am trying to ensure that all Psychology Majors have the basics down pat. Before you can move on to a new unit of material, I want you to demonstrate that you have a solid understanding of the current material. "A solid understanding" is operationalized [you may remember that concept from the Methods course] by ***getting at least 80% on the unit tests***. With this knowledge you can then go on to learn the next unit's content; moreover, you will be better prepared to take the course exams because you have already acquired the bulk of the information.

Accordingly, the course has been designed to present five [5] units of material which cover the basics. In fact, you have already had some exposure to many of these core concepts in PSYO 270. My task is to refine your understanding of this material so that you can perform fundamental statistical procedures and interpret the results in original research papers. We will not cover all the statistical techniques used by psychologists, but you should have a reasonable comprehension of the foundation of those techniques.

Statistics is particularly suited to mastery learning because it is so cumulative in nature; the material builds in a logical and systematic way such that you will likely have difficulty with later material if you do not adequately understand earlier concepts and procedures. Consequently, I want to encourage you to do all of the unit tests at the mastery level, and I will reward you for doing so. You may take each unit test up to three [3] times unless otherwise specified. The specific questions on your test will be randomly generated from a large test bank, so it is likely that you will not have the same questions if you retake a unit test. If you do not reach the 80% mastery criterion, you fail that unit. You may still proceed to the next unit, but your grade will be reduced if you do so without successfully completing the prior unit. I strongly urge you to delay retaking the unit test for 24 hrs so that you can identify the problems you had on the earlier version of the quiz and seek help from the TAs, tutors, or me.

You will not be abandoned. I have built in a variety of ways to help you get the material. In addition to the face-to-face lectures, I will record all the lectures and put them on Canvas for review or downloading. I will also put my PowerPoint presentations on Canvas, as well as any handouts I distribute in class. There will be assigned homework questions for you to work on; I will provide the answers to all of these questions. I will make available a sample quiz for each of the units which reflect what the unit tests will look like. Similarly, I will provide a sample midterm exam where I will model what I expect your answers to be. I will endeavor to make sure that I clearly spell out what you need to know and how you can demonstrate it; if I do not, please let me know so that I can correct it.

In addition to the scheduled lecture times where I will present the material, I will be available for personal assistance during office hours [and at other times, if necessary], as will my Teaching Assistants [TAs]. We will be organizing volunteer tutors [who have already taken this course] to help you with the material. We will also try to setup a mechanism to facilitate the development of effective study groups. I am prepared to do "extra" sessions to answer questions or review difficult material at a time that will work for most of you.

My goal is to ensure that you are all successful in this course.

SUPPLEMENTAL LEARNING PROGRAM

A Supplemental Learning (SL) component is provided for all students who want to improve their understanding of the material taught in this course. SL sessions are led by a student who has mastered the course material, done well in the class, and who is trained specifically to facilitate group sessions. An SL session provides students a chance to meet, review, and discuss important concepts, develop strategies for solving problems, and prepare for exams. Attendance at SL sessions is free and voluntary. Students may attend as many times as they choose. There is empirical evidence that this program helps students do better in the class—it can boost your final grade substantially. SL is particularly helpful for students in the mid-range of grades, but it has been shown useful for all. SL is not a replacement for lectures, nor is it a review of the class lectures; rather SL gives **you**, the student, a chance to practice, to ask questions, and to share information with others who attend the class. SL sessions begin the second or third week of class and continue throughout the semester. A session schedule will be announced in class.

For information about the program, session schedule/updates, and possible study guides, visit their website at http://students.ok.ubc.ca/academic-supports/sl.html

EVALUATION

Your final grade in this course is derived from four [4] sources:

Unit tests: There are five [5] units which are sequentially organized. I want you to score ***a grade of at least 80%*** [mastery level] for the unit before you continue on to the next unit's test. If you do not succeed on the unit test, you are advised to seek assistance from the TAs or me; we will also have a roster of volunteer tutors who may be willing to assist you.

You may take each unit test up to three [3] times in order to demonstrate mastery; if you have not reached the 80% mark after the three attempts, however, you have failed that unit. You may

proceed to the next unit in sequence and take the next appropriate test, but your grade will be reduced. When you complete all five unit tests at the mastery level you have earned 18 marks [5 × 3.6]. However, if you only complete 4 units, you earn 13.4 marks [4 × 3.6 -1]; 3 units earn you only 8.8 marks [3 × 3.6 - 2]; 2 units earn 4.2 marks [2 × 3.6 - 3]; and anything less will earn no marks for this segment of your grade. Because the sequence of material is so important, if you have not reached the mastery level on the previous unit before you take the next unit test, you have failed the previous unit. ***You control the timing of the unit tests to a certain extent, but each unit MUST be completed at mastery within approximately TWO [2] weeks of it being assigned. For example, unit test 1 will be made available at 8:00 p.m. on January 17th and you will have until January 31st at 5:00 p.m. to reach the mastery level on it or else you will fail that unit and forfeit the marks from it. Check the dates and times for each unit quizze in Canvas since they vary from quiz to quiz. The last of the first three unit quizzes needs to be completed by February 21 at 5:00 p.m.***

The unit tests are to be taken on Canvas and usually involve 30 multiple choice questions, but sometimes there are fewer questions if some questions are complex and therefore are worth more points. These unit tests are self-administered with a time limit of 60 min, except for Unit 3 which has a 90-min limit. ***Moreover, you should not retake a unit quiz for at least 24 hrs; this delay will give you time to fix any problems which you have by doing some remedial work and/or seeking help. The delay means you need to plan this out so that your first quiz is no later than 4 days before the cutoff or you may not be able to have all three attempts available to you.*** The quizzes will contain both calculations as well as theory questions. Students are expected to work independently and to take these tests only with authorized aids in order to mirror exam conditions. While you may think that doing whatever is necessary to pass the quizzes is a good idea [because you may get a higher grade on this section], this strategy will ultimately work against you as you will not have acquired the necessary knowledge or skills to do well on the rest of the evaluation methods. In essence, ***I am relying on your personal integrity to follow the rules. It is important for you to know, however, that if I find out that you have cheated, I will give you ZERO for the entire quiz component.*** This is not a threat, but rather a clear expression of consequences and how strongly I feel about this issue. [See also *Academic Integrity* below.] A sample quiz will be available for each unit.

Term exams: There are two [2] supervised term exams [one midterm and one final]. The first exam will cover Units 1-3. This midterm exam will be similar to the unit tests in that there will be multiple choice questions drawn from the same test banks as the quizzes. However, you will also be required to show the process through which you obtained your calculated answers and generate some of the theory answers rather than simply identifying the correct response in a multiple choice format. There will also be some questions which evaluate a higher level of understanding and so will be more difficult. The midterm will be 75 min in duration. The supervised exams will also be used to validate your unit test results. The final exam is 3 hr and is cumulative: It covers **all** the material from the start of the course until the end. Given that the final exam is cumulative, your marks for these two tests will be weighted 1:2; consequently, the midterm exam contributes 20 marks and the final exam counts for 40 marks. The supervised exams are to be taken at the time and location specified, unless special arrangements have been made [e.g., because of a disability]. If you fail to take the midterm exam for a legitimate reason,

the grade from that term exam will be shifted to the finals so that it will now be worth 60 marks toward your course grade.

Homework: I have assigned a series of homework questions for you to do as practice. It is ***extremely*** important that you do these questions in order to ensure that you have the necessary skills to succeed on the unit tests and term exams. You will be handing in your assigned homework ***each Thursday at the start of class*** [see schedule of homework]. You will be rewarded for completing the assigned homework and handing it in. If you hand all of the completed homework you will earn 3% of your final course grade, but you will lose 1% for each assignment that is not handed in. Moreover, if you hand in a homework assignment but only complete part of it, then you will only receive part marks (e.g., if you only do half of the questions then you will lose 0.5 from the 3). In addition, we will also be marking the content of the homework. However, only a selection of these questions will be marked each week. Your homework will be evaluated for the steps you took to get your answer, not just the final answer since you will know what the correct final answer is. Therefore, you need to provide the necessary details. Your mark on the content of the homework questions will contribute 12% toward your final course grade. You are to submit all of the homework assigned for the previous week; that is, the work assigned for Jan. 9th-11th is due on the 18th; the work assigned for 16th-18th is to be handed in the 25th, etc., except around the Midterm—check the Homework Problems handout schedule for details. In summary, the homework is worth 15%: 3% for completing all of it, and 12% for doing it correctly.

In-class quizzes: I have reserved 7 marks from your final grade for in-class quizzes and assignments. These will be interspersed during the lectures and will include material that has been covered recently in class. My intention is to reward you for following along as I progress through the material in class. I have yet to determine exactly how many questions I will ask, but I will calculate your mark for this on only 90% of the questions given. For example, if over the course of the semester I ask 40 questions, you will earn full marks if you have 36 or more correct answers; if you have fewer than 36 correct answer, your grade will be based on your total divided by 36 and multiplied by 7 marks.

SUMMARY

Unit tests [18% max]	5 tests at 80% = 18.0
	4 tests at 80% = 13.4
	3 tests at 80% = 8.8
	2 tests at 80% = 4.2
	1 test at 80% = 0
Term exams [60% max]	Midterm [75 min] = 20
	Final [3 hr] = 40
Homework [15% max]	Handing each homework assignment in on time [lose one point for each assignment **not** submitted and part marks for incomplete assignments] = 3
	Marked homework = 12

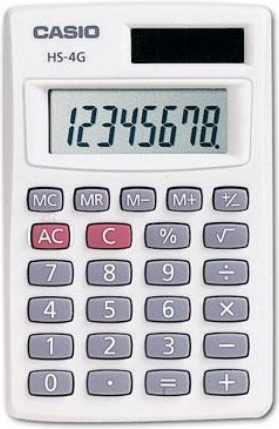
In-class quizzes [7% max] Number varies = 7

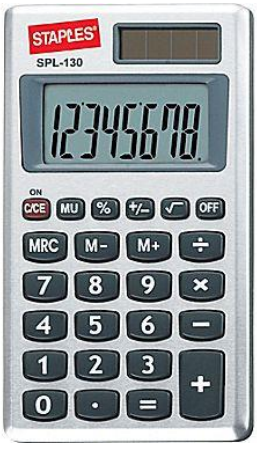
Bonus marks: Bonus marks (up to 2%) are available to students who participate in psychological research through the volunteer subject pool. I would like to encourage you to participate in the subject pool because not only will you assist researchers (including fellow students) and earn some extra marks, you will also be seeing what it is like to be in a study. This can be a valuable experience which will enrich your understanding of behavioural research. Students who wish to access these bonus marks, but not act as research participants, may elect to do the paper summary alternative (see SONA handout on Canvas).

In order to get a C [60% or better] for the course, the mark on the Final Exam must be at least 40/100; failure to reach this criterion will result in a D or less [i.e., <60%] in the course. Note that the Final Exam is cumulative and covers all the material in the course.

APPROVED CALCULATORS

A ***basic calculator*** with a square root and memory function is necessary for course work. Sophisticated calculators with built-in or programmable statistical functions are **not** permitted and ***cannot*** be used during examinations. It is recommended that you use an approved calculator when completing all unit tests and homework to ensure you are comfortable and familiar with the calculator you will be using during your exams. We will be doing a calculator check prior to the midterm exam; I will ask you to bring the calculator you intend to use to class and we will examine it to see if it is OK. Should you arrive at either of the exams with an unacceptable calculator then it will be removed and you will be forced to complete the exam with paper and pencil only. It is your responsibility to ensure that you have an approved calculator for the exam. [See below and the homepage for PSYO 271 on Canvas for pictures of acceptable calculators.]





SEQUEL COURSES

Students in the Honours Psychology programs [both B.A. & B.Sc.] are required to take two more research methods / statistics courses as part of their programs. To be admitted to the first course in the series [i.e., PSYO 372], students must attain a minimum grade of 80% in this course and PSYO 270; to get into PSYO 373, students will need a minimum of 76% in PSYO 372.

Entry into PSYO 372 will be based on academic performance in Psychology courses: We will initially have everyone interested in PSYO 372 go on a waitlist. We will then rank order applicants based on their Psychology weighted average. Entry will depend on the number of seats we ultimately decide to open, but currently we expect there to be 30-35 openings. Entry into PSYO 373 is limited by space and so will be based on your grade in PSYO 372.

If you are completing a Major you are **not** required to take any more stats/methods courses, but are advised that these courses would be helpful if you are planning to attend graduate studies in psychology or related social sciences. Taking the PSYO 372/373 will keep your options open for doing an Honours degree at a later date. There is a provision for students to return to the University and upgrade their Major in Psychology to an Honours in Psychology by taking the Honours thesis and additional psychology credits. If you already have PSYO 372/373, this can be done in one academic year; if not, it will likely take two academic years. Entry into these courses is limited and does **not** guarantee admissions to the Honours programs.

MISSED ASSIGNMENTS/EXAMS

It should be noted that if the date specified for handing in assignments is missed, the mark for that assignment will be reduced by 10% for each calendar day (or part thereof) it is late unless prior approval has been given. In-class examinations **must** be written during the designated times; no alternative exam will be available. As indicated above, failure to take the midterm will mean that the points for that exam will be transferred to the Final Exam making it worth 60% of your Course Grade.

FINAL EXAMINATIONS

The examination period for Term 2 of Winter 2017-18 is April 9-24. Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 24-hr period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job.

Students who miss, or plan to miss the final exam, must consult the office of the Associate Dean, Curriculum and Student Affairs and follow the University's policies on out-of-time exams. See http://ikbsas.ok.ubc.ca/students/undergrad/finals.html and of the form itself go to http://ikbsas.ok.ubc.ca/__shared/assets/Out-of-Time_Final_Examination31637.pdf

Further information on Academic Concession can be found under Policies and Regulation in the *Okanagan Academic Calendar* http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0

DISABILITY RESOURCES

If you require disability-related accommodations to meet the course objectives please contact the Coordinator of Disability Resources located in the Student Development and Advising area of the Student Services building. For more information about Disability Resources or about academic accommodations please visit the following website:
http://students.ok.ubc.ca/drc/welcome.html

EQUITY, HUMAN RIGHTS, DISCRIMINATION, AND HARASSMENT

UBC Okanagan is a place where every student, staff, and faculty member should be able to study and work in an environment that is free from human rights-based discrimination and harassment. UBC prohibits discrimination and harassment on the basis of the following grounds: age, ancestry, colour, family status, marital status, physical or mental disability, place of origin, political belief, race, religion, sex, sexual orientation, or unrelated criminal conviction. If you require assistance related to an issue of equity, discrimination, or harassment, please contact the Equity and Inclusion Office – Okanagan and/or your department head.

Equity and Inclusion Office - Okanagan . Phone: 250-807-9291; Toll-free: 1-866-596-0767 ext. 2-6353. Email: equity.ubco@ubc.ca **Web:** www.ubc.ca/okanagan/equity

OFFICE OF THE OMBUDSPERSON FOR STUDENTS

The mandate of the Ombuds Office is to ensure that students are treated fairly in every aspect of their university life. The office is a safe and confidential place where students can get assistance and guidance on existing resources and processes, and help in resolving conflicts related to fairness issues. If you require assistance, please contact the Office of the Ombudsperson: ombuds.office@ubc.ca | 604-822-6149 www.ombudsoffice.ubc.ca

SAFEWALK

*Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at **250-807-8076. For more information, see: http://security.ok.ubc.ca/welcome.html***

ACADEMIC INTEGRITY

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating usually result in a failing grade or mark of zero on the assignment or in the course. Careful records are kept in order to monitor and prevent recidivism.
A more detailed description of academic integrity, including the policies and procedures, may be found at http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,54,111,959#11230 and http://library.ok.ubc.ca/wrs/aim/

As indicated above, I take these issues very seriously since I see them as a violation of our personal trust relationship. **If you have any questions about how academic integrity applies to this course, please talk to me.**

Just to be clear, students who use more than one clicker [trying to help out a friend?] are violating the principle of academic integrity and so should be forewarned that there will be consequences.

It should be obvious that we are operating on the basis of mutual, personal trust. I am expecting you to act ethically, just as you are expecting me to do the same.

USEFUL CONTACTS

THESE ARE ALL UBC NUMBERS SO THEY START WITH 250-80

Very Important Numbers		
First Aid / Emergency	78111	
Security (non-emergency)	79236	
IT Services Helpdesk	79000	
Contacts for Students		
Marla MacDonald, Psychology Secretary	79258	ART 321
Trudy Kavanagh, Associate Dean [Students]	78754	ASC 449
Places to Refer Students		
Psychology Program Advisors		
Jan Cioe	78732	ASC285
Barb Rutherford	78734	ART318
Academic Advising	79100	UNC 207
Disability Resource Centre	79263	UNC 227
Psychology Course Union		ART281
Math and Science Centre		UNC 201
Writing and Research Centre	79185	LIB 237
Health and Wellness	79270	UNC 337
Equity Office	79291	FIP 302
Safewalk	78076	
Useful People to Talk To		
Cindy Bourne, Co-ordinator-Learning Centre	78065	UNC 325H
Janine Hirtz, e-Learning Support (Canvas)	79133	SCI 200
Liz Hilliard, Manager, Campus Life	79012	UNC 329B
Terina Mailer, Senior Academic Advisor	78726	UNC 207D

Unit #	Week	Date	Readings	Topic
1	1	Jan. 4	McCall [Mc] 1 [to p. 9]; Mc12 [pp. 300-314, a review from P270]	Introduction – Course outline.
1	2	9	Mc 1 [to 17]	Nature of measurement; scales of measurement. Measurement error.
1		11	Mc 2; Mc 4 [to 87]	Frequency distributions and graphs.
		??	Mc Appen. 1	Algebra review – We will need to find a time for this; likely early evening]
1	3	16	Mc 1 [rest]	Frequency distributions and graphs [rest]. Summation signs.
2		18	Mc 3 [to 63]	Descriptive statistics: Measures of central tendency. **BRING YOUR CALCULATOR TO CLASS FOR CLICKER MARKS**
		??	Mc Appen. 1	Algebra review – [We will need to find a time for this; likely early evening]
2	4	23	Mc 3 [rest]	Descriptive statistics: Measures of variability.
2		25	Mc 4 [88-98]; Mc 5 [to 105]	Resistant indicators. Percentile points.
2	5	30	Mc 5 [to 107]	Percentile ranks
3		Feb 1	Mc 5 [to 113]	Effects of scale change. *z* scores. Standard normal distribution.
3	6	Feb. 6	Mc 5 [rest]	Application of standard normal curve problems.
4		8	Mc 8	Probability theory and introduction to hypothesis testing; sampling distribution; sampling error; central limit theorem.
	7	12-16		**READING BREAK: No class**

Unit #	Week	Date	Readings	Topic
	8	20		NO CLASS—I WILL BE AVAILABLE IN MY OFFICE
		22		**EXAM I – All material to Feb. 6th [Units 1-3]**
4	9	27	Mc 9 [to 218]	Hypothesis testing: Strategy for experimental inferences.
4		Mar 1	Mc 9 [to 224]	*z* test for true means.
4	10	6	Mc 9 [to 231]	Inferential statistics: populations & samples, null hypothesis, statistical decisions, type I & II, error, power, directional tests.
4		8		**EXAM I – Review exam results**
4	11	13	Mc 9 [rest]	The *t* distribution; *t* test for true mean.
4		15	Mc 10 [to 253]	Difference between means *t* test, independent-samples *t*.
4	12	20		Correlated *t* / paired-samples *t*.
5		22	Mc 6	Regression: Linear regression; regression line; standard error of estimate.
5	13	27	Mc 7 [to 176]	Correlation: Pearson product moment correlation coefficient. Properties of *r*.
5		29	Mc 7 [rest]; Mc 10 [253-264]	Factors that change *r*. Causality and correlation. Inferences about correlations.
		Apr 3	Mc 11	Effect size and interval estimation: Limitations of hypothesis testing; indices of effect size; interval estimation.
		5		*F* test; One-way ANOVA; factorial ANOVA.
		9-24		**Final Exams – NOTE: Saturday exam is possible. ALL MATERIAL TO DATE in 3-hr format.**