

82:250 – FUNDAMENTALS OF PSYCHOLOGICAL RESEARCH I – A01

<i>Fall Semester:</i>	September 4 th – December 5 th 2024	
<i>Lectures:</i>	Mon, Wed, and Fri: 1:40pm – 2:30pm	Room: BB 1 – 53
<i>Instructor:</i>	Nicholas Watier, PhD	
<i>E-mail:</i>	watiern@brandonu.ca	
<i>Office hours:</i>	By appointment	Room: BB 1 – 09
<i>Course Resources:</i>	Moodle for course lecture slides and videos, practice questions, grades (moodle.brandonu.ca; enrollment key: 82250)	

Course Description (from the course calendar): Examination of basic theoretical, methodological and statistical issues involved in data generation and analysis in psychology. Topics will include selected measurement techniques, characteristics of problems, hypothesis, and variables as they relate to systematic observational techniques, experimental and correlational designs. Descriptive statistical procedures will be dealt with in conjunction with the substantive characteristics of the different designs. (Required for all Psychology Majors and normally to be taken during the second year of the student's program).

Course Description (from the perspective of the instructor): Carl Sagan described science as the fine art of baloney detection. As the human mind is one of the most complex natural phenomena we have encountered, there is no shortage of claims about the mind that are simply baloney. Like other scientific disciplines, psychology has fortunately developed various methods to detect and test such bogus claims. This course gives you an introductory overview of those methods. We'll begin by discussing various research designs, with an emphasis on experiments. Specific techniques for describing, visualizing, and interpreting psychological data will then be examined in detail. An appreciation for mathematics and critical thinking will be facilitated by exposing you to various research problems and prompting you to propose solutions to these problems. **Wild speculation is encouraged.** Emphasis will be placed on conceptual understanding rather than computational rigor.

Prerequisite: 82:160 and 82:161

Course Resources: I recorded videos for most of the lecture topics in the course during the pandemic. The slides for each topic and accompanying videos will be posted on Moodle as the course unfolds. While the videos are a few years old, they can still nevertheless act as a substitute if you are unable to attend class or would like a refresher in preparation for the tests and exam. Practice questions for each lecture topic are also posted on Moodle. They provide the opportunity to assess your current understanding of the material, and help prepare you for the tests.

Textbook: While a textbook is not required for this course, some students prefer to have one. If you are one of those students, the following textbook is recommended: Gravetter, F.J., Wallnau, L.B., Forzano, L.B., & Witnauer, J.E. (2020). *Essentials of Statistics for the Behavioral Sciences (10th Ed)*. Belmont, CA: Wadsworth. Early editions of the textbook are fine and usually cheaper. Past students have done well in the course without the textbook, whereas others have indicated that the textbook was critical in obtaining an A grade. I personally think that you should only buy the textbook if you are actually going to read it and complete the practice questions at the end of each chapter. Otherwise, you can rely on the course resources described above in lieu of a textbook.

Evaluation: Three in-person tests and one in-person final exam. Each test is worth 20% of your final grade and contains only a handful of short-answer questions and calculations. One point on a test roughly corresponds to one percent of your final grade. To help you succeed and offset the weight of the questions, the following supports are implemented. First, the tests and exam are open-book. You can use a calculator

and bring your notes, a textbook, and/or printed lecture slides, but you cannot use your cell-phone or any other electronic device. Second, a review class will be held before each test and before the exam, and will cover similar questions as those that appear on the test and final exam. Finally, if you receive a mark below 70% on a test, you can write a make-up test and replace your original mark.

Evaluation Item	Course Material that the Item will Cover	Test Date	Make-Up Test Date	Percentage of Final Grade
Test #1	Topic: 1	Fri Sept. 27 th	Tues Oct. 8 th	20%
Test #2	Topics: 1 to 5	Mon Oct. 21 st	Tues Oct. 29 th	20%
Test #3	Topics: 1 to 10	Wed Nov. 6 th	Tues Nov. 19 th	20%
Final Exam	Everything	TBD	No Make Up	40%

Make-Up Tests and Missed Tests: If you are unable to attend a test, you must notify me prior to the test date, otherwise you will receive a grade of zero for that test and you cannot write a make-up. If you intend on writing a make-up test to improve your original grade, you must notify me of your intentions to do so by the Friday before the make-up test date. Unless otherwise requested, I do not need supporting documentation if you cannot attend a test. I understand that moments occasionally arise where it seems that factors beyond worldly comprehension have manifested and conspired to solely undermine your ability to perform and focus on your studies (e.g. death, illness, family responsibilities, vehicle explosion). These moments, while distressing, should not ultimately impede your progress, as long as you have been taking your studies seriously up to that point. As such, a make-up test is a reasonable accommodation to grant. That said, if I obtain the impression that students are taking advantage of me or are simply trying to avoid responsibility, no make-up tests will be granted. All make-up tests take place in BB 1-53 on the dates listed above from 12:40 to 1:30. There are no alternative dates for the make-up tests and there is no make-up for the final exam.

Content: The course is structured into three parts. The first, which will last until the Thanksgiving break, will focus on families of research designs, how to design an experiment, and using numbers to make measurements. The second part focuses on descriptive statistics and spans from the Thanksgiving Break to the Fall Reading Week. It is at this point where we will gently introduce mathematics to the course. I anticipate that the previous sentence elicited a state of anxiety for some of you. Nearly a century of research into anxiety has revealed that the single most effective strategy for overcoming anxiety is to willingly confront the thing that worries you. This part of the course is structured to help you do just that - to recognize that you have the ability to understand formal and technical concepts. The final part of the course will focus on inferential statistics, and will last from the Fall Reading Week to the end of the semester.

Course Outline (approximate temporal sequences of topics)

1. Research Methods
 - a. Why study research methods?
 - b. Families of research designs
 - c. Designing an experiment
 - d. Variables and operational definitions
 - e. Independent and dependent variables
 - f. Describing experimental designs
 - g. Controlling confounding variables
 - h. Correlational designs
2. Scales of Measurement
 - a. Nominal, Ordinal, Interval, Ratio
3. Introduction to Statistics
 - a. Samples & Populations; Sampling Error
4. Measures of Central Tendency
 - a. Selecting a Measure; Median & Mode
 - b. The Mean
5. Measures of Variability
 - a. Variance and Standard Deviation
 - b. Sample Data and Degrees of Freedom

6. Visualizing Data
 - a. Histograms, Normal Curve, Boxplots
7. Variability of Sample Means
 - a. Standard Error, Bar Graphs
8. Z-Scores
 - a. Measure of Location
 - b. Standardization
9. The Normal Distribution
 - a. Probability = Proportion
 - b. Practice with The Unit Normal Table
10. The Distribution of Sample Means
 - a. The Central Limit Theorem (CLT)
 - b. Practice with the CLT
11. Introduction to Inferential Statistics
 - a. Test Statistics and $p(D|H_0)$
12. Null Hypothesis Testing (NHT)
 - a. Logic of NHT
 - b. Steps in NHT
 - c. Practice with NHT

How to Succeed: Think, speculate, discuss, attend the lectures, read a textbook, complete the practice questions on Moodle or at the end of a textbook, **practice, practice, practice, practice, ask questions, ask questions, ask questions, ask questions**, give yourself plenty of time to study for the tests, and most of all, practice and ask questions. Statistics is a hierarchically organized and cumulative discipline. If you don't grasp the basics (i.e. mean, variability, standardization, inference using a normal curve), then the more complex topics will seem impossible. Constantly working on practice problems and reflecting on your understanding is crucial. If I do a poor job of explaining something, tell me. If you don't quite fully understand something, ask a question. If I can't answer the question during the lectures, arrange to meet with me to go through it in more detail. This is especially important once we begin statistics. Most statistical concepts build on antecedent statistical concepts; consequently, it is critical that you pay attention and consistently reflect on your understanding.

Calculator: A scientific calculator is necessary for this course. Some questions on the test and exam require calculations that would be tedious to do by hand, and as cell-phones are not permitted, a calculator would be of benefit.

Mathematics: Appendix A of the recommended textbook contains an excellent mathematics review. Throughout the course you will be required to know the order of operations, and how to use fractions, decimals, proportions, exponents, roots, and algebra to solve linear equations with one unknown (e.g. $2x = 6$, what is x ?)

Attendance: All of you are autonomous, independent, and capable of making your own decisions as to how you should spend your time and money, but remember this: you paid approximately 500\$ for this course, and not only will you learn something, but you might actually enjoy it as well, so I encourage you to attend the lectures.

Accessibility Services: Brandon University values diversity and inclusion, recognizing disability as an aspect of diversity. Our shared goal is to create learning environments that are accessible, equitable, and inclusive for all students. The Student Accessibility Services (SAS) office works with students who have permanent, chronic, or temporary disabilities. SAS will provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g. mental health, attentional, learning, vision, hearing, physical, medical, or temporary), you are invited to contact Student Accessibility Services to arrange confidential discussion at (204) 727-9759. If you are registered with SAS and have a letter requesting accommodations, you are encouraged to contact the instructor early in the term to discuss the accommodations outline in your letter. Additional information is available at the Student Accessibility Services website.

Psychology Department Statements Regarding Rewrites & Waiving Pre-Requisites:

The Psychology Department does not permit individual student rewrites of any exams (or any other alternate form of assessment).

The Psychology Department will not waive prerequisites unless the student can display sufficient background knowledge and/or experience. The student must provide the request to the department in writing for approval with appended documentation.

Letter Grade Equivalents:

A+ 90-100%	B+ 75-79%	C+ 61-64%	D 50-53%
A 85-89%	B 70-74%	C 57-60%	F Below 50%
A- 80-84%	B- 65-69%	C- 54-56%	

Academic Integrity: Academic fraud will not be tolerated. Academic fraud includes, but is not limited to: plagiarism, cheating, submitting assignments from other courses, and falsifying research data. As stated in the Senate Policy on Academic Integrity (<https://www.brandonu.ca/senate-office/senate-policies/>), students that are suspected of departing from academic integrity will have a hold placed on their course withdrawal eligibility, meet with the professor to determine student’s responsibility for departure, and if the student was deemed responsible, face sanctions from the Dean, including: a grade of zero on the assignment, a grade of F-AD in the course, or expulsion from the university.