

HUMBEHV 3HB3: STATISTICS & RESEARCH METHODS

Course Syllabus

Fall Term, 2018

The instructor and university reserve the right to modify elements of this course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Contact Information

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Email Contact: All emails to the instructor and TAs *must* be sent from your McMaster address and *must* include the term “HUMBEHV 3HB3” in the subject heading. **Emails sent from other accounts or lacking an appropriate subject may not be answered.**

Course website: The website for this course is <http://www.psychology.mcmaster.ca/bennett/humbehv3hb3>. Students should check the website periodically during the term for announcements and course materials.

Course Description

This course introduces descriptive, exploratory, and inferential statistics that are commonly used in behavioural research, especially Psychology. The course is designed with the assumption that students have not completed a previous undergraduate course in statistics. The emphasis is placed on understanding the conceptual bases of various statistical analyses – with the goal of preparing students to properly interpret statistical analyses – and less on the actual computation of statistics *per se*.

Prerequisite: Registration in Level III of an Honours Human Behaviour (B.A.Sc.) program.

Antirequisites: STATS 2B03 (Stats Methods for Science).

Course Format

The course consists of three weekly lectures on Monday, Wednesday, and Thursday 1:30-2:20 PM, in BSB B136.

Intended Learning Outcomes

By the end of this course, students should be able to:

1. Distinguish a sample and a population, and understand how the two are linked.
2. Identify various types of experimental variables, and the salient characteristics of distributions.
3. Interpret common statistical graphs.
4. Understand the pros and cons of using a correlation coefficient to measure the association between variables.
5. Understand the appropriate uses and limitations of z , t , and F tests.
6. Understand the logic of Null Hypothesis Significance Testing.
7. Understand the strengths and weakness of using p values to evaluate hypotheses.

Required Textbook

The textbook for this course is *Fundamental Statistics for the Behavioral Sciences* (9th edition) by D.C. Howell. The companion website for this book is at <https://www.uvm.edu/~dhowell/fundamentals9>.

Software

Some in-class demonstrations will use the statistical computing environment, **R**. Students are *not* expected or required to use **R**, though some may find it useful to reproduce the in-class examples on their own. **R** is free. Versions for Windows, OS X, and Linux can be obtained at <http://cran.r-project.org/>.

Mid-terms and Final Exam

Grades will be based on two in-class, mid-term tests and one *cumulative* final exam. Exams primarily will be multiple choice, but may include some short-answer and calculation questions. Please bring the following items to each exam: 1) a McMaster-approved calculator; 2) pencils and erasers suitable for multiple-choice scan sheets; and 3) your McMaster student ID card.

Course Assessment	% of Final Grade
Mid-term 1	30%
Mid-term 2	30%
Final Exam	40%

Missed Work Policy

In the event of an absence for medical or other reasons, **students must review and follow** the guidelines described in *Requests for Relief for Missed Academic Term Work* in the Undergraduate Calendar. Those guidelines, as well as instructions for using the McMaster Student Absence Form (MSAF), can be found at <https://www.mcmaster.ca/msaf>.

Academic Integrity

Students are responsible for demonstrating behaviour that is honest and ethical in their academic work, and are expected to be familiar with the University's regulations regarding academic integrity. More generally, students are expected to conduct themselves in a manner that is consistent with the University's code of student rights and responsibilities. More information about the University's policy on academic integrity and the student code of conduct can be found at the following links:

Academic integrity: <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>
 Student Code of Conduct: http://studentconduct.mcmaster.ca/student_code_of_conduct.html

Course Outline

The following schedule is approximate: Dates for specific lecture topics may change as we progress through the term, but every attempt will be made to keep the same dates for the tests/exams. Also, the exact reading assignments may be altered as we go through the term: please check the course website periodically. Students should try to complete the readings before the lectures. All readings refer to chapters in the course textbook.

1. Week 1 (Sep 5 & 6): Basic Concepts & Graphical Displays
Reading: Chapters 1-3.
2. Week 2 (Sep 10, 12 & 13): Defining “typical” scores & the amount of variation between scores
Reading: Chapters 4 & 5.
3. Week 3 (Sep 17, 19 & 20): Measuring the association between 2 variables: Correlation
Reading: Chapter 9
4. Week 4 (Sep 24, 26 & 27): Measuring the association between 2 variables: Linear regression
Reading: Chapter 10
5. Week 5 (Oct 1, 3 & 4): **Review & in-class mid-term test (October 4)**
6. Week 6 (Oct 8-12): Mid-term recess. No Class.
7. Week 7 (Oct 15, 17 & 18): Deciding if data are unusual: Using the normal distribution for hypothesis testing
Reading: Chapters 6 & 8
8. Week 8 (Oct 22, 24 & 25): Testing hypotheses about one group: One-sample t tests
Reading: Chapter 12
9. Week 9 (Oct 29, 31 & Nov 1): Two-sample t tests & statistical power
Reading: Chapters 14 & 15
10. Week 10 (Nov 5, 7 & 8): **Review & in-class mid-term test (November 8)**
11. Week 11 (Nov 12, 14 & 15): Comparing 3 or more groups (One-way ANOVA)
Reading: Chapter 16
12. Week 12 (Nov 19, 21 & 22): Factorial ANOVA: main effects & interactions
Reading: Chapter 17
13. Week 13 (Nov 26, 28 & 29): Analysis of tabular data (Chi-Square)
Reading: Chapter 19
14. Week 14 (Dec 3 & 5): Summation & Review