

INFERENTIAL STATISTICS PNB 3XE3

Term 1 2018

Monday, Wednesday 11:30 to 12:20

and Friday 13:30 to 14:20

BSB B136

Instructor: Professor M.D. Rutherford

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Text: *An Adventure in Statistics* by Andy Field, published by SAGE.

Objectives: Students will learn how to make inferences using data and the statistical methodologies that are used in the social and natural sciences. Students should gain a strong foundation in inferential statistics, including *t*-tests, Analysis of Variance, and Chi-Square, assessing Power and choosing appropriate analyses. Students will understand the theory behind the General Linear Model and be able to use these tests correctly and appropriately to analyze data and be able to report and interpret results.

Software: The software package used throughout this course is IBM SPSS. You have access to this software on campus. You will **not** need to purchase this software for this course.

Tentative Evaluation Plan: Marks will be based on 1) Homework 2) Computer Lab Tutorials 3) Peerwise questions 4) Midterms and 5) a Final exam. 1) There are 16 Homework assignments (2 per chapter) worth 2 points each for a total of **32 points**. 2) There are 8 Computer Lab Tutorials, worth 1 point each for a total of **8 points**, 3) You will create 1 PeerWise question for each of our 8 chapters, for a total of **8 points**. 4) There are 8 midterms worth 4 points each, for a total of **32 points**, and 5) The final exam is worth **20 points**. The final is cumulative. NOTE: If any midterm does not take place on the scheduled date due to weather, facilities, or any other unforeseen circumstance THE MIDTERM WILL TAKE PLACE AT OUR NEXT MEETING.

McMaster's Grading Scale:

90-100	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	50-52	0-49
A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

The instructor reserves the right to adjust the final marks up or down, on an individual basis, in the light of special circumstances and/or the individual's overall performance in the course. Students will be assigned a grade from the McMaster University Grading Scale between 0 and 12 based on an overall assessment by the professor on the work submitted.

Policy Reminder: The instructor and university reserve the right to modify elements of the 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.

Please note the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes one of these resolutions will be treated according to the published policy. Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, at http://www.mcmaster.ca/senate/academic/ac_integrity.htm

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

Collaboration is not allowed on in class midterms or the final exam. It is allowed on homework assignments and computer labs.

Computer Lab Tutorials: Please bring a USB key to use to store your files. Each week, we will be using SPSS to complete some of the analyses we have been learning about and may have time in some weeks to work on PeerWise questions. Videos may be assigned before Lab Tutorials, and the assignment will be provided via Avenue to Learn.

PeerWise: You will need to create a PeerWise account and create one question on PeerWise for each chapter we cover. One of the best ways to learn new material is to teach someone else. With PeerWise, you'll get to create a question, give the answer, and answer clarifying discussion questions posted by your peers. The question for each chapter is due at the time of the second class meeting for that chapter. Login at https://peerwise.cs.auckland.ac.nz/at/?mcmaster_ca

Communication:

For e-mail communications, Avenue to Learn is preferred. Should we need to communicate with you about individual matters, we will send it to your Avenue to Learn account. You should monitor this account regularly.

Students should be aware that when they access some of the electronic components of this course using Avenue to Learn, information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

Please note that instructors cannot return long distance telephone calls.

Any change in the course outline will be posted on the webpage and the details will be announced in class. *This is the 1st version of the course outline.*

Problems with the final exam schedule must be addressed to the Office of the Registrar.

Tentative Schedule

September 5: Course Overview, Introductory Lecture

September 7: p value, one and two-tailed tests. Homework 1 due. Read Chapter 10 pp. 331-345

September 10: Power, Statistical Significance. Homework 2 due. Read Chapter 10 pp. 345-358

September 12: Chapter 10 review

September 14: **In-class midterm: Chapter 10**

September 17: Effect size. Homework 3 due. Read Chapter 11 pp. 361-380

September 19: Meta Analysis, Bayesian Approaches. Homework 4 due. Read Chapter 11 pp. 380-393

September 21: Chapter 11 review

September 24: **In-class midterm: Chapter 11**

September 26: Model Fitting. Homework 5 due. Read Chapter 12 pp. 395-410

September 28: Assumptions. Homework 6 due. Read Chapter 12 pp. 410-426

October 1: Chapter 12 review

October 3: **In-class midterm: Chapter 12**

October 5: PeerWise Talent Show

October 8 - 12: FALL BREAK

October 15: Chi-squared. Homework 7 due. Read Chapter 13 pp. 429-451

October 17: Covariance. Homework 8 due. Read Chapter 13 pp. 451-474

October 19: Chapter 13 review

October 22: **In-class midterm: Chapter 13**

October 24: General Linear Model. Homework 9 due. Read Chapter 14 pp. 477-506

October 26: Models with several predictors. Homework 10 due. Read Chapter 14 pp. 506-525

October 29: Chapter 14 review

October 31: **In-class midterm: Chapter 14**

November 2: Independent t test. Homework 11 due. Read Chapter 15 pp. 527-547

November 5: Paired t test. Homework 12 due. Read Chapter 15 pp. 547-562

November 7: Chapter 15 review

November 9: **In-class midterm: Chapter 15**

November 12: *F* ratio. Homework 13 due. Read Chapter 16 pp. 567-592

November 14: Sum of squares. Homework 14 due. Read Chapter 16 pp. 592 -628

November 16: Chapter 16 review

November 19: **In-class midterm: Chapter 16**

November 21: Factorial Designs. Homework 15 due. Read Chapter 17 pp. 633-658

November 23: Alternative approaches. Homework 16 due. Read Chapter 17 pp. 658-670

November 26: Chapter 17 review

November 28: **In-class midterm: Chapter 17**

November 30: PeerWise Talent Show

December 3: Final Review

December 5: Open House

Final Exam: TBA