INFERENTIAL STATISTICS PNB 3XE3
Term 1 2020
Monday, Wednesday, and Thursday
13:30 to 14:20

Instructor: Professor M.D. Rutherford

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TA 5

Learning Outcomes: By the end of this course you will be able to:
• apply the General Linear Model by analyzing data and creating and interpreting reports.
• select from among Chi-square, correlation, regress, \( t \)-tests and Analysis of Variance to test hypotheses.
• plan and execute statistical analyses using the R statistical software package.
• evaluate the robustness of your hypothesis testing using results from your power calculation and apply alternative approaches when necessary.

Remote Learning Format: This course is a synchronous remote class. This course has no in-person meetings. Teaching will be synchronous, which means you will participate during the scheduled class times. You will connect to both class time and computer tutorials via MS Teams. Links will be available on Avenue to Learn.

Text: An Adventure in Statistics by Andy Field (2016), published by SAGE.

Required course materials: The software package used throughout this course is R. You can download R for free onto your computer. Links to download:
R: https://cloud.r-project.org/
RStudio: https://www.rstudio.com/products/rstudio/download/#download

Course Assessments: In order to complete the course, you must complete all of the following: 1) Homework Assignments 2) Computer Lab Tutorials 3) Peerwise questions 4) In-class Chapter Quizzes and 5) the Final exam. There are 1) 18 Homework assignments worth 1 point each for a total of 18 points 2) 8 Computer Lab Tutorials, worth 2 points each for a total of 16 points, 3) You will create 1 PeerWise question for each of our 8 chapters, worth 1 point each, for a total of 8 points. 4) There are 8 Practice Quizzes worth 1 point each, for a total of 8 points, and 5) The final exam is worth 50 points. The final is cumulative. NOTE: If any quiz does not take place on the scheduled date due to any unforeseen circumstance THE QUIZ WILL TAKE PLACE AT OUR NEXT MEETING.

Final Exam Proctoring: The final exam will be conducted remotely. Collaboration is not allowed on in Chapter Quizzes or the final exam. Collaboration is allowed on homework assignments. Collaboration is allowed on computer lab assignments but not computer lab quizzes.

Computer Lab Tutorials: Each week, we will be using R to complete some of the analyses we have been learning about. 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/?memaster_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.

**McMaster’s Grading Scale:**

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<thead>
<tr>
<th>90-100</th>
<th>85-89</th>
<th>80-84</th>
<th>77-79</th>
<th>73-76</th>
<th>70-72</th>
<th>67-69</th>
<th>63-66</th>
<th>60-62</th>
<th>57-59</th>
<th>53-56</th>
<th>50-52</th>
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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.
Tentative Schedule

September 9: Course Overview, Introductory Lecture

September 10: \( p \) value, one & two-tailed tests. Homework 1 due. Read Chapter 10 pp. 331-345

September 14: Power, Statistical Significance. Homework 2 due. Read Chapter 10 pp. 345-358

September 16: Chapter 10 review

September 17: **In-class Practice Quiz: Chapter 10**


September 23: Meta Analysis, Bayesian Approaches. Homework 4 due. Read Chapter 11 pp. 380-393

September 24: Chapter 11 review

September 28: **In-class Practice Quiz: Chapter 11**

September 30: TA review of Chapter 10 and 11 Practice quizzes

October 1: Model Fitting. Homework 5 due. Read Chapter 12 pp. 395-410

October 5: Assumptions. Homework 6 due. Read Chapter 12 pp. 410-426

October 7: **Chapter 12 review**

October 8: In-class Practice Quiz: Chapter 12

October 4: Chi-squared. Homework 7 due. Read Chapter 13 pp. 429-451

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

October 12 – 18: FALL BREAK

October 19: Chapter 13 review

October 21: **In-class Practice Quiz: Chapter 13**

October 22: Simple Regression analysis. Homework 9 due. Read Chapter 14 pp. 480-496

October 26: Multiple Regression analysis. Homework 10 due. Read Chapter 14 pp. 496-512


October 29: Chapter 14 review
November 2: **In-class Practice Quiz: Chapter 14**

November 4: TA review of Chapter 12, 13 and 14 Practice quizzes

November 5: Independent ttest. Homework 12 due. Read Chapter 15 pp. 527-547

November 9: Paired ttest. Homework 13 due. Read Chapter 15 pp. 547-562

November 11: Chapter 15 review

November 12: **In-class Practice Quiz: Chapter 15**

November 16: ANOVA. Homework 14 due. Read Chapter 16 pp. 569 - 590

November 18: Contrast Coding. Homework 15 due. Read Chapter 16 pp. 590-609

November 19: Repeated-measures designs. Homework 16 due. Read Chapter 16 pp. 609 -628

November 23: Chapter 16 review

November 25: In-class Practice Quiz: Chapter 16


December 2: Chapter 17 review

December 3: In-class Practice Quiz: Chapter 17

December 7: TA review of Chapter 15, 16 and 17 Practice quizzes

December 9: PeerWise Talent Show

**Final Exam: TBA**