MATH 204: Principles of Statistics 2

Course Details

Lectures:

- **MWF 13:35 - 14:25 at ENGMC 204**

Tutorials

- **M 16:35 - 17:25 at WONG 1020**

The purpose of the tutorials is to see more examples, at a slower pace than during the lecture. You are strongly encouraged to ask questions during the tutorials.

Registration for the tutorial is not required. Attendance is not mandatory.

Office hours:

- Jose Correa (Instructor)

  WF 15:00-16:30 at BURN 1233

- Bryden Cheong (Teaching Assistant)

  M 15:15-16:15 and Th 13:30-14:30 at BURN 1115

Course objectives

- The goal of this course is to teach students applied statistical modelling, continued on from the basic ideas in MATH 203.
- The course begins with a review of basic material in MATH 203.
- The course covers practical aspects of experimental design and Analysis of Variance; applied simple and multiple linear regression, including model fitting, assumptions, testing, diagnostics, and variable selection; basic categorical data analysis and basic nonparametric statistics.
- The instructor will strive to provide as large a selection of examples and applications as possible in order to encourage the students to evaluate research encountered in their course of study and future work.

Course Content

- **Simple Linear regression**

  Simple Linear Regression; Probability Models; Least-Squares Fitting; Model Assumptions; Parameter Estimation and Testing; The Correlation Coefficient; Prediction; Polynomial Regression.

- **Multiple Linear Regression**

  Model Building and Checking; Stepwise Model Selection; Residual Analysis; Pitfalls of Regression Modelling.

- **Categorical data**

  The Multinomial distribution; Chi-square test; Contingency tables.

- **Non-parametric statistics**

  Distribution-Free Tests; Single Population Tests; Comparing Two Populations: Independent Samples; Comparing Two Populations: Dependent Samples; Comparing Three or More Populations; Rank Correlation; Simulation-based Testing: Permutation Tests.

- **Analysis of variance: comparing more than two means**

  Designed Experiments; Randomized Designs; Multiple Comparison of Means; Randomized Block Designs; Factorial Experiments.

Pre-requisites

MATH 203 or equivalent. There is no calculus pre-requisite for this course.

Restriction: This course is intended for students in all disciplines. For extensive course restrictions covering statistics courses, see Section 3.6.1 of the Arts and Science sections of the calendar regarding course overlaps.

You may be unable to receive credit simultaneously for this and other statistic courses. Please check the Course Overlap section under Faculty Degree Requirements in the Arts and Science sections of the calendar.

Textbook

Statistics, James T. McClave and Terry Sincich.

We will cover roughly Chapters 10-14 of the textbook.

An e-book version of the textbook is available at the McGill bookstore: https://iejames.ca

The data sets for the textbook examples and exercises are here:

https://media.pearsoncmg.com/cmg/pmmg_mml_shared/mathstatsresources/home/index.html

- Use the link M (for McClave / Sincich)
- Statistics, 13/e
- The formats are .csv, .txt and .ti

I will also post data sets that are not in the textbook in *myCourses*.

Assessment

Option 1

- **Quizzes**: 9%
- **Assignments**: 21%
- **Midterm**: 20%
- **Final exam**: 50%

Option 2

- **Quizzes**: 9%
- **Assignments**: 21%
- **Final exam**: 70%

If you do not take the midterm, your final grade will be under Option 2. If you take the midterm, the final grade will be the **maximum** of Options 1 and 2.

- **Quizzes**

There will be **8** quizzes. They will be given roughly every week, will be **online**, open book, and administered via myCourses.

I will only take into account the best **6** quizzes out of the **8** (1.5% each).

Quizzes will be **timed** assessments and graded automatically.

There will be no chance for writing makeup quizzes.

Note for students registered at the office of Student Accessibility & Achievement (SAA): The time allowed to finish the quiz will be more than double the estimated time to finish the quiz. Therefore, there would not be any need for students to ask the SAA for extra quiz-time accommodations. The SAA office is aware of this arrangement.

- **Assignments**

There will be **8** assignments. They will be given roughly every week via myCourses.

I will only take into account the best **6** assignments (3.5% each).

Assignments must be uploaded to MyCourses in *.pdf* format only.

- Non-pdf assignments will not be graded and will receive a grade of 0.

You will have unlimited attempts to solve the problems until the due date.

Please submit your assignment on time.

- Late assignments will not be graded and will receive a grade of 0.

Make sure you have submitted your assignment.

- **There will be no chance for re-submission of assignments once the deadline has passed**.
- Solutions are posted soon after the deadline.

Read all questions and instructions carefully.

Answers can be handwritten or typed, but must be legible.

- Non-legible answers will not be graded.

An answer alone will not be sufficient; it is important to show how you obtained your answer.

All questions can (and should) be done using the methods discussed in class.

You will be allowed (in fact encouraged) to discuss the homework with other students, and you may consult any books, websites, etc. you wish. However, you must work out your own solution. Direct copying from other students is not permitted. If you ask for help on internet forums, you are expected to state that yourquestion relates to an assigned homework problem.

There will be no chance for writing makeup assignments.

- **Midterm**

Date: **Monday February 20**.

Format: **TBA**

More details will be announced in class and posted on myCourses.

- **Final exam**

There will be a written final exam. It will cover material from the entire course.

The final exam will be **in-person** and must be written at the date and place decided and scheduled by the University, some time in April.

Important notes:

The date and place of the final exam is decided by the University. Instructors have no authority over matters regarding the final exam.

Reasonable excuses for missing the final exam will be considered and may result in a makeup exam (deferral). If granted, the exam would then be scheduled by the University according to the standard deferral exam process. **This process and the decision to grant or not a deferral exam depends entirely on the University and not on the instructor.**

Instructors are forbidden by University regulations to make special arrangements with any student regarding the final exam date and place. **Please do not make travel plans before knowing the date of the final exam**.

McGill Policy Statements

The following statements are included in this course outline, in keeping with various Senate resolutions:

Academic integrity. McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (Approved by Senate on 29 January 2003) (see https://www.mcgill.ca/students/srr/honest/ for more information)

Submitting work. In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Other Statements

Indigenous Land Statement

McGill University is located on land which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. McGill honours, recognizes and respects these nations as the traditional stewards of the lands and waters on which we meet today.

Disclaimer

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme is subject to change.

Inclusive learning environment

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and/or Student Accessibility and Achievement.

Assesments. The University Student Assessment Policy (https://www.mcgill.ca/secretariat/files/secretariat/2016-04_student_assessment_policy.pdf) exists to ensure fair and equitable academic assessment for all students and to protect students from excessive workloads. All students and instructors are encouraged to review this Policy, which addresses multiple aspects and methods of student assessment, for example, the timing of evaluation due dates and weighting of final examinations

Course material. Instructor-generated course materials (e.g., handouts, notes, summaries, exam questions) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

Resources

Please see **Resources** in **myCourses/Content/Information**.