MATH 423/533

REGRESSION AND ANALYSIS OF VARIANCE (3 CREDITS)
HONOURS REGRESSION AND ANALYSIS OF VARIANCE (4 CREDITS)

Instructor:	Yi Yang, Burnside Hall 1240
Email:	yi.yang6@mcgill.ca
Lectures:	Monday, Wednesday; 4:05 PM – 5:25 PM Arts Building W-120
Office hours:	Monday, Wednesday; 10:30 AM – 11:30 AM.
MATH 533 Extra hour:	Monday; 5:35 PM – 6:30 PM Burnside Hall 1234
R Tutorial:	Thursday 10:00 AM – 11:00 AM Burnside Hall 1214
Textbook:	*Introduction to Linear Regression Analysis*, 5th edition 2012, D. C. Montgomery, E. A. Peck, and G. G. Vining. Mainly Chapters 1–6, 8, 9 and 10.
Software:	Free software R, Version 3.1.0 or later (http://www.r-project.org/)
	Rstudio (https://www.rstudio.com/)
Prerequisites:	MATH 323 and MATH 324 or MATH 356 and MATH 357 or equivalent, **AND** MATH 223 (or equivalent course in linear algebra)

This course will cover both theory and practice of simple and multiple linear regression, and analysis of variance models. Good data analysis principles will be emphasized along with mathematical rigour. MATH 423 and MATH 533 will share lectures, and may share problems on homework, although the MATH 533 students will typically have supplementary questions. MATH 533 students will also have a compulsory weekly one-hour extra lecture devoted to more advanced material: this tutorial will also be open to MATH 423 students.

The main concepts covered in the course are: *Simple Linear Regression; Multiple Linear Regression; Residual Diagnostics (Model Adequacy Checking); Indicator Variables; Analysis of Variance (*ANOVA*); Model (Variable) Selection; Multicollinearity; Transformations and Weighted Least Squares; Measures of Influence; Additional topics: flexible regression models; penalized regression, shrinkage & Bayesian approaches; information criteria.*

EVALUATION

Coursework:	Four assignments, must be written as PDF files using R Markdown and submitted on myCourses.
Midterm exam:	In class, **Wednesday October 18th** (provisional)
Final term project:	The project will involve the analysis of a real dataset
Final exam:	3 hours, to be held in the final exam period **Date and venue to be confirmed: the scheduling of the final exam is not under the control of the Instructor**.

The final mark for the course will be calculated as the larger of

25% assignments + **20%** midterm + **50%** final exam + **5%** final term project

and

25% assignments + **70%** final exam + **5%** final term project.

COURSE MANAGEMENT

1 The midterm exam will cover materials from the first half of the course. The final exam may cover all material covered in the course.
2 Four homework assignments will be handed out. Late submission may be penalized by up to 100 % loss of possible marks. **Assignments are to be submitted electronically via myCourses. All queries concerning homework grading should be addressed to the course instructor**.
3 Assignments will mainly focus on statistical data analysis. More details will be given during the class.
4 In the event of extraordinary circumstances beyond the University's control, the content of the course and/or evaluation scheme is subject to change.

COURSE WEBSITE

The course website will accessible via **myCourses** and hosted on

`http://www.math.mcgill.ca/yyang/regression`

You will be able to access all online course material through this website. If you encounter any problems, please ask the course instructor.

MCGILL UNIVERSITY POLICY STATEMENTS

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

1 *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****. For more information, see*

`www.mcgill.ca/students/srr/honest/`

[*Approved by Senate on 29 January 2003*]

2 *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.*

[*Approved by Senate on 21 January 2009*]

3 *Instructors who may adopt the use of text-matching software to verify the originality of students' written course work must register for use of the software with Educational Technologies and must inform their students before the drop/add deadline, in writing, of the use of text-matching software in a course.*

[*Approved by Senate on 1 December 2004*]

If you have a disability and need special arrangements, please contact the **Office for Students with Disabilities** at 514–398–6009.