STAT 3470
Statistical Methods for Research Workers 1
Fall 2019

Time	Tu & Th 11:30 a.m. – 12:45 p.m.
Location	111 Armes
CRN	10105

Instructor	Ankit Doshi
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Web Pages	UM Learn: `http://umanitoba.ca/umlearn`
	Statistics: `http://umanitoba.ca/statistics`

Office Hours	Tuesday 1:00 p.m. – 2:30 p.m.
	Tuesday 5:45 p.m. – 6:45 p.m.
	Thursday 1:00 p.m. – 2:30 p.m.

If the above times are not convenient for you, please contact me to arrange an alternate time to meet. I will do my best to return all email or telephone messages within 24 hours.

Calendar Description

Linear regression, multiple regression, correlation analysis, introduction to one way analysis of variance, some related topics. May not be held with STAT 3000 or the former STAT 3120. Prerequisite: STAT 2150 (C). Pre- or corequisite: STAT 3400 or the former STAT 3500.

Textbook

Applied Linear Statistical Models by M.H. Kutner, C.J. Nachtsheim, J. Neter, and W. Li. 5th Edition, McGraw-Hill Irwin 2005, Boston. ISBN 0-07-238688-6.

Note that this book is out of print. With the copyright permission from the publisher, our bookstore has made copies of this text (required chapters) for you. You can buy it from the bookstore. The book is also on reserve in the Sciences and Technology Library.

Course notes and other materials (e.g. assignments, data sets, SAS code) will be posted on UM Learn.

Supplementary Reference

Introduction to Linear Regression Analysis by D.C. Montgomery, E.A. Peck and G.G. Vining. 5th Edition, Wiley 2012, ISBN 978-0-470-54281-1. This book is available from the Sciences and Technology Library.

Software

We will be using SAS in this course. SAS is available in the open area computer labs or you can install a free copy of SAS University Edition on your personal computer.

Assignments

There will be four assignments, each counting equally (5%) toward your final grade. Assignments may include data analysis using SAS. Assignments are due at the beginning of class on the due date; late assignments will not be accepted. You are encouraged to discuss assignments with your classmates and me, but final submission must be written independently.

Exam Information

The midterm test will be held **Tuesday, October 22, 2019**, in-class. There will be no make-up midterm. Students missing the midterm test for a valid reason (and with documentation) will have the midterm weight added to the final exam.

The final exam will be 3 hours in duration and will be scheduled by the Registrar's Office. It will cover the entire course, with emphasis on the material after the midterm test.

For the midterm test and the final examination: (i) nonprogrammable handheld calculators are permitted (graphing calculators are **not** permitted), (ii) electronic devices, such as cell phones or headphones, are prohibited, (iii) statistical tables will be provided, if required, and (iv) a formula sheet with selected formulas will be provided.

Evaluation

Assignments	20%
Midterm Test	30%
Final Examination	50%

Graded materials will be returned within two weeks of submission. Marks will be posted on UM Learn (see the web link above).

The following are the minimum percentage grades required to receive each of the various letter grades: A^+ (90%), A (80%), B^+ (75%), B (70%), C^+ (65%), C (60%), D (50%).

Voluntary Withdrawal

The voluntary withdrawal date is **November 18, 2019**.

Academic Integrity

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic integrity and academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

`http://www.sci.umanitoba.ca/undergraduate-students/academic-resources/academic-integrity-2/`

Copyrighted Material

All course notes, assignments, and exams are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.

Recording of Class Lectures

Your instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from your instructor.

Use of Electronics in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Accessibility Services. Students should not engage in electronic messaging/posting activities (e-mail, texting, video or voice chat, social networking (e.g. Facebook)) or electronic gaming during scheduled class time.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see

`http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html`

You are required to obtain and use your U of M email account for all communication between yourself and the university.

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

`http://umanitoba.ca/student-supports/accessibility`

ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UM Learn page.

Course Outline

In the beginning, you will notice that we will be revisiting some topics that you have encountered in your previous courses. Then we will start advanced topics. Our primary goal will be to reinforce the fundamental concepts, and to have a solid understanding of regression analysis.

The following is a non-exhaustive list of topics to be covered in the course. Chapters 1 – 11 will be covered. Some parts of Chapters 12 – 14 will be covered if time permits.

1. Linear regression with one predictor variable.
2. Inferences in regression and correlation analysis.
3. Diagnostics and remedial measures.
4. Simultaneous inferences and other topics in regression analysis.
5. Matrix approach to simple linear regression analysis.
6. Multiple regression I.
7. Multiple regression II.
8. Regression models for quantitative and qualitative predictors.
9. Building the regression model I: Model selection and validation.
10. Building the regression model II: Diagnostics.
11. Building the regression model III: Remedial measures.
12. Autocorrelation in time series data.
13. Introduction to nonlinear regression and neural networks.
14. Logistic regression, Poisson regression, generalized linear models.