The University of Manitoba
STAT 3470: Statistical Methods for Research Workers 1
Fall Term 2017
Course Outline

Course Number & Title: STAT 3470, Statistical Methods for Research Workers 1

Time, Location & CRN: Tuesdays & Thursdays 11:30 a.m. – 12:45 p.m., 527 Buller. CRN: 10105.

Instructor: Dr. You Liang

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Office Hours:

Tuesday	13:00 p.m. – 14:15 p.m.
Wednesday	10:00 a.m. – 11:30 a.m.

or by appointment.

If the above times are not convenient for you, please phone, email or speak to me to arrange an alternate time to meet.

Web Pages: UM Learn: http://umanitoba.ca/umlearn
Statistics: http://umanitoba.ca/statistics
Gradebook: http://www.stats.umanitoba.ca/gradebook

Calendar Description

(Formerly 005.347) Linear regression, multiple regression, correlation analysis, introduction to one way analysis of variance, some related topics.
Prerequisite: STAT 2000, STAT 2001 (005.200) (C).
Prerequisite or Concurrent Requirement: STAT 3400 or the former STAT 3500 (005.350).
Not to be held with STAT 3000 or the former STAT 3120 (005.312).

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.

Lecture notes and other materials (e.g. assignments, data sets, SAS code) will be posted in 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 Science Library.

Statistical Software

SAS statistical software will be used to perform the necessary calculations for regression and correlation analysis. Various data sets will be used to perform the analysis. Instructions will be given in the class, and SAS codes will be posted in UM Learn. There are many computers on campus that can be used for running SAS. In particular, you can practice this software in the Stats Lab at 311 Machray Hall. Opening hours are posted outside the lab. You can also install a copy of the SAS University Edition in your computer for free:
https://www.sas.com/en_us/software/university-edition/download-software.html
Documentation, including installation guides:
http://support.sas.com/software/products/university-edition

Assignments

There will be five assignments, each counting equally (5%) toward your final grade. Assignments will include mathematical statistics problems and applied statistical data analysis. The computing problems will involve some data analysis using SAS software.

Assignments are due in the beginning of class on the day assigned. No late assignments will be accepted. All assignments will be done on 8.5×11 paper, using one side only. Make a cover-page for each assignment with your name, student number, instructor's name, course number and assignment number. Write your name and student number on top right corner clearly on each page. Any computer output should be cut out and placed in your assignments at the appropriate place (with paste or staples). Whenever you answer an assignment question using SAS, you must attach the output (highlight the appropriate sections and answer the questions using the output).

Midterm Test and Final Exam

There will be one in-class midterm test. The tentative date is October 31, 2017. If there is a change on this date, I will notify you well in advance. There will be no make-up midterm test. Students who miss the test with legitimate reasons and notify me within 48 hours will have the midterm weight added to the final exam.

The final exam will be three hours in duration and will be scheduled by the Student Records Office. The final exam will cover the whole syllabus, with emphasis on the materials 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. The midterm test and final exam are closed book.

Course Evaluation and Grading Scheme

The final mark for the course will be obtained from the following rule:

Assignments: 25%
Midterm Test: 25%
Final Exam: 50%

Work should normally be graded and returned promptly. It is expected to return the graded materials within two weeks of submission. Marks for the assignments and midterm test will be posted on Statistics Gradebook: http://www.stats.umanitoba.ca/gradebook

The following are the minimum percentage grades required to receive the final grades:
A+ (90%), A (80%), B+ (75%), B (70%), C+ (65%), C (60%), D (50%), F (below 50%).

General Goals and Course Contents

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. We will also make extensive use of the computer software SAS throughout the whole course.

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.

Important Dates

The following dates are important to how the course will progress throughout the term.

Sept 7: First lecture - course overview.
Sept 20: End of the registration revision period.
Oct 5 - 6: Fall term break, no class.
Oct 31: Midterm test.
Nov 17: Last day for voluntary withdrawal (VW).
Dec 7: Last lecture.
Dec 11: First day of final examination period.
Dec 21: Last day of final examination period.

Academic Dishonesty

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 dishonesty (including plagiarism, cheating, inappropriate collaboration, examination impersonation and typical penalties) can be found at: http://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html.

Copyrighted Material

Please respect copyright. We may use copyrighted content in this course and ensure that the contents are appropriately acknowledged according to copyright laws and university guidelines. The course notes, assignments, tests 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. For more information, see the university's copyright office website at http://umanitoba.ca/copyright.

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. For more information, 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 Student Accessibility Services (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.

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 in UM Learn. This document is available from the Department of Statistics web page: http://umanitoba.ca/statistics.