STAT 3470
Statistical Methods for Research Workers 1
Fall Term 2014

Course Outline

Instructor: Dr. Saumen Mandal

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Time, Location & CRN: Tuesdays, Thursdays 11:30 a.m. – 12:45 p.m., 111 Armes. CRN: 10123.

Office Hours: Tuesdays, Thursdays: 1:00 p.m. – 2:30 p.m., or by appointment.

Calendar Description: (Formerly 005.347) Linear regression, multiple regression, correlation analysis, introduction to one-way analysis of variance, some related topics.
Prerequisites: STAT 2000, STAT 2001 (005.200).
Prerequisite or Co-requisite: 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, 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 for only about $46.95 (plus applicable taxes).

Some notes will be provided.

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.

Assignments, Test and Final Examination: There will be five assignments, one midterm test and the final exam. The date of the midterm test and final exam will be given later. Both the midterm test and final exam are closed book. A formula sheet and relevant statistical tables will be provided if required. A non-programmable calculator will be needed. Note that graphing calculators are not permitted. There will be no make-up midterm test. Students who miss the test with legitimate reasons will have the midterm weight added to the final exam. All assignments are due in class. No late assignments will be accepted.

Attending class regularly is extremely important. You are responsible for any information/announcements given in the class.

You can check the course materials in the Desire 2 Learn web site: www.umanitoba.ca/d2l
If you need assistance for this web site, visit the D2L Resources Page: http://intranet.umanitoba.ca/academic_support/catl/resources/d2lstudent.html
Also note the instructor's web page: http://home.cc.umanitoba.ca/~mandals/ for any additional information.

Marks Breakdown:	Assignments:	15%
	Midterm Test:	35%
	Final:	50%

Grade Cut-offs: 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%).

Computer Packages: 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 D2L web site. 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.

Academic Integrity: I have been asked to draw your attention to the sections in the *University of Manitoba Academic Calendar* regarding academic integrity and dealing with academic dishonesty including "plagiarism and cheating" and "examination personation". Links to resources that describe academic dishonesty can be found at: umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html umanitoba.ca/admin/governance/governing_documents/students/278.html umanitoba.ca/calendar/

Course Contents: The following is a non-exhaustive list of topics to be covered in the course. 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.

All chapters 1 – 14 (from the text) 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, POISSION REGRESSION, GENERALIZED LINEAR MODELS.