

STAT 360
Linear Models
Fall 2019

Instructor: Dr. D. Sen, Office: LB 1041-21 (SGW), Phone: (514)848-2424, Ext. 3241
Email: debaraj.sen@concordia.ca

Office Hours: Thursdays, 11:00-12:30.

Text: *Applied Linear Regression Models*, 4th Edition, by Kutner, Nachtsheim and Neter, McGraw Hill-Irwin, 2004.

Assignments: There will be 5 or 6 assignments. Assignments are compulsory. Students are expected to submit assignments in class. **Late assignments will not be accepted.** Assignments contribute 15% to your final grade. Working regularly on the assignments is essential for success in this course.

Calculators: Only calculators approved by the Department (with a sticker attached as a proof of approval), such as **Sharp EL 531** or the **Casio FX 300MS**, available at the Concordia Bookstore, are permitted for the class test and final examination. See <https://www.concordia.ca/content/dam/artsci/math-stats/docs/AppCalculatorList.pdf> for details.

Midterm Test: There will be one **midterm test**, based on the material of lectures 1-6, which will contribute up to 20% to your final grade (see the **Grading Scheme** below). Midterm test will be held on **Tuesday, October 15, 2019 in class.** This exam, as well as the final, will be closed book exams.

NOTE: It is the Department's policy that tests missed for any reason, **including illness**, cannot be made up. If you miss the midterm test **because of illness (medical note required)** the final exam will count for 85% of your final grade, and the assignments will count for the remaining 15%.

Final Exam: The final examination will be three hours long and will cover all the material in the course. In order to obtain a good grade, the student **MUST** show that she/he has a THOROUGH understanding of the subject and is good at problem solving.

NOTE: Students are responsible for finding out the date and time of the final exams once the schedule is posted by the Examinations Office. Conflicts or problems with the scheduling of the final exam must be reported directly to **the Examinations Office, not to your instructor.** It is the Department's policy and the Examinations Office's policy that **students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

- Final Grade:**
- a) Assignments (15%)
 - b) Mid-term test (20%)
 - c) Final examination (65%)

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

IMPORTANT: PLEASE NOTE THAT THERE IS NO '100% FINAL EXAM' OPTION IN THIS COURSE.

Lectures	Sections	Topics to be covered
1	1.3, 1.6, 1.7, 1.8	Simple linear regression models; estimation of regression function; estimation of error term variance; normal error regression model.
2	2.1, 2.2, 2.4	Inferences concerning β_1 and β_0 ; interval estimation of $E(Y_h)$.
3	2.5, 2.6, 2.7	Introduction to R software/language , prediction of new observation; confidence band for regression line; ANOVA approach to regression analysis.
4	2.8, 2.9, 3.1, 3.2	General linear test approach; descriptive measures of linear association between X and Y; diagnostics for predictor variable; residuals.
5	3.3, 3.4, 3.7, 4.1	Diagnostic for residuals; overview of tests involving residuals; F-test for lack of fit; Joint estimation of β_0 and β .
6	4.2, 4.3, 4.4, 5.1, 5.2	Simultaneous estimation of mean responses; simultaneous prediction intervals for new observations; regression through origin; Matrices; Matrix Addition; Subtraction.
7	Midterm 5.3, 5.4, 5.5	Mid Term exam will cover material up to section 4.4. Matrix multiplication; Special Types of Matrices; Linear Dependence and Rank.
8	5.6, 5.8, 5.9, 5.10	Inverse of a matrix; random vectors and matrices; simple linear regression model in matrix terms; least square estimation of regression parameters
9	5.11, 5.12, 5.13	Fitted values and residuals; ANOVA results; inferences in regression analysis.
10	6.1, 6.2, 6.3	Multiple regression models; general linear regression model in matrix terms; estimation of regression coefficients.
11	6.4, 6.5, 6.6, 6.7	Fitted values and residuals; ANOVA results; inferences about regression parameters; estimation of mean response and prediction of new observation.
12	6.8; 6.9, 7.1, 7.2	Diagnostics and remedial measures; multiple regression with two predictor variables. Extra sum of squares & its application; Uses of Extra Sum of squares in Tests for regression Coefficients.
13	7.3, 7.4, 7.5, 7.6 & Review	Summary of Tests concerning regression coefficients; coefficient of partial determination; standardized multiple regression model; multicollinearity and its effects.

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." [Undergraduate Calendar, Sec 17.10.2]