

STAC67: Regression Analysis

Jabed H. Tomal

Fall, 2014

Course Description:

This course covers theory and applications of regression analysis. We will cover the following topics: simple/multiple linear regression models, least squares estimation of model parameters, inference, residual analysis, checking model assumptions and remedial procedures, model selection procedures, logistic regression model, and models for categorical data. Table 1 shows the tentative lecture guide. We will use R for computation, and students will be expected to interpret R codes and outputs on tests and the exam.

Course Schedule:

- **Lectures:** Monday 10 am - 12 noon & Wednesday 12 noon - 1 pm at HW 215 (Humanities Wing).
- **Course Web Page:** <http://math-ta-x.utsc.utoronto.ca/stac67/>
- **Instructor:** Dr. Jabed H. Tomal, Assistant Professor in Statistics, Department of Computer and Mathematical Sciences, University of Toronto Scarborough.
- **Email:** jtomal@utsc.utoronto.ca
- **Office:** IC497 (room 497 of the “instructional centre”.)
- **Office Hours:** Monday & Wednesday 2 - 4 pm

Textbooks:

This course requires the following textbook:

- **Applied Linear Regression Models, Fourth Edition**, by Michael H. Kutner, Christopher J. Nachtsheim and John Neter, Publisher: McGraw-Hill Irwin.

Evaluation:

- Assignments: 30%
- Midterm Test: 20% (approximately two-hour long test for which the date will be announced later).
- Final Exam: 50% (a three-hour long comprehensive exam).

Assignments:

There will be three assignments throughout the term. I wish you will start working on problems as soon as they are posted in the course web page. Please don't expect to be able to do the problems just before the submission date.

Practice Problems:

Practice problems from the text will be posted regularly. Please note that the practice problems are to help you prepare for the test and exam and are not to be handed in.

Missed Tests:

There are **NO** make-up tests. If a test is missed for a valid reason, you must submit appropriate documentation to the course instructor within **one week** of the test. Print on it your name, student number, course number, and date. If documentation is not received in time, your test mark will be **ZERO**. If a test is missed for a valid reason, its weight will be shifted to the final exam.

Calculators:

Hand calculators are useful. **NO** phone calculators are allowed in tests and exams.

Computing:

We will be using **R** – free Statistical Software – for computations. **No previous computing experience is assumed.**

Table 1: STAC67H3: Fall, 2014 – Tentative Lecture Guide.

Week	Topics to cover
1	Introduction to course, Simple linear regression [Ch1, p2], parameter estimation, interpretation
2	Properties of the least square estimates [p18]
3	Inferences in regression and correlation [Ch2, p40]
4	Diagnostics and Remedial Measures [Ch3, p100]
5	Simultaneous inferences and other topics [Ch4, p154]
6	Matrix approach to Simple Linear Regression [Ch5, p176]
7	Multiple Regression I [Ch6, p214], general linear regression model [p217], estimation of regression coefficients [p223], ANOVA [p225], Diagnosis and remedial measures [p232]
8	Multiple Regression II [Ch7, p256], extra sums of squares [p263], multicollinearity and its effects [p278]
9	Regression models for quantitative and qualitative predictors [Ch8, p294], polynomial regression models [p298], interaction models [p306], qualitative predictors [p313]
10	Building the regression model [Ch9, p343], criteria for model selection [p353]
11	Model diagnostics [Ch10, p384], outliers [p390], residuals, studentized residuals [p394], deleted residuals [p395], leverage values [p398], DFFITS, DFBETAS, cook's distance [p400], multicollinearity diagnostics – variance inflation factor [p406]
12	Logistic regression [Ch14, p555], selected topics