STEVENS INSTITUTE OF TECHNOLOGY

SYLLABUS: MA331 INTERMEDIATE STATISTICS

FALL 2012

Instructor: Dragos Bozdog
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Time: Tue, Thu, and Fri (1:00pm-1:50pm)

Room: Pierce Complex 120

Objective: An introduction to statistical inference and to the use of basic statistical tools. Topics include descriptive and inferential statistics; review of point estimation; interval estimation and hypothesis testing; simple and multiple linear regression; analysis of variance. Selected topics, such as quality control and time series analysis, may also be included. Statistical software is used throughout the course for exploratory data analysis and statistical inference based in examples and in real data relevant for applications.

Textbook: *"Introduction to the Practice of Statistics"*, by D. Moore, G. McCabe, and B. Craig, 7th Ed., New York: W.H. Freeman and Co, 2012, ISBN: 1-4292-4032-6, ISBN-13: 978-1-4292-4032-1.

Software Textbook: *"Introductory Statistics with R"*, by P. Dalgaard, Springer Verlag, 2008, 2nd Ed, ISBN: 978-0-387-79053-4

Computational: Laptop with *R Software* installed and a scientific calculator for exams.

Tentative Course Schedule:

Week	Topic	Book Sections	HW/Tests
Week 1	Review: Looking at Data. Random Variables. Sampling Distributions. Estimating Population Mean and Population Proportion. Introduction to R.	**Ch.1** **Ch.2 (2.1,2.2)** **Ch. 5**	
Week 2	Review: Confidence Intervals and Testing Hypothesis on Population Means and Proportions	**Ch.6** **Ch.7 (7.1)** **Ch.8 (8.1)**	HW 1
Week 3	Two Population Tests of Means and Proportions	**Ch.7 (7.2)** **Ch.8 (8.2)**	HW 2
Week 4	Test of Population Variance and Two Population Variances	**Ch.7 (7.3)**	HW 3

Week 5-6	Simple Linear Regression. Least Squares Fitting. Analysis and Testing Model Utility. Prediction of Future Values	**Ch.10** **Ch.2 (2.3-2.5)**	HW 4
Week 6-7	Multiple Regression. Data, Model Estimation of the Regression Parameters. Confidence Intervals, ANOVA Table, Multiple R^2, Residuals. Selection of variables. Part one of the project due (Read Ch.3 to help you with data gathering)	**Ch.11**	HW 5
Week 8	Categorical Data Analysis. One and Two Way Tables. Goodness of Fit	**Ch.9**	Midterm
Week 9	One-Way Analysis of Variance	**Ch.12**	HW 6
Week 10-11	Two-Way Analysis of Variance	**Ch.13**	HW 7
Week 12	Analysis of Covariance and Logistic Regression	**Ch.14**	HW 8
Week 13	Bootstrap Method and Permutation tests	**Ch.16**	HW 9
Week 14	Second Part of the project due. Review.		

Project: As part of the requirements for completion of this class students will have to demonstrate the ability of using and applying material learned in class to real problems. The first part of the Project has a deadline around the middle of the semester and the second part will be due around the end of the semester (the exact dates to be announced later). A more formal description of the Project will be posted on the course website. The projects are worked in groups. During the last week of the semester each group will present the work and the results during a 15 min presentation. The suggestions received during the presentation from the instructor and the fellow students are to be addressed in the final project write-up. During the finals week the students will turn in the final project in the form of a regular scientific article. You may browse past year projects for this course at: http://www.math.stevens.edu/~ifloresc/Teaching/studentResearch.html

Grades:

Assignments	30%
Project (Part one)	10%
Midterm	30%
Final Project (Part Two) Presentation	10%
Final Project (Part Two) Paper	20%

The corresponding letter grade A (90-100), B (80-90), C (70-80), D (60-70), F (<60).

The lectures will be posted on the website.