Introduction to Regression and Statistical Computing

STAT 410 / STAT 615 Fall 2012

Course home page: http://www.ece.rice.edu/~erzsebet/STAT410-615.html

Class meets: TR 9:25 - 10:40am DH 1064
Lab, section 1: W 7 - 9pm, Ryon 102, Matthew Ginley
Lab, section 2: W 4 - 6pm, Ryon 102, Benjamin White
Lab, section 3: W 3 - 5pm, Sewall 101, Patrick O’Driscoll
Instructor: Erzsébet Merényi
email: erzsebet@rice.edu
Office/Phone: DH 2040, 713-348-3595
Office hour: by appointment
Teaching Assistants and contact information:
Patrick O’Driscoll DH 1032, 713-348-2341
Advising by TA: TBA, or by appointment
Benjamin White DH 1036
Advising by TA: by appointment
Matthew Ginley DH 2077
Advising by TA: by appointment

Short course description

A survey of regression, linear models, and experimental design. Topics include simple and multiple linear regression, single- and multi-factor studies, analysis of variance, analysis of covariance, model selection, diagnostics. Data analysis using statistical software is emphasized. Students enrolled in STAT 615 are required to complete extra, graduate level assignments in addition to the assignments for STAT 410 students.

Course Coverage (Sample, subject to change!)
Simple Linear Regression
Multiple Linear Regression
Generalized Least Squares
Weighted Least Squares
Transformations
Variable Selection Methods
Robust Regression
Analysis of Variance
Analysis of Covariance
Quantile Regression
Introduction to Computationally Intensive Methods
Introduction to Generalized Linear Models

Software: We will work with R: www.r-project.org
**Detailed Course Schedule**

A detailed schedule of class topics will come on-line in a timely manner at the course web site [http://www.ece.rice.edu/~erzsebet/STAT410-615.html](http://www.ece.rice.edu/~erzsebet/STAT410-615.html) under Course Schedule, along with reading assignments from text book and lecture notes. I will also indicate here when home work assignments are posted in Owl Space, along with due dates, post the dates of upcoming test, and all relevant logistics. The materials (s.a. lecture notes and home work assignments) indicated in the Course Schedule will be downloadable from Owl Space.

**Pre-requisites**

STAT 310 OR (STAT 312 AND STAT 340) OR (STAT 331 AND STAT 340) AND (MATH 355 OR CAAM 335) or permission of instructor.

- **STAT 310 - Probability and Statistics**
- **STAT 312 - Probability & Statistics for Civil & Environmental Engineers (replaced section 2 of STAT 310)**
- **STAT 331 - Applied Probability**
- **STAT 340 - Statistical Inference**
- **MATH 355 – Linear Algebra**
- **CAAM 335 – Matrix Analysis**

Further details on the above courses can be found at the links provided at the course home page, [http://www.ece.rice.edu/~erzsebet/STAT410-615.html](http://www.ece.rice.edu/~erzsebet/STAT410-615.html) under Prerequisites.

**Course Materials**

The course will be based on Lecture Notes, scheduled as described at the course web site [http://www.ece.rice.edu/~erzsebet/STAT410-615.html](http://www.ece.rice.edu/~erzsebet/STAT410-615.html) under Course Schedule, and on the textbook


The course will follow parts of this book. It is available at Amazon, or may be available at the campus bookstore. Fondren Library also has a few copies. Further suggested reading is listed at the course web site under Course Materials.

**Grading Policies for STAT 410 / STAT 615**

Grades will be made up of the following components, with approximate weights as shown:

- 30% - Homework assignments
- 10% - Lab assignments
- 10% - Quizes
- 25% - Exam 1
- 25% - Exam 2

1. Homework assignments
There will be approximately one assignment per week. The scheduling of assignments and their due dates will also be shown in the Course Schedule in a timely manner. You are
encouraged to work in groups and get help from anyone as needed, but you will hand in
your own solution which you are expected to understand. If the solution is the result of
group work, each group member will write the names of the collaborators on their solution.
Students enrolled in STAT 615 will receive extra problems with higher difficulty level, in
addition to the problems for STAT 410 students.

1.1 Late homework policy Homework is due at the beginning of class on the due date. You
will submit solutions electronically through Owl Space. We will try to go paperless this year,
but if that does not work well we may need to revert to submitting both an electronic copy,
and a hard copy in class. Should any circumstance prevent electronic submission to Owl
Space at any time, please submit a hard copy to me in class or drop it in the designated
wall pocket next to my office door, any time before it is due. We will work with your hard
copy and ask you to upload the electronic version when the problem has been fixed.
However, please let me and Patrick know immediately (by phone if necessary) of any
problem accessing Owl Space. After the due date, but before solutions are handed out,
homework can be turned in for 50% credit. After solutions are handed out, 0% credit will be
issued.

2. Lab assignments
There will be one lab per week, on Wednesdays, in three separate sections as posted at the
STAT 410 / STAT 615 course home page. The scheduling of labs will also be shown in the
Course Schedule in a timely manner, so any changes would be posted there, in addition to
being announced in class. Lab assignments will require solving problems using R. Since a
great part of the home works will involve computing with R, the Lab sessions are designed
to help everyone acquire the necessary skills efficiently. You will be required to complete lab
assignments and have them verified by the Teaching Assistant. You will not be required to
stay for the entire lab period after you correctly completed your assignment. If, however,
your solution is unsatisfactory you will be asked to continue to work on it. As with home
works, you are encouraged to work in groups but you will hand in your own solution which
you are expected to understand.

3. Tests
There will be four tests. Quiz 1 and Quiz 2 (approx. 35 min, in class, closed
notes/books/phones/computers), a midterm exam, Exam 1 (take home), and Exam 2 (take
home). The exact dates of these will be posted in the Course Schedule as well as announced
in class 1 - 2 weeks ahead of time. The anticipated approximate dates are September 18
(Quiz 1), October 16 or 18 (Exam 1), November 1 (Quiz 2), and November 29 (Exam 2).
The Exams will be take-home, open book and open notes but using restricted time, and
other resources (s.a. internet) will be restricted, and I will require you to give (write) and
sign the honor pledge. The exact requirements and details will be given with the exams.
Students enrolled in STAT 615 will receive extra problems with higher difficulty level, in
addition to the problems for STAT 410 students.

University Disability Accommodation Policy

Any student with a documented disability needing academic adjustments or
accommodations is requested to speak with me during the first two weeks of class, after
class or during office hours. All discussions will remain confidential. Students with disabilities should also contact the Disabled Student Services in the Ley Student Center.