ISyE 4031-B Regression and Forecasting
Spring 2017

Instructor: Gamze Tokol-Goldsman
Time/Location: MWF 11:05am-11:55am in IC 211.
Office: 311 Groseclose Building
Email: gtg3@gatech.edu (or gamze@mindspring.com)
Office Hours: MWF: 10:25–10:55 am and MWF: 2:05–2:35 pm
GTA's: Section A: J. Simon Chow; jsimonchow@gatech.edu; Main
       Building 432. Office Hours: Mon&Wed: 2-3 pm, Tue: 10-11 am.
       Section B: Cyrus Rich; crich@gatech.edu; Main Building 321.
       Office Hours: Tue: 1-3 pm, Fri: 2-3 pm.

Textbook: *Forecasting, Time Series, and Regression* by Bowerman, O'Connell, and Koehler, 4th Edition, Duxbury Applied Series.

Prerequisite: ISyE 2028.

Software: R (www.r-project.org and www.rstudio.org) and Minitab (www.minitab.com).

Objective: The objective of this course is to learn about regression, time series, and other forecasting models and their applications in various fields of science and engineering.

At the end of the course, students should be able to formulate real-life problems using regression and forecasting models, collect appropriate data for solving the problems, use statistical software to estimate and analyze the models from real data, and draw conclusions and develop solutions from the estimated models.

Course Outline

Part I: *Introduction* (at most 1 week):
Brief overview of the course (Chapter 1)
Rapid review of statistical concepts (Chapter 2)

Part II: *Regression*
Simple linear regression (Chapter 3; 2 weeks)
Multiple linear regression (Chapter 4; 2.5 weeks)
Model building and residual analysis (Chapter 5; 2.5 weeks)

Part III: *Forecasting*
Time series regression (Chapter 6; 1.5 weeks)
Exponential smoothing (Chapter 8; 1 week)
Non-seasonal Box-Jenkins models (Chapters 9 and 10; 2 weeks)
Box-Jenkins seasonal modeling (Chapter 11; 1.5 weeks)

You are responsible for any and all material covered in the lectures, even if it is not explicitly outlined in the syllabus.

Grading:

Homework: 10%
Exam 1:   22.5%
Exam 2:   22.5%
Final Exam: 25%
Project: 15%
Participation: 5%

Tentative Exam Dates:

Exam 1: February 17.
Exam 2: March 15.
Scheduled Final Exam: April 28, 8–10 am (Final exam will take two hours)
Semester Project due: April 21.

Term Project:

A project will be assigned to each team of about 4 or 5 students. Students will choose and define a real-life problem, formulate it by using regression/forecasting techniques, collect/find necessary data, analyze the data, draw conclusions, and submit a project report. Project report submissions should follow appropriate technical writing requirements. I'll provide more information later on about the project.

You can see me about your project whenever you want to. Also, I may request to meet with you if necessary. Since it's a team project, the team members should plan and divide the tasks in a fair way. The ideal is for all team members to receive the same grade. However, individual deductions from the overall team grade may be assessed for failing to contribute a fair and significant share to the overall team effort.

Class Policies:

–**Class participation**: This includes class attendance, paying attention during the lectures, participating in the lectures and class activities, and professionalism (being respectful of your classmates, the instructor and the TAs; being a good team member; being prompt and respectful in any form of communication including emails, etc.). Attendance will be checked randomly by circulating a sign-up sheet. You will be asked to sign your test so that we can compare your signature on the test with those on past sign-up sheets. If you miss a class due to a reasonable excuse (such as being sick or attending a school activity, etc.), tell me in advance. If you do not stay for the whole lecture without any notification, you may be considered to be absent for the class.

–**During the lectures**:

  - Please turn off your cell phone.
  - If you use your laptop or any electronic devices, that activity should be ISyE 4031 related, i.e., you are not allowed to do your other course assignments, check your personal massages, texts, Facebook, YouTube, or any social media.
   - Please avoid walking in and out of class at random times. If you have an obligation, please inform me prior to class.

–**Homework**: Homework assignments will be for individual completion. However, students can share ideas, discuss, or help each other. Any other type of collaboration (such as sharing written work, data, or computer files) is not permitted. Unless otherwise required, HW may *not* be submitted by email – just hard copies, please. You *must staple* (or clip) all your problems together with your name, the course, the term, the HW number, and the section clearly written on the front page (not doing so may result in losing some points). You can ask the TAs for help. Late submissions without legitimate excuses will not be accepted. Please check your homework grades in T-square, and in case of a problem, let us know not later than a couple of weeks.

–**Exams**: The exams will be closed book and closed notes. You will be allowed to use a cheat sheet and a calculator (no programmable calculators, computers, cell phones, ipod products, or similar devices). I will also supply statistical tables.

Please do not ask for a make-up exam without an acceptable/documentable excuse. Machine stamped or unsigned (or not signed by a certified doctor or nurse) walk-in forms from the Student Health Center (or any health center) are not valid written excuses. If you miss a test on a scheduled date, you will need to produce appropriate documentation (e.g., medical documentation, letter from the Athletic Department, etc.). In addition, you should inform us prior to the exam if possible. In case of emergency, please contact the Dean of Students. If you have a legitimate excuse, the weight of the missed exam will be divided between the remaining two tests.

If we make a mistake in grading something, we will be happy to correct it. In order to receive a re-grade, you must *neatly* state in writing the reason that you would like your test to be re-graded and attach it to your test paper. If a test is submitted for a re-grade, we have the right to re-grade the entire test – so keep it mind that it is possible to *lose* additional points. Therefore, it is strongly recommended that you do not ask for a re-grade unless you have substantial reason to believe that there was a mistake when originally grading the test.

–**Office Hours**: Please respect the office hours of the instructor and the TAs by planning ahead. Other times are possible by appointment. Please ask for an appointment by sending an email in advance.

–**GT Honor Code**: Make sure that you are aware of the Honor Code by visiting www.honor.gatech.edu. Any violation of the Honor Code (e.g., cheating in assignments or tests, not being truthful, plagiarism, etc.) may result in an automatic F in this class. Please see the page: http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code#Article_I:Honor_Agreement.