Course Description: Econometrics, in essence, is the application of statistical methods to economic models. In this course, we will work to fully understand, develop and implement some of the fundamental causal models currently used. These models generate information that is quite valuable across a range of disciplines in the business analytic world.

This full semester course starts with a review of probability and probability distributions, basic statistics, and the linear regression model—the basis for much of causal modeling. The remainder of the course will involve looking at modifications to this model to account for a variety of violations of its basic assumptions. To that end, we will examine how to model non-linear variables as well as how to move from cross-sectional data to both panel and time-series data. While all of these models initially utilize a continuous dependent variable, we will also learn to generate models with limited dependent variables, where the outcome is non-continuous, e.g. binary or categorical.

Towards the end of the course, we will focus on methods to correct for violations related to the impacts of missing variables, endogeneity and other issues arising from error term correlations. For these, we will employ a number of approaches including Instrumental Variables and two-stage least squares.

Learning Goals: The learning goals for this course will enable students to identify, generate and interpret the appropriate econometric models to use as a function of the available data and violations to the basic regression framework.

Specifically we will learn to:

- Understand the basic assumptions that underpin regression analysis
- Be able to identify violations of these assumptions and know how best to correct for these with alternative models, approaches and techniques
- Become proficient with the use of Stata to generate appropriate econometric models
- Be able to take the generated empirical results and provide written analyses of this work

Course Requirements: There will be both readings and assigned problem sets (graded) once a week. Problem sets will be provided after class and need to be electronically submitted before the next class begins (as solution sets will be posted and discussion of the work done will comprise the first part of the next session). Students will be expected to have prepared thoroughly for class (reading the assigned text and completing problem sets) and can assume that they will be called upon to contribute to in-class discussions. These problem sets are a crucial aspect of this course as they provide the basis for assessing how well the material is being both conveyed and, more importantly, understood. You may discuss your homework assignments with other students in the course and form study groups. However, you must do
the computer assignments yourself and write up your own answers to all questions. Please write the name(s) of any students you have worked with on the first page of the problem set. Late problem sets will not be accepted. We will have two mid-terms and a final (take-home).

**Course Reading:** There is one required text: James H. Stock and Mark W. Watson, *Introduction to Econometrics*. We will make extensive use of this book and it will serve as a good reference. You should purchase the 2nd Edition version as it is quite affordable. A number of other handouts will be made available on the LATTE site.

Other texts we will use are readily available on-line; the electronic textbook from StatSoft (http://www.statsoftinc.com/textbook/stathome.html) and the HyperStat online Textbook (http://davidmlane.com/hyperstat/).

**Grading:** The grade will be based upon a number of factors which are weighted approximately as: problem sets (15%), midterm 1 (25%), midterm 2 (25%), and the final (35%).

**Provisions for Feedback:** Feedback will be provided along a number of paths. The problem sets offer a rich weekly source on your progress, as well as in-class interactions. The midterms and final will also provide strong indications of your progress. I will also offer a minimum of two hours a week of office time during which I will be available if you have any problems/concerns about your work. As I spend much of my time online, e-mail questions are absolutely welcomed and I will respond as quickly as possible. The TA is also available for individual or group work and will provide me another channel for feedback from students. I am absolutely available to any individual who would like to speak with me: just ask.

**Academic honesty:** You are expected to be honest in all of your academic work. Please consult Brandeis University *Rights and Responsibilities* for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at LTS - Library guides

**Notice:** If you have a documented disability on record at Brandeis University and require accommodations, please bring it to the instructor’s attention prior to the second meeting of the class.