Economics 7828 is a course in intermediate econometrics for PhD students and for Master's students specializing in the field. Building upon the statistical foundations presented in 7818, this course covers both theoretical and applied aspects of econometrics.

Economics 7818 is the prerequisite for this course, which requires a solid background in mathematical statistics and matrix algebra. Our text also covers the essentials of probability and statistics, matrix algebra, and linear statistical models in appendices A and B.

You will be actively involved with computers in this course. Computer exercises and instruction will be based on the EViews econometrics package that is available on our PC network. Instruction on EViews will be provided through a series of econometrics exercises, designed to illustrate the use of an econometric software package and to develop skills in the application of econometric tests and procedures to economic data. Instructions and data sets for these exercises will be accessible from the Webct site for our class. Complete instructions on the use of EViews is available from the help menu of the EViews program.

Your grade in the course will be based on a midterm exam, a final exam, and an individual applied regression project, each counting towards 30% of your grade. The remaining 10% of the grade is based on your completion of the EViews computer exercises. Problems will be assigned frequently, and completion of these is essential to learning econometrics and, incidentally, doing well on the exams and the project. I will not grade your problem sets, but answers will be available on the Webct site, and we will go over some of these in class.

**Individual Regression Projects**

The applied regression project should be an interesting and educational experience for each of you. You are free to choose any topic in empirical economics that is amenable to econometric analysis. Ideas for topics may be found in The Review of Economics and Statistics, Applied Economics, and other applied economics journals. You may also get some ideas from other economics courses, and from examples presented in the text, the EViews exercises, or in lectures.

Although the topic choice is fairly open-ended, I want to make sure that everyone finds an appropriate topic and does so long before the end-of-term rush. You are therefore required to submit a brief written proposal identifying the topic you will investigate, sketching a tentative model for estimation, describing hypotheses to be tested and questions to be addressed, and identifying the data sources and some background literature relevant to your project. This can be done in two or three pages. This proposal is due on Thursday, February 21.

You are invited to discuss your ideas with me at any time during the
development of your project.

Once we have agreed on a project you should collect the necessary data and proceed with the estimation. In estimating your model there may be several variants you will try (alternative functional forms, differing variable definitions, alternative lag structures, alternative estimation techniques etc.). You will also certainly encounter various econometric problems. An important part of your assignment is to test for the presence of econometric problems (autocorrelation, heteroscedasticity, multicollinearity, etc.) and to deal with these problems using procedures you will learn in the course. The evaluation of your project will reflect, in part, your skill in handling these econometric problems, and your use and interpretation of variants of your basic model.

When you have completed your estimation, you should prepare your final report following the format of empirical articles in economics journals. Typically these papers include the following:

1. Introductory overview of the research question; statement of objectives.
2. Presentation of theory and review of relevant theoretical literature.
3. Discussion of previous empirical work in the area; critique and explanation of why your approach is vastly superior, or at least different.
4. Specification of your model(s) to be estimated; variable definitions and description of data sources.
5. Presentation of results: estimated equations and summary statistics; results of tests of econometric problems and description of corrective actions taken; results of statistical tests of hypotheses; comparison with other studies.
6. Conclusion; implications of your results for theory and policy; suggestions for further research (now that I have done all this work, this is how I would do it right).

Your final paper is due on Thursday, April 25. Include with your written paper the computer printouts of your most important results, with some guide to the output in your text. Late papers will be penalized by 10 percentage points if I receive it before I must post grades, and by 20 percentage points if it is any later.

The Economics Department will make reasonable accommodations for persons with documented disabilities. Students must notify their instructors no later than January 26, and provide documentation of the disability obtained from the Disabilities Services office located in Willard Hall, Room 322.

Important Dates:
   February 21 - Proposals Due
   March 7 - Midterm Exam
   April 25 - Projects Due
   May 4 (Saturday 7:30-10:00 a.m.) Final Exam
Readings and Assignments


I. Classical Linear Regression: estimation and tests of simple hypotheses. Chapters 1-3. In class lectures I will introduce the two-variable model (section 1.4) only and then move quickly to the k-variable model (chapter 3), referring back to chapter 1 as a special case. You should cover the material in chapter 2 on functional forms (sections 2.1 - 2.3), and I will talk some about nonstationarity (section 2.5).

II. Specification analysis: Chapter 4
Current practice in applied econometrics includes application of a number of diagnostic tests of model specification. You will read about several tests of the constant parameters assumption in section 4.3. Lectures will focus on tests of structural change and dummy variables.

III. Maximum likelihood estimation, generalized least squares, and instrumental variables: Chapter 5.
These topics provide the foundations for a number of estimation procedures appropriate for models introduced during the second half of the course.

**Midterm Examination - March 7**

IV. Heteroscedasticity and autocorrelation. Chapter 6.
These are the first applications of the generalized least squares procedure.

V. Regressions with time series data; cointegration. Chapter 8.
A primary concern in regressions with time series data is how to handle the likely occurrence of nonstationary data.

VI. Simultaneous equations models and seemingly unrelated regressions. Chapter 9, sections 9.4-9.6, and appendix 9.1.
Taking the more traditional approach in this class, we will cover the issues of identification and estimation of systems of structural equations. The material on vector autoregressions is more appropriate for a course on time series methods.

VII. Pooled time series and cross sectional data analysis. Chapter 12.
Opportunities to combine both time series and cross sectional data on the same set of variables provides possibilities for powerful data analysis, but also introduces some potential pitfalls.

**Final Examination - May 4** (Saturday 7:30-10:00 a.m.)