Causal Inference and Scientific Research

The goal of this course is to introduce students to the concepts and techniques used in modern causal research methods. It covers counterfactual model, matching, propensity scores, regression, instrumental variable methods, panel data, regression discontinuity, and difference in differences. In addition, it also covers graphical causal models which originated in computer science and have found adherents among researchers in epidemiology, sociology, and political science. Graphical models help think through the identification issues in econometrics. Finally, it also shows the application of these and other techniques in actual research contexts. The last few sessions of the course are devoted to sensitivity analysis, i.e., qualitative and quantitative techniques to assess the potential limitations of the chosen research design.

By the end of the course, students are expected to be proficient in (a) choosing the right tool for their research, and (b) implementing them appropriately.

Communicating Scientific Results: The Sense of Style

Research in psycholinguistics and on academic writing provides the basis for sound advice on writing. This workshop-style course will introduce students to the elements of writing style, grounded in research on readers’ comprehension. It meets for 10 weekly sessions of two hours each. Students will revise their paper and give feedback to help revise their chosen partner’s paper. The expected end result is that they will have substantially improved their draft and developed a sense of style so that they become better writers. Since writing is thinking, another equally important expectation is that students will understand how-to do-good research.

Econometric Analysis of Panel Data

This course provides a comprehensive treatment of the linear Panel Data Analysis including the dynamic model. A good understanding of the linear regression model with matrix algebra is assumed. Some basic knowledge of asymptotic theory is also assumed.

Econometrics A (Cross-Section)

This course is designed as a beginner’s guide in empirical research. It will cover introduction to the Classical Linear Regression model, estimation using Stata, hypothesis testing, and the consequences of relaxing the assumptions of the Classical Linear Regression model and their remedies. After a review of the linear model, the student will develop the asymptotic distribution theory necessary for the analysis of generalized linear and nonlinear models, a sequel of this course.

Econometrics-B

This course provides a comprehensive treatment of the micro econometrics, the analysis of individual or firm level data using regression methods. It will cover topics like types of endogeneity problem including simultaneity, tests and remedies. Various estimation methods e.g., MLE, RMLE, GMM, EM. Analysis of categorical and censored data. As a prerequisite to the course the students should have a good understanding of the linear regression model along with matrix algebra and some basic knowledge of asymptotic theory.
Econometrics C (Time Series Analysis)

This course covers classical time series analysis. The first part will deal with the Box-Jenkins methodology, concentrating on properties of stationary processes and univariate time series analysis. We will then go on to multivariate time series analysis, and end with some selected topics in time series, like model building, test procedures, recursive least squares, cointegration and auto-regressive conditional heteroscedasticity models.

Experimental Design

The course will introduce students to experimental research designs in applied social sciences. The pedagogy used for this course involves engagement with the way in which different experimental designs and analytical approaches have been used by researchers through discussion of peer-reviewed journal articles. There will be some lecture content on the core concepts necessary to appreciate experimental designs and analysis, but participants should expect to contribute to discussion around assigned readings in terms of application of concepts, designs, and analysis as seen in the assigned readings.

Industrial Organization-A (IO / Game Theory)

The course sets out the analytical framework of industrial organization economics—the basis and method for evaluating the performance of markets. Topics include size and structure of firms, market concentration, pricing in oligopoly and other markets, entry and entry deterrence strategies, and advertising and product strategies, networked industries. The students apply tools like statistical analysis, microeconomic theory, game theory etc. to understand them.

Industrial Organisation: Part B: Empirical IO

This course is an introduction on how to use micro economic theory and empirical methods to estimate important parameters that define how firms behave in markets. The topics will include methods to “identify” market structure, to discuss how to estimate the impact of mergers on market structures, to estimate demand functions in markets where goods are differentiated (many brands for a product), where markets are segmented (for example budget cars, SUV's, sedans) where firms sell multiple products through various kinds of stores (that may be differentiated spatially or in terms of their quality). The course will also look at how to estimate price discrimination: for example, for pricing theatre tickets, petrol prices across self-service/full-service stations. Other topics covered look at estimating the different roles of advertising, estimating the impact of networks between insurers and providers and a brief introduction to productivity estimation.

Linear Algebra

This course covers matrix theory and linear algebra, emphasizing topics useful in other disciplines. Linear algebra is a branch of mathematics that studies systems of linear equations and the properties of matrices. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering. Due to its broad range of applications, linear algebra is one of the most widely taught subjects. Students will leave the course with a computational ability and conceptual understanding of solving linear equations, vector spaces and subspaces, orthogonality, determinants, eigenvalues and eigenvectors, linear transformations and selected applications.

Microeconomics A
The purpose of this course is to give students a rigorous introduction to modern microeconomic theory. It is designed to equip students with a sound understanding of the core concepts that economists use to understand the world of business, trade and public policy. The course will familiarize the students with the mathematical techniques that economists routinely use in their analysis. Modern economics makes heavy use of mathematics and statistics that advanced students must master. Finally, it tries to illustrate the usefulness of the abstract ideas and concepts introduced in the course with the aid of suitable applications to real world problems.

**Microeconomics B**

This course is a sequel to Microeconomics A, which covered the classical theory of individual decision and competitive markets. Here we will learn about strategic interaction. The emphasis here will be on applying the tools of game theory and information economics to a wide variety of problems. Another major theme will be asymmetric information and how it may give rise to market imperfections and failures. As in Microeconomics A, the objectives are three-fold. The course will try to develop useful tools of analysis, learn a set of concepts that help us understand a wide range of problems, and finally, see these ideas in action through suitable applications.

**Microeconomics C**

The students will learn how people and organizations construct and develop legal agreements. The course draws upon principles of financial and economic behaviour as different parties have different incentives to perform or not perform particular actions.

**Multivariate Statistics – A & B**

The two-part course (A&B) will be devoted to facilitate understanding of the theory and applications of standard multivariate techniques that are often used in management research. The students will be exposed to hands on use of such techniques by analyzing some data sets using appropriate statistical software.

**Philosophy of Science**

What is science? Is scientific knowledge always correct? If not, how can we make out which scientific knowledge to believe in and which one not to? How to do science? How to use science? The purpose of this course is to help you understand what science is, so that you can more confidently understand theory and how to develop and use it. The ultimate purpose is to give you direction about what is expected in your dissertation and what you should learn through your coursework to meet those expectations.

**Probability**

The course covers the basic principles of the theory of probability and its applications. Topics include computing probabilities, probability function, conditional probability and independence of events; discrete and continuous random variables; joint, marginal, and conditional distributions; moment generating function; binomial, Poisson, gamma, univariate, and bivariate normal distributions; limits theorems, weak law of large numbers, Markov chains.

**Real Analysis**

This is an introductory course on Real analysis. No previous experience is assumed. It covers fundamental concepts in mathematical analysis: continuity, differentiability, Riemann integration,
convergence of sequences and series of numbers and functions, and analysis of functions of several variables. The course aims to develop familiarity with the major concepts in real analysis, and be able apply them to solve basic problems in topics such as optimization, functional approximation, etc.

**Statistics**

This course is an introduction to descriptive statistics, probability, sampling, estimation, hypothesis testing, correlation, and regression. It provides an intuitive approach to why and when the procedures may be used.

**Theories of the Firm**

This course is a seminar on the theories of the firm which aims to explain why firms exist, what are their boundaries, and how do they organize to conduct productive activities. It aims to provide the student an overall understanding of the economic study of the firm as well as an in-depth understanding of the modern theories of the firm thereby providing knowledge that can be applied to undertake scholarly research in this and related fields. This course aims to arm the student with knowledge of various issues in theories of the firm space allowing the student to carve out a research agenda that either directly contributes to research on organizations, strategy, contracting, governance, and/or helps the student apply this understanding towards advancing research in other fields.