

## Econometrics

**Department: Fudan International Summer Session**

**(This course is a compulsory course for economics majors at Fudan.)**

<b>Course Code</b>	ECON130006		
<b>Course Title</b>	Econometrics		
<b>Credit</b>	3	<b>Credit Hours</b>	54+3 tutorial hours (one credit hour is 45 minutes)
<b>Course Nature</b>	<input type="checkbox"/> Specific General Education Courses <input type="checkbox"/> Core Courses <input type="checkbox"/> General Education Elective Courses <input type="checkbox"/> Basic Courses in General Discipline <input checked="" type="checkbox"/> Professional Compulsory Courses <input type="checkbox"/> Professional Elective Courses <input type="checkbox"/> Others		
<b>Course Objectives</b>	This course aims to provide the students with basic understanding of econometrics and its applications to different data including cross sections and panel ones. After the course, the students should be able to carry out elementary regression analyses with both estimation and inference in their studies.		
<b>Course Description</b>	The course will cover a number of topics, including single variable and multiple variables linear regression analysis, simple nonlinear regression analysis, basic tests and inference, multi-equation model, basic time series analysis, basic panel data model and discrete (binary) choice models.		
<b>Course Requirements:</b>			
<b>Prerequisite courses</b>			
Calculus, Theory of Probability, Linear Algebra, Statistics			
<b>Teaching Methods:</b>			
Lectures			
<b>Instructor's Academic Background:</b>			
Ruochen Wu, Assistant Professor, School of Economics, Fudan University. He received his PhD in Economics from University of Cambridge (2018), Master of Applied Economics from University of Bonn (2013), and Bachelor of Computer Science and Technology from Fudan University (2011). His main research interests are semi-parametric Bayesian econometric theory and application, and applied microeconomics.			
<b>Course Schedule:</b>			
<b>1、 Introduction:</b>			
What Econometrics is; Brief history and key figures; Major methods in the subject Stock & Watson Ch 1			

## **2. Review of probability and statistics**

Random variables; Population and sample; Distributions; Moments.

Stock & Watson Ch 2 & 3

## **3. Univariate regression model**

Linear regression models with one regressor; OLS estimator; Assumptions of OLS; Measure of fit.

Stock & Watson Ch 4

## **4. Hypothesis testing and inference**

Hypothesis: one vs. two sided; Confidence interval; Binary explanatory variables; Gauss-Markov assumptions; t-test.

Stock & Watson Ch 5

## **5. Multivariate regression model**

Omitted variable bias; Multiple regressors; OLS for multiple regression models; Multicollinearity; Joint hypothesis testing.

Stock & Watson Ch 6 & 7

## **6. Specification**

Nonlinear equation form; Polynomial and logarithm; Interaction between regressors; Class size and test score (example).

Stock & Watson Ch 8

## **7. endogeneity**

Causes of endogeneity; Consequences of ignoring endogeneity; Instrumental variables; Validity of IV; Two stage least square.

Stock & Watson Ch 9 & 12

## **8. Panel data**

Panel structure; Time series dimension; Fixed effect model; Estimation.

Stock & Watson Ch 10

## **9. Binary choice model**

Binary dependent variables; Linear probability model; Logit and Probit models; Estimation with MLE.

Stock & Watson Ch 11

### **The design of class discussion or exercise, practice, experience and so on:**

There will be four problem sets containing both theoretical exercises and practical problems to be solved using statistical software. These problem sets will be designed to help the students understand the materials of the course more thoroughly.

**Grading & Evaluation:**

Homework 40%

Final Exam 60%

There will be no make-up exam.

**Teaching Materials & References:**

J. Stock, M. Watson, Introduction to Econometrics, Pearson,2019

J. Wooldridge, Introductory Econometrics: A Modern Approach, Cengage Learning, 2019

D. Gujarati, Basic Econometrics, The McGraw-Hill Education, 2003

M. P. Murray, Econometrics: A Modern Introduction, Pearson,2006

J. Wooldridge, Econometric Analysis of Cross Section and Panel Data, Massachusetts Institute of Technology, 2010