

**Fulbright School of Public Policy and Management**  
Academic Year 2017 - 2018

**Fall semester**

(16/10/2017 - 02/02/2018)

**Quantitative Methods**

**(4 credits)**

**Teaching team**

Instructors:	Cao Hao Thi	(email: thi.cao@fuv.edu.vn)
	Le Viet Phu	(email: phu.le@fuv.edu.vn)
Teaching Fellow:	Hoang Van Thang	(email: thang.hoang@fuv.edu.vn)

**Class Meeting Time**

Tuesday & Thursday	10:15 to 11:45
Friday	13:30 to 15:00

**Office hours**

Cao Hao Thi:	Monday 16:45 – 18:00 or email for appointment
Le Viet Phu:	Thursday 15:00 – 17:00 or email for appointment
Hoang Van Thang:	Monday and Wednesday 15:00 – 16:30 or email for appointment

Office hours are for groups or individual to exchange ideas and discuss the course material or to need more help. The timings of the office hours are sometimes changed to help the students before the exams and before the assignments due date.

If the timings of the office hours are not convenient, please feel free to make appointments at other times during the week to meet with members of the Teaching Team via email or faculty dropbox.

**Course Objectives and Description**

The Quantitative Methods course is designed with two objectives. The first is to provide participants with the ability to analyze critically quantitative and empirical analysis done by others and to use that analysis in the design of public policy. The second is to provide students with the skills necessary to perform quantitative policy analysis on their own.

The course includes two main parts:

- Applied statistics
- Econometrics

The applied statistics module will review fundamental concepts of statistics, including descriptive statistics, basic probability, probability distributions, sampling and sample

distribution, estimation and hypothesis testing. This module provides the foundation for participants to study econometric analysis.

The second half of the course is devoted to the teaching of fundamental tools of econometrics. The module introduces the standard methods for estimating relationships among observed social and economic variables and for testing hypotheses about their relationships. Participants will learn how to use models, data, and appropriate analysis to describe the real world and to contribute to policy discussions. Participants will be introduced to the power of econometric methods while also noted about their limitations. The focus will be on formulation, estimation, testing of econometric models, and discussing policy implications from econometric findings. In addition, participants will also learn how to carry out an empirical study through a term project. The course will be required the use of specialized software packages such as Eviews and Stata.

Given its technical nature, the Quantitative Methods course is a very challenging subject for participants. It is absolutely critical that participants have to maintain a steady pace of study. Simple memorization, and last-minute studying will not help to understand well the application to the real world. Therefore, if participants encounter any problems or have any questions, make sure to seek help from the teaching team as early as possible. It is important to understand concepts and develop the ability to apply them to the solutions of various problems. This takes practice. The lectures, textbooks, handouts, problem sets, and the term project are all designed to help our participants develop these skills.

## Course Learning Outcomes

- To analyze, synthesize, think critically, solve problems and make decisions.
- Understand how the “ideal” of the policy process—problem analysis, policy analysis, recommendations, implementation and evaluation—works in practice.
- Become proficient at reading, analyzing, criticizing, making sense of, and translating policy work into plain Vietnamese or English.
- Show proficiency in designing, executing, analyzing and reporting social science research and policy analysis studies.
- Discuss the rise of evidence-based policy in the context of traditional social sciences research methodology.

## Course Requirements

Participants are required to read the assigned readings before the class. During the course participants will have to complete problem sets, a term project, and a midterm test in applied statistics module.

The term project must be done by groups of five to six participants. A one-page project proposal must be submitted to the teaching team for approval on **28 December 2017**. A draft project report must be submitted on **18 January 2018** and the final report on **25 January 2018**. After that the teaching team will meet each group on **02 February 2018** to evaluate the project and each student’s contribution in the group project.

Participants are encouraged to form study groups on their own to discuss the lessons, problem sets and reviews together. However, each student has to complete his/her assignments using his/her own writings.

**Regulations on assignment submission, complaints, plagiarism, exam cheating, or other exceptions are specified in Student Handbook which are delivered to all students.**

## Grading

Applied statistics:	40%
Problem sets:	15%
Midterm:	25%
Econometrics:	60%
Problem sets:	30%
Term project:	30%

## Readings

### ❖ *Statistics*

1. Mendenhall, Beaver, and Beaver, *A Brief Course in Business Statistics*, 2<sup>nd</sup> Edition, Thompson South-Western, 2001. [**Abbreviation: MBB2**]
2. Cao Hao Thi, *Thống Kê Ứng Dụng trong Kinh Doanh (Applied Statistics in Business)*, 1998.

### ❖ *Econometrics*

#### ➤ **Required readings**

**Main Textbooks.** Lectures will be drawn mostly from two textbooks, both of which are available in English and Vietnamese. Specific chapter references are given in the course outline. Additional material will be distributed at appropriate times. This material will also be part of required readings.

3. *Introductory Econometrics: A Modern Approach*, 2nd edition by Jeffrey M. Wooldridge, South-Western, 2002 (Chapter 1-9, 17). Students can refer to STATA code to simulate for the results in the book at:  
<http://fmwww.bc.edu/gstat/examples/wooldridge/wooldridge.html>. [**Abbreviation: JW**]
4. *A Guide to Modern Econometrics* by Marno Verbeek, John Wiley & Sons, 2000 (Chapter 4). [**Abbreviation: MV**]

**Exercises:** Several exercises and illustrative examples will be assigned and/or discussed in class at appropriate times. The purpose is to familiarize you with the various ways in which econometric techniques have been used to investigate “real world” problems and policy issues. These exercises will be drawn from the two main textbooks plus some case studies developed from the real context of Vietnam.

## Software

*Eviews* by Quantitative Micro Systems. *Eviews Learning Scripts* will be translated into Vietnamese and distributed.

*STATA* by StataCorp LP, 11<sup>th</sup> or later edition.

## Schedule

### PART 1: APPLIED STATISTICS

#### **Week 1**

**Tuesday 17/10/2017** **Cao Hao Thi**

#### **Descriptive Statistics**

Measures of central tendency: mean, median, and mode

- MBB2, Chapter 2

*Problem Set 1 Distributed*

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**Thursday 19/10/2017** **Cao Hao Thi**

#### **Descriptive Statistics**

Measures of variability and correlation: variance, standard deviation, covariance and correlation

- MBB2, Chapter 2

**Friday 20/10/2017** **Hoang Van Thang**

#### **Review**

#### **Week 2**

**Tuesday 24/10/2017** **Cao Hao Thi**

#### **Basic Probability**

Probability concepts

Probability properties

- MBB2, Chapter 3, Sections 3.1-3.3

*Problem set 1 Due; Problem set 2 Distributed*

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**Thursday 26/10/2017** **Cao Hao Thi**

#### **Conditional Probability**

Conditional probability

Bayes' rule

- MBB2, Chapter 3, Sections 3.4-3.5

**Friday 27/10/2017** **Hoang Van Thang**

#### **Review**

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### **Week 3**

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☐ **Tuesday 31/10/2017** **Cao Hao Thi**

**Probability Distributions: Discrete Distributions**

Binomial distribution

Poisson distribution

- MBB2, Chapter 3, Sections 3.6
- MBB2, Chapter 4

*Problem set 2 Due; Problem set 3 Distributed*

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☐ **Thursday 02/11/2017** **Cao Hao Thi**

**Probability Distributions: Continuous Distributions**

Uniform distribution

Normal distribution

- MBB2, Chapter 5

☐ **Friday 03/11/2017** **Hoang Van Thang**

**Review**

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### **Week 4**

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☐ **Tuesday 07/11/2017** **Cao Hao Thi**

**Sampling**

Sampling distribution

The central limit theorem

- MBB2, Chapter 6

*Problem set 3 Due; Problem set 4 Distributed*

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☐ **Thursday 09/11/2017** **Cao Hao Thi**

**Statistical Estimation**

Point estimation

Confidence Intervals

- MBB2, Chapter 7

☐ **Friday 10/11/2017** **Hoang Van Thang**

**Review**

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## Week 5

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**Tuesday 14/11/2017** **Cao Hao Thi**

### Hypothesis Testing

Tests of Hypotheses for Population Means

Tests of Hypotheses for the Difference between Two Population Means

- MBB2, Chapter 8, Sections 8.1-8.5

*Problem set 4 Due; Problem set 5 Distributed*

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**Thursday 16/11/2017** **Cao Hao Thi**

### Hypothesis Testing

Tests of Hypotheses for Population Proportions

Tests of Hypotheses for the Difference between Two Population Proportions

- MBB2, Chapter 8, Sections 8.7-8.8

**Friday 17/11/2017** **Hoang Van Thang**

### Review

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## PART2: ECONOMETRICS

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## Week 6

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**Tuesday 21/11/2017** **Le Viet Phu**

### Introduction to Econometrics

- JW, Chapter 1

*Problem set 5 Due; Problem set 6 Distributed*

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**Thursday 23/11/2017** **Le Viet Phu**

### Univariate regressions

- JW, Chapter 2

**Friday 24/11/2017** **Cao Hao Thi**

### Midterm Exam Review

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## Week 7

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**Review, no class**

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### Week 8

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- Monday 04/12/2017** **Cao Hao Thi, Le Viet Phu, Hoang Van Thang**  
**Midterm exam (Morning)**

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### Week 9

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- Tuesday 12/12/2017** **Cao Hao Thi**  
**Introduction to econometric projects**  
*Problem set 6 Due; Problem set 7 Distributed*

- Thursday 14/12/2017** **Le Viet Phu**  
**Simple Regression: Hypothesis Tests**  
○ JW, Chapter 2

- Friday 15/12/2017** **Hoang Van Thang**  
**Review**

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### Week 10

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- Tuesday 19/12/2017** **Le Viet Phu**  
**Lab Practice: Using Stata and socioeconomic dataset - 1**  
*Problem set 7 Due; Problem set 8 Distributed*

- Thursday 21/12/2017** **Le Viet Phu**  
**Lab Practice: Using Stata and socioeconomic dataset - 2**

- Friday 22/12/2017** **Hoang Van Thang**  
**Review**

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### Week 11

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- Tuesday 26/12/2017** **Le Viet Phu**  
**Multivariate regressions**  
○ JW, Chapter 3  
*Problem set 8 Due; Problem set 9 Distributed*

- Thursday 28/12/2017** **Le Viet Phu**



## Multivariate regressions: functional forms and model selection

- JW, Chapter 4 và 6

### *Econometric Project Proposal Due*

Friday 29/12/2017

Hoang Van Thang

Review

### **Week 12**

Tuesday 02/01/2018

Le Viet Phu

Regression with qualitative variables

- JW, Chapter 7

*Problem set 9 Due; Problem set 10 Distributed*

Thursday 04/01/2018

Le Viet Phu

Regression diagnostics, model specifications, and problematic data

- JW, Chapter 8 và Chapter 9

Friday 05/01/2018

Hoang Van Thang

Review

### **Week 13**

Tuesday 09/01/2018

Le Viet Phu

Heteroskedasticity and autocorrelation

- JW, Chapter 8 and MV, Chapter 4

*Problem set 10 Due; Problem set 11 Distributed*

Thursday 11/01/2018

Le Viet Phu

Regression with limited dependent variables – 1

- JW, Chapter 17

Friday 12/01/2018

Hoang Van Thang

Review

### **Week 14**

Tuesday 16/01/2018

Le Viet Phu

Regression with limited dependent variables - 2

- JW, Chapter 17

***Problem set 11 Due; Problem set 12 Distributed***

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- Thursday 18/01/2018**

**Le Viet Phu**

**Summary of regressions and potential applications**

***First Draft Econometric Project Due***

- Friday 19/01/2018**

**Hoang Van Thang**

**Review**

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### ***Week 15***

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- Review, no class**

- Tuesday 23/01/2018**

***Problem set 12 Due***

- Thursday 25/01/2018**

***Final Draft Econometric Project Due***

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### ***Week 16***

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- Friday 02/02/2018**

**Cao Hao Thi, Le Viet Phu, Hoang Van Thang**

**Morning and Afternoon: Team presentation of econometric project**

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