

## **COURSE SYLLABUS**

### **FOR FULL-TIME UNDERGRADUATE PROGRAMS**

*(Issued under Decision No.1380/QĐ-ĐHKTQĐ on 15/8/2016 by the University President)*

#### **1. COURSE NAME:** Econometrics II

Code: TOTKT1103

Number of Credit: 03

#### **2. DEPARTMENT IN CHARGE OF INSTRUCTION:** Mathematical Economics

**Office:** Room 403, Bld 7

**Office Hours:** 14h-17h Friday

**Office Telephone:** 084.36283007

#### **3. PREREQUISITE:** ECONOMETRICS I

#### **4. COURSE DESCRIPTION**

This course provides an introduction to the econometric models used to analyse and forecast in economics, business and finance. It covers seven chapters: Chapter 8 considers several dynamics models and chapter 9 introduces simultaneous equation models. In chapter 10, models with discrete dependent variable are introduced. The last four chapters focus on time series: chapter 11 presents smoothing and extrapolation; chapter 12 considers the stationarity of a series as well as some statistical characteristics of a stationary series. This chapter also introduces the concept of co-integration. Popular models used in time series analysis include ARIMA, VAR and VECM will be presented in chapter 13 and chapter 14.

#### **5. COURSE OBJECTIVES**

This course aims to provide students with knowledge in modern econometric models, which is the next step from the basic regression model in Econometrics 1. By the end of the course, students will be able to:

- apply appropriate models in analyzing and forecasting.
- conduct the analysis and forecast on computers

## 6. COURSE CONTENTS:

### TENTATIVE SCHEDULE

STT	Contents	Total hours	In details		Notes
			Theory	Practice, Discussion, Exams	
1	Chapter 8	4	3	1	Need a projector
2	Chapter 9	4	3	1	
3	Chapter 10	4	3	1	
4	Chapter 11	6	4	2	
5	Chapter 12	6	4	2	
6	Chapter 13	12	8	4	
7	Chapter 14	9	5	4	
	<b>Total</b>	<b>30</b>	<b>18</b>	<b>12</b>	

### CHAPTER 8: DYNAMIC MODELS

One importance feature of models with time series is the dynamic nature in the relationship between variables. Chapter 8 introduces some popular models which take into account this dynamic relationship.

- 8.1. Infinite distributed lag models
- 8.2. The Koyck model
- 8.3. Adaptive expectation models
- 8.4. Partial adjustment model
- 8.5. Estimation issues.

#### Readings:

- 1 - Nguyen Quang Dong and Nguyen Thi Minh, 2012, Econometrics, NEU publisher, Chapter 8.
- 2 - Nguyen Quang Dong, 2001, Econometrics, Science and Technology publisher, Chapter 9.
- 3 - Wooldridge, 2009, Introductory econometrics: a modern approach, McGraw-Hill.

### CHAPTER 9 – SIMULTANEOUS EQUATIONS MODEL

This chapter introduces models consisting of many equations in which variables are simultaneously related. It mainly focuses on model identification and estimation methods.

- 9.1. Simultaneous relationship
- 9.2. Identification
- 9.3. Identification rules
- 9.3. Hausman test about simultaneity
- 9.4. Estimation of simultaneous equations models

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2012, Econometrics, NEU publisher, Chapter 9.
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, Econometrics, Science and Technology publisher, Chapter.
- 3- Enders, 2004, Applied Time series, Wiley, 2004, 2nd edition.

## **CHAPTER 10 - REGRESSION WITH DISCRETE DEPENDENT VARIABLE**

In the previous models, the dependent variables are continuous. This chapter introduces several common models in which the dependent variable is either discrete or limited.

- 10.1. Linear probability model
- 10.2. Logit model
- 10.3. Probit model
- 10.4. Testing with Logit and Probit model
- 10.5. Tobit model
- 10.6. Poisson model

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2011, Econometrics, NEU publisher, Chapter 10
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, Econometrics, Science and Technology publisher, Chapter.
- 3- Enders, 2004, Applied Time series, Wiley, 2nd edition.

## **CHAPTER 11 – TIME SERIES, SMOOTHING AND EXTRAPOLATION**

The main content of this chapter includes: extrapolation techniques, components of a time series, and some smoothing techniques.

- 11.1. Simple extrapolation techniques
- 11.2. Testing for randomness – run test

- 11.3. Simple smoothing techniques
- 11.4. Seasonal adjustment
- 11.5. Components of a time series
- 11.6. Holt-Winters smoothing and forecasting
- 11.7. Hodrick –Prescott (HP) filter
- 11.8. Census II X-11

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2011, Econometrics, NEU publisher, Chapter 11
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, Econometrics, Science and Technology publisher, Chapter.
- 3- Enders, Applied Time series, Wiley, 2004, 2-nd edition.
- 4- Hamilton, J. D, 1994, *Time Series Analysis*, Princeton: Princeton University Press

## **CHAPTER 12 - NON-STATIONARY TIME SERIES**

This chapter considers the stationarity of a series, testing stationarity, some statistical characteristics of a stationary series, and co-integration of non-stationary series

- 12.1. Stationary and non-stationary series
- 12.2. Some simple random series
- 12.3. Unit root tests
- 12.4. Autocorrelation function
- 12.5. Non-stationary series and basic regression models
- 12.6. Spurious regression, trend- stationary and difference stationary series.
- 12.7. Co-integration tests

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2012, Econometrics, NEU publisher, Chapter 12
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, Econometrics, Science and Technology publisher, Chapter.
- 3- Enders,, 2004, Applied Time series, Wiley, 2-nd edition.
- 4- Hamilton, J. D, 1994, *Time Series Analysis*, Princeton: Princeton University Press

## **CHAPTER 13 – ARIMA MODEL**

This chapter introduces a univariate forecast model and ARIMA model with the Box-Jenkins methodology.

- 13.1. AR, MA and ARIMA

- 13.2 Box- Jenkins methodology
- 13.3 ARIMA model with seasonality
- 13.4. Examples

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2012, *Econometrics*, NEU publisher, Chapter 13.
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, *Econometrics*, Science and Technology publisher, Chapter.
- 3- Enders, 2004, *Applied Time series*, Wiley, 2-nd edition.
- 4- Hamilton, J. D., 1994, *Time Series Analysis*, Princeton: Princeton University Press.

## **CHAPTER 14 – VAR MODEL AND CO-INTEGRATION**

This chapter presents VAR model, which is a multivariate model for forecasting – a direct extension of ARIMA model. When the series are co-integrated, the VECM will be more appropriate as it takes into account the integration relationship among the variables.

- 14.1. VAR model - introduction
- 14.2. VAR model - estimation
- 14.3. Co-integration
- 14.4. Testing co-integration

Readings:

- 1- Nguyen Quang Dong and Nguyen Thi Minh, 2012, *Econometrics*, NEU publisher, Chapter 14.
- 2- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, *Econometrics*, Science and Technology publisher.
- 3- Enders, 2004, *Applied Time series*, Wiley, 2-nd edition.
- 4- Hamilton, J. D., 1994, *Time Series Analysis*, Princeton: Princeton University Press.

## **7. TEXTBOOK**

Nguyen Quang Dong and Nguyen Thi Minh, 2012, *Econometrics*, NEU publisher.

## **8. READING MATERIALS**

- 1- Vu Thieu, Nguyen Quang Dong, and Nguyễn Khắc Minh, 2001, *Econometrics*, Science and Technology publisher, Chapter.
- 2- Nguyễn Quang Dong, 2002, *Bài tập Econometrics*, Science and Technology publisher, Chapter.

- 3- Damodar N. Gujarati, 2003, Basic Econometrics, fourth Edition, McGraw-Hill.
- 4- Enders, 2004, Applied Time series, Wiley, 2-nd edition.
- 5- Hamilton, J. D., 1994, *Time Series Analysis*, Princeton: Princeton University Press.

## **9. ASSESSMENT & GRADING POLICY:**

- Band score: 10/10 and 4/4
- In which:
  - + Class participation: 10%
  - + Midterm test: 30%
  - + Final Exam: 60%
- Conditions for taking the final test:
  - + attend at least 80% of scheduled course hours
  - + take the midterm test.

*Hanoi, 2016*

**HEAD OF DEPARTMENT**

**PRESIDENT**

(signed)

(signed)

**PhD. Nguyen Manh The**

**Prof.Dr. Tran Tho Dat**