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## **COURSE SYLLABUS**

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

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

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

Code: TOTKT1102

Number of Credit: 02

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

**Office:** Room 403, Bld 7

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

**Office Telephone:** 084.36283007

#### **3. PRE-REQUISITE:** Econometrics 1

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

Econometrics II provides an introduction to the forecasting techniques using time series data. It consists of four chapters: Chapter 11 presents concepts in time series, smoothing techniques and extrapolation. Chapter 12 focuses on stationary series and related testing as well as some basis statistics of a stationary series. Co-integration is also presented in chapter 12. Chapter 13 and chapter 14 consider frequently used models in time series forecasting: ARIMA, VAR and VECM.

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

The course aims to provide students with modern techniques in time series forecasting, which is the next step from the basic regression model in Econometrics 1. By the end of the course, students will be able to:

- competently forecast and analyse time series data using relevant models.
- conduct the forecast and analysis on computers

## 6. COURSE CONTENTS:

### TENTATIVE SCHEDULE

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

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

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

Reading materials:

- 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

Reading materials:

- 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 variables.

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

Reading materials:

- 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- Nguyen 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 and 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**