



# **B.E. International Program**

## **Faculty of Economics, Thammasat University**



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### **Course Outline**

#### **EE 435 Introductory Financial Econometrics**

**Semester:** 2/2018 (January 14 – May 12, 2019)

**Number of credits:** 3 credits (3-0-6)

**Lecture Time:** Tuesday and Thursday, 8.00-9.30 a.m.

**Lecture Venue:** Room 204, Faculty of Economics

**Instructor:**



Wasin Siwasarit, Ph.D

**Office:** Room 455, Faculty of Economics

**E-mail:** wasin@econ.tu.ac.th

**Office hours:** Tuesdays and Thursdays 13.30 –14.30 hrs.  
(or by appointment)

**Enrollment key for BE moodle:** 2514

**Course Description:**

The estimation methods of financial econometrics models, such as least square method and maximum likelihood, with the emphasis on time-series model including univariate time-series model, high frequency time-series model, multivariate time-series model; financial forecasting; The regression estimation of variables with long run relationship and short run dynamics; The application of model to analyze financial economics issues.

**Prerequisites:** EE325 (or EE425) and EE431

**Course Objectives:**

This course aims to apply econometric methodology with the economic and financial theory in explaining empirical data, and introduce a more advanced econometrics methodology beyond basic econometrics, especially time series econometrics. The objective is to train students for empirical research. The course focuses mainly on model formulation, parametric estimation method, and applications of the model. Emphasize of the course will be on empirical examples rather than theoretical proof. However, students are all expected to have a good understanding of basic statistics, calculus, and matrix algebra. Thus, students are all responsible for all pre-requisites of the course. This course also aims to have students learn how to use computer software in estimating the econometric models by letting students work on empirical assignments concerning on each topic.

**Required Text:**

\*Tsay , R. (T) (2010). *Analysis of Financial Time Series. 3rd Ed.*, Hoboken, NJ: John Wiley & Sons.

\*Jonathan D. Cryer and Kung-Sik Chan (CC). *Times Series Analysis with Applications in R*, 2nd Ed., Springer.

**Supported Text:**

- Baltagi, B.H. (2008). *Econometric Analysis of Panel Data*. 4<sup>th</sup> ed. West Sussex, UK: John Wiley & Sons.
- Berndt, E.R. (1991). *The Practice of Econometrics: Classic and Contemporary*. New York: Addison-Wesley Publishing. (Chapter 2)
- Brooks, C. (2008). *Introductory Econometrics for Finance*. 2<sup>nd</sup> ed. New York, NY: Cambridge University Press.
- Heij, C., de Boer, P., Franses, H.P., Kloek, T., & van Dijk, K.H. (2004). *Econometric Methods with Applications in Business and Economics*. New York, NY: Oxford University Press. (Chapter 4)
- Enders, W. (2003). *Applied Econometric Time Series*. 2<sup>nd</sup> ed. New York: John Wiley & Sons.
- Greene, W.H. (2008). *Econometric Analysis*. 6<sup>th</sup> ed. Upper Saddle River, NJ: Prentice Hall.
- Hamilton, J.D. (1994). *Time Series Analysis*. Princeton, NJ: Princeton University Press.
- Johnston, J., & DiNardo, J. (1997). *Econometric Methods*. 4<sup>th</sup> ed. Singapore: McGraw-Hill.
- Ruud, P.A. (2000). *An Introduction to Classical Econometric Theory*. New York: Oxford University Press.

## **Expected Learning Outcomes:**

### **1. Morality and Ethics**

| Applicability | Learning Goals                                                                                         |
|---------------|--------------------------------------------------------------------------------------------------------|
| ●             | 1.1 Students demonstrate integrity.                                                                    |
| ●             | 1.2 Students prioritize social and public benefits over personal ones.                                 |
| ●             | 1.3 Students are punctual and comply with the code of conduct of the institution and society at large. |
| ●             | 1.4 Students are responsible and accountable to society, the nation, and the subject of economics.     |
| ○             | 1.5 Students realize the cultural and environmental value of the sustainable society.                  |

### **2. Knowledge**

| Applicability | Learning Goals                                                                                                                                                                                                                                                                 |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ●             | 2.1 Students know and understand modern economics principles and theories, and are up to date with new developments.                                                                                                                                                           |
| ●             | 2.2 Students know and understand Thai and global economic structure, and the importance of major international economic events.                                                                                                                                                |
| ○             | 2.3 Students know and understand instruments of economic analysis.                                                                                                                                                                                                             |
| ●             | 2.4 Students know and understand applied fields in economics, including monetary, public, international, business, natural resource and environmental, industrial, agricultural, cooperative, political, developmental, and entrepreneurial economics as well as agribusiness. |
| ○             | 2.5 Students are informed about related fields including sociology, business administration, education, law policy, and science.                                                                                                                                               |

### 3. Intellectual Development

| Applicability | Learning Goals                                                                                                                                                                                                                                                                                              |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ●             | 3.1 Students have developed individual critical thinking.                                                                                                                                                                                                                                                   |
| ●             | 3.2 Students are sufficiently trained in research skills.                                                                                                                                                                                                                                                   |
| ●             | 3.3 Students demonstrate an ability to analyze and synthesize data, as well as appropriately integrate economics concepts to understand causes of current economic problems in Thailand. Based on analysis and synthesis, students demonstrate an ability to propose policy guidelines to resolve problems. |

### 4. Interpersonal Skills and Responsibilities

| Applicability | Learning Goals                                                                                |
|---------------|-----------------------------------------------------------------------------------------------|
| ●             | 4.1 Students are responsible for assigned tasks and work in groups effectively.               |
| ●             | 4.2 Students have problem-solving skills.                                                     |
| ●             | 4.3 Students show leadership skills and team spirit.                                          |
| ●             | 4.4 Students are always improving themselves.                                                 |
| ●             | 4.5 Students have good interpersonal skills, adapting and working under different conditions. |

## 5. Quantitative Analysis, Communication and Information Technology

| Applicability | Learning Goals                                                                                                                                                            |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ●             | 5.1 Students select and apply appropriate statistical and mathematical methods for data processing, interpretation, conclusions, and recommendations to resolve problems. |
| ●             | 5.2 Students communicate effectively and select appropriate presentation methods.                                                                                         |
| ●             | 5.3 Students use information and communication technologies appropriately to gather data as well as process, interpret, and present results.                              |

### Assessment

|                 |             |
|-----------------|-------------|
| 1. Assignments  | 20%         |
| 2. Midterm Exam | 35%         |
| 3. Final Exam   | <u>45%</u>  |
|                 | <u>100%</u> |

### Academic Honesty

You are expected to be honest in all of your academic work. Copying is plagiarism and will be treated as an honor code violation. Potential sanctions include failure in the course and suspension from the university.

## **Conduct and Manner**

Ethics is all above everything, far more valuable than merely subject knowledge. Accordingly, plagiarism and cheating, including any possible plagiarism and cheating, will be subject to penalties as stated in the University Regulations. More importantly, to achieve overall objectives of learning, it is strongly advised that all students of EE435 classes behave in proper manner with socially acceptable and right conduct.

Below is advised code of conduct to be performed in EE435 class. Achieving and maintaining the code of conduct throughout the course will surely be awarded.

1. No mobile phones used. This includes silent mode, message sending, LINE, and all social network communication that would interfere teaching and learning. Should any mobile phone ring, a pop-up closed-book quiz will be given to all students in the group. Score earned from the quiz will be counted toward the course evaluation.
2. Be punctual. Class starts at 08:00 am. Yet it is understood that students may have continuing classes that cause delay. It is acceptable if it is a few minutes late. But unnecessary delay should be avoided. Even if students are on time, they are advised not to leave the room without unnecessary purposes.
3. Behave. Everyone is expected to behave with basic politeness, civility, and respect for others. In particular, talking in class is allowed if it's part of a class discussion. Private communications are not, especially during quizzes. Neither are reading extraneous materials, using electronic equipment/s or sleeping. Other socially acceptable manner should be practiced here. For example, this is a classroom whereby food and drink is not allowed. This is the university whereby students wear proper dress.

## Course Outline:

### 1 : Introduction

| Sessions | Topic                                                                                                                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3-4      | 1. Time Series and Stochastic Processes<br>2. Means Variances and Covariances<br>3. Fundamental Distributions (Normal, Chi, and F)<br>4. Stationarity<br>5. Unit Root and Stationary<br>6. Correlation and Autocorrelation Functions<br>7. White noise process<br>8. Estimation ( OLS and MLE)<br>9. Trends<br>10. 10.Seasonal Models |
| Readings | CC. Ch 2 , 3.1 T. Ch1, Ch 2.1, 2.2, 2.3, 2.7, 2.8                                                                                                                                                                                                                                                                                     |

### Univariate Time Series Models

### 2 : Autoregressive Models

| Sessions | Topic                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------|
| 3-4      | Autoregressive (AR) Models<br>Specification<br>Properties<br>Estimation<br>Forecast and Forecast Error |
| Readings | CC. Ch 4 T. Ch 2.4                                                                                     |

### 3 : Moving Average Models

| Sessions | Topic                                                                                           |
|----------|-------------------------------------------------------------------------------------------------|
| 3-4      | Moving Average (MA)<br>Specification<br>Properties<br>Estimation<br>Forecast and Forecast Error |
| Readings | CC. Ch 4 T. Ch 2.5                                                                              |

**Midterm Exam: Tuesday, March 5, 2019, 09:00 – 11:00 hrs.**

## **Volatility Models**

### **4 : Autoregressive Conditional Heteroskedastic Model**

| Sessions | Topic                                                                                                                               |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|
| 3-4      | Autoregressive Conditional Heteroskedastic (ARCH) Model<br>Specification<br>Properties<br>Estimation<br>Forecast and Forecast Error |
| Readings | CC. Ch 12.1 12.2 T. Ch 3.1, 3.2, 3.3, 3.4                                                                                           |

### **5 : Generalized Autoregressive Conditional Heteroskedastic Model**

| Sessions | Topic                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 2-3      | Generalized Autoregressive Conditional Heteroskedastic (GARCH) Model<br>Specification<br>Properties<br>Estimation<br>Forecast and Forecast Error |
| Readings | CC. Ch 12.3 T. Ch 3.5                                                                                                                            |

## **Multivariate Time Series Models**

### **6 : Vector Autoregressive Model**

| Sessions | Topic                                                                                                                                                                                                                                    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4-5      | Vector Autoregressive (VAR) Model<br>Specification<br>Properties<br>Estimation<br>Forecast and Forecast Error<br>Cointegration and Error Correction Model<br>Impulse Response Functions<br>Variance Decomposition<br>( Extension to VMA) |
| Readings | T. Ch 8.1, 8.2, 8.5, 8.6                                                                                                                                                                                                                 |

**Final Exam: Wednesday, May 29, 2019, 9:00 – 12:00 hrs.**



## ACADEMIC CALENDAR SEMESTER 2/2018

| Event                                        | Semester 2<br>(January - June 2019) |
|----------------------------------------------|-------------------------------------|
| Pre-Registration period (BE Portal)          | October 29 - November 1, 2018       |
| Course Registration (Reg TU)                 | November 20 - 23, 2018              |
| Payment                                      | November 20 - 26, 2018              |
| Classes Begin                                | January 14, 2019                    |
| Adding and Dropping Courses W/O Record       | January 14 - 28, 2019               |
| Payment                                      | January 14 - 29, 2019               |
| <i>Makha Bucha Day*</i>                      | <i>February 19, 2019</i>            |
| Mid-term Examination Period                  | March 4 - 9, 2019                   |
| Course Withdrawal With "W"                   | March 20 - 25, 2019                 |
| <i>Chakri Memorial Day*</i>                  | <i>April 6, 2019</i>                |
| <i>Substitution for Chakri Memorial Day*</i> | <i>April 8, 2019</i>                |
| <i>Songkran Festival Day*</i>                | <i>April 12 - 18, 2019</i>          |
| Last Day of Classes                          | May 12, 2019                        |
| Final Examination Period                     | May 13 - 17, 21 - 30, 2019          |

Remark:

\* Holiday, No classes during this period