

## Course Outline

### EE 325 Introductory Econometrics

Semester 1/2022

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

**Lecture Time:** Section 046401: Tuesday and Thursday, 11:00 – 12.30 hours

**Lecture Venue:** Room 302, 3rd floor, Faculty of Economics

**Instructor:** **Section 046401: Asst. Prof. Dr. Kaewkwan Tangtipongkul**

**Office:** Faculty of Economics 458

**Email:** kaewkwan@econ.tu.ac.th

**Course Description:**

Application of statistical and economic theories in analyzing economic data, with emphases on parameter estimation techniques and applications of simple and multiple regression models to economic analyses. Use of computer application in practice is also covered.

**Prerequisites:** EE211, EE212, MA216 (or MA211), and ST216 (or ST211).

(Credits will not be awarded to students who are taking or have completed EE 425)

**Aims and Objectives:**

This course provides an introduction to basic results and techniques of econometric theory. The emphasis will be on principles of econometrics and the application of econometric techniques rather than the derivation of theoretical statements. It is expected that at the completion of the course, students will be able to employ econometric investigation in their preparation for writing a seminar paper and to read critically empirical literature.

**Instructor's Note:**

This is an introductory course for econometric analysis. To understand and be able to apply it effectively, you need to learn some basic theories and the reasoning underlying an estimated equation. Some applied examples will be discussed in class but exercises in homework will provide various examples of econometric application for students. Students are expected to use an econometrics computer package to do the homework. We will primarily use Stata statistical and econometrics software package for computer work in this course. There will be 2-3 STATA workshops in the student computer lab. Each of these workshops will last 1.5 hours. The dates and times will be announced in class accordingly.

Homework will be assigned on a regular schedule. An assortment of assignments based on theory and some computer applications that involve programming. Homework assignments are expected to be handed on time. There will be both online- and paper-based homework. Late submission will be graded on the basis of 50% of the total scores of that assignment. More than two-day late homework will not be accepted. There will be occasional, possibly unannounced, quizzes during the semester. Missed quizzes may not be made up (unless this is the result of an officially excused absence)

**Assessment:**

|                                                |           |
|------------------------------------------------|-----------|
| Homework Assignments                           | 15 points |
| Class Attendances, participations, and Quizzes | 10 points |
| Midterm Exam                                   | 35 points |
| Final Exam                                     | 40 points |

**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.

**Required Textbooks:**

1. \*\*Gujarati, D.N., and D.C. Porter, **Basic Econometrics**. 5<sup>th</sup> ed., N.Y., McGraw-Hill, 2009.
2. \*\*Wooldridge, J. M. **Introductory Econometrics: A Modern Approach**. 6<sup>th</sup> ed. Thompson: South-Western, 2016.

\*\*Main Text

**Recommended Texts for Further Study**

Jame H. Stock and Mark W. Watson, **Introduction to Econometrics**, 2<sup>nd</sup> Edition, Boston: Pearson Addison Wesley (2007)  
William E. Griffiths, R. Carter Hill and George G. Judge, **Learning and Practicing Econometrics**, John Wiley & Sons (1993 or latest edition)  
Joshua D. Angrist and Jörn-Steffen Pischke, **Mostly Harmless Econometrics: An Empiricist's Companion**, Princeton University Press (2009)  
ISBN-13: 978-0-691-12035-5

**Other teaching materials:**

Teaching notes will be uploaded on Moodle at least 1 days prior to class.

**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.                              |

## Course Outline

### Introduction

- What is econometrics?
- Methodology of econometrics
- Types of economic data  
(Wooldridge, ch.1 or Gujarati, ch. 1)

### Review of Some Statistical Concepts

- Random variables and distributions
- Expectation, variance, covariance and correlation
- Estimators and desirable properties of estimators  
(Wooldridge, Appendix B or Gujarati, Appendix A, pp.869-912)

### Simple Regression Models

- Principle, assumptions and derivation of ordinary least squares (OLS) estimators
- Properties of OLS estimators
- Statistical inference
- Prediction
- Test on individual regression coefficients
- Regression Through the Origin
- Data scaling on OLS statistics
- More on functional forms  
(Wooldridge, ch. 2, ch. 6 (6.1 and 6.2)) or Gujarati, chs. 2 – 6)

=====MIDTERM EXAM: Tuesday September 27, 2022, noon – 2.00 PM=====

### Multiple Regression Analysis (Estimation)

- Motivation
- Model and assumptions
- Estimation of parameters and properties of estimators
- Meaning of partial regression coefficients
- Measuring goodness of fit:  $R^2$  and adjusted  $R^2$
- The matrix approach to linear regression model  
(Wooldridge, ch. 3 or Gujarati: ch. 7, Appendix B, C)

### Multiple Regression Analysis (Inference)

- Sampling Distribution of the OLS estimators
- Test on individual regression coefficients
- Testing the multiple linear restrictions
- Testing the equality of two regression coefficients
- Testing for equality or stability of parameters (Chow test)
- Prediction with general linear model  
(Wooldridge, ch. 4 or Gujarati: ch. 8)

## **Dummy Variable Regression Models**

- Describing Qualitative Information
- Models with a single dummy independent variable
- Using dummy variables for multiple categories
- Interactions involving dummy variables  
(Wooldridge, ch. 7 or Gujarati: ch. 15)

## **Multicollinearity Problem**

- Nature and Consequences of Multicollinearity
- Detecting Multicollinearity  
(Wooldridge, ch. 3 (3.4) or Gujarati, ch. 10)

## **Heteroscedasticity Problem**

- Nature and Consequences of heteroscedasticity for OLS
- Testing for heteroscedasticity
- Remedial measures (weighted least squares estimation)  
(Wooldridge, ch. 8 or Gujarati, ch. 11)

## **Autocorrelation Problem**

- Nature and Consequences of Autocorrelation, Serial Correlation
- Testing for Autocorrelation
- Remedial measures  
(Wooldridge, ch. 12 (12.1-12.3) or Gujarati, ch. 12)

## **Specification Errors and Data Problems**

- Type of specification errors
- Consequences of specification error
- Tests of specification error
- Errors of measurement  
(Wooldridge ch. 9 or Gujarati: ch. 13)

**=====FINAL EXAM: Thursday, December 1, 2022,9:00 AM - noon =====**

### **Remarks:**

- ◆ **Mid-Term Examination: Tuesday September 27, 2022, noon – 2.00 PM**
- ◆ **Final Examination: Thursday, December 1, 2022,9:00 AM - noon**

## ACADEMIC CALENDAR

### Semester 1/2022

**(August 8 – November 26, 2022)**

| <b>Semester 1/2022 (August 8 – November 26, 2022)</b>       |                                                                                              |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Registration at REG TU (*ID.62-64)                          | July 11 - 14, 2022                                                                           |
| Registration at REG TU (*ID.65)                             | July 26, 2022                                                                                |
| Tuition Fee Payment Period (Via TU Greats App)              | July 15 - 17, 2022                                                                           |
| Classes Begin                                               | August 8, 2022                                                                               |
| Add-drop period                                             | August 8 – 21, 2022<br><i>(from 9.00 AM of August 8 to 10.30 PM of August 21)</i>            |
| <i>H.M. Queen Sirikit The Queen Mother's Birthday*</i>      | <i>August 12, 2022</i>                                                                       |
| Tuition Fee Payment Period (Via TU Greats App)              | August 22 – 24, 2022<br><i>(9 AM - 10.30 PM)</i>                                             |
| Mid-term Examination Period                                 | September 25 – October 2, 2022                                                               |
| Withdrawal period with "W" on record                        | August 26 – October 16, 2022<br><i>(from 9.00 AM of August 26 to 10.30 PM of October 16)</i> |
| <i>H.M. King Bhumibol Adulyadej The Great Memorial Day*</i> | <i>October 13, 2022</i>                                                                      |
| <i>King Chulalongkorn's Day*</i>                            | <i>October 23, 2022</i>                                                                      |
| <i>Substitution for King Chulalongkorn's Day*</i>           | <i>October 24, 2022</i>                                                                      |
| Last day of class for Semester 2/2021                       | November 26, 2022                                                                            |
| Final exam period                                           | November 28 – 30, December 1 – 4, 6 – 9, 13 – 16, 2022                                       |
| <i>H.M. King Bhumibol Adulyadej The Great's Birthday*</i>   | <i>December 5, 2022</i>                                                                      |
| <i>Constitution Day*</i>                                    | <i>December 10, 2022</i>                                                                     |
| <i>Substitution for Constitution Day*</i>                   | <i>December 12, 2022</i>                                                                     |
| Submitting Forms for Degree Conferral                       | August 8 – 21, 2022                                                                          |

**Remark\* Holiday, No classes during this period**