

## Course Outline

### EE 325 Introductory Econometrics

#### Semester 1/2024

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

**Lecture Time:** Section 046402: Thursday, 9:00 – 12.00 hours

**Lecture Venue:** Room 303, 3rd floor, Faculty of Economics

**Instructor:** **Section 046402: Assoc 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 (5 Assignments)	10 points
Class Attendances, Quizzes and participations	15 points
Midterm Exam	35 points
Final Exam	40 points

To receive full points on class attendances, participations and quizzes, students must submit minimum of 8 participation activities and 8 quizzes.

To receive full points on homework assignments, students must submit minimum of 5 out of 6 homework assignments. Each homework is equal to 2 points. For HW 3, 4, and 5, to receive full credits, students must submit log file with answers file. If submit only log file or answer files, you will receive only half credits.

### **Academic Honesty**

You are expected to be honest in all 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 Willey & 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)

===== Mid-Term Examination: Tuesday 1st October 2024 (12:00-14:00 hrs) =====

### 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: Saturday 7th December 2024 (9:00-12:00 hrs) =====

### **Remarks:**

- ◆ **Mid-Term Examination: Tuesday 1st October 2024 (12:00-14:00 hrs)**
- ◆ **Final Examination: Saturday 7th December 2024 (9:00-12:00 hrs)**

**Academic Calendar (Semester 1/2024):**

<b>Activities</b>	<b>Time Period</b>
Classes Begin	August 13, 2024
Add-drop period	August 13 – 26, 2024 (from 9.00 AM of August 13 to 10.30 PM of August 26)
Mid-term Examination Period	September 29 – 30, October 1 – 6, 2024
Substitution for H.M. King Bhumibol Adulyadej the Great Memorial Day*	October 14, 2024
King Chulalongkorn's Day*	October 23, 2024
Withdrawal period with “W” on record	August 29 – October 20, 2024 (from 9.00 AM of August 29 to 10.30 PM of October 20)
Special Withdrawal with “w” on record	October 21 – November 20, 2024
Last day of class for Semester 2/2023	December 2, 2024
Final exam period	December 3-4, 6-9, 11-19, 2024
H.M. King Bhumibol Adulyadej the Great's Birthday*	December 5, 2024
Constitution Day*	December 10, 2024

Remark \* Holiday, No classes during this period