



## Course Outline

### EE425 Econometrics 1

**Semester 1/2024 (August 13 - December 2, 2024)**

**Lecture Time:** Thursday, 09.00-12.00 hours

**Lecture Venue:** Room 201, 2<sup>nd</sup> floor, Faculty of Economics

**Teaching Materials Platform:** Google Classroom, Class code [g453c6a](#)

**Instructor: Name: Asst. Prof. Dr.Wanwiphang Manachotphong**

**Office Hours: By appointment**

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**Line Group:**



**Number of Credit:** 3 Credits (3-0-6)

**Prerequisite:** EE211 (or EE213), EE212 (or EE214), MA216 (or MA211) and ST216  
(or ST211)

**Course Description:** Applying statistical methods and economic theories to analyze economic data, including simple and multiple regressions; estimation using the ordinary least squares (OLS) hypothesis testing; and dummy variable. This course also examines various problems in regression models, including Multicollinearity, Heteroscedasticity, Autocorrelation, Specification Error, Stochastic Regressors; and some advanced topics in regression method such as Generalized Least Squares (GLS) estimation, System of regressions and Seemingly Unrelated Regression (SUR), Simultaneous Equation System and solving Endogeneity problem with instrumental variables. Trainings in econometrics softwares.

**Course Objectives:** This course is the more advanced alternative to EE325 (Introductory Econometrics). It will focus on the theory that underpins standard econometric methods. Students will learn to derive simple theoretical results from standard principles. They will also learn to apply the knowledge to analyze actual datasets using a standard software such as STATA.

## Expected Learning Outcomes

### 1. Morality and Ethics **EE425**

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students demonstrate integrity.	Do assignments and exams with integrity and honesty.
○	2. Students prioritize social and public benefits over personal ones.	Do assignments and exams with integrity and honesty.
●	3. Students are punctual and comply with the code of conduct of the institution and society at large.	Students attend class regularly and show up on time.
○	4. Students are responsible and accountable to society, the nation, and the subject of economics.	Do assignments and exams with integrity and honesty.
○	5. Students realize the cultural and environmental value of a sustainable society.	Do assignments and exams with integrity and honesty.

### 2. Knowledge

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students know and understand modern economics principles and theories, and are up to date with new developments.	Homework and Examination
●	2. Students know and understand Thai and global economic structure and the importance of major international economic events.	Homework and Examination

●	3. Students know and understand the instruments of economic analysis.	Homework and Examination
●	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.	Homework and Examination
○	5. Students are informed about related fields including sociology, business administration, education, law policy, and science.	Homework and Examination

### 3. Intellectual Development

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students have developed individual critical thinking.	Homework and Examination
●	2. Students are sufficiently trained in research skills.	Homework and Examination
●	3. Students demonstrate an ability to analyze and synthesize data, as well as appropriately integrate economics concepts to understand the causes of current economic problems in Thailand. Based on analysis and synthesis, students demonstrate an ability to propose policy guidelines to resolve problems.	Homework and Examination

### 4. Interpersonal Skills and Responsibilities

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students are responsible for assigned tasks and work in groups effectively.	Homework and Examination
●	2. Students have problem-solving skills.	Homework and Examination
○	3. Students show leadership skills and team spirit.	Homework and Examination
●	4. Students are always improving themselves.	Homework and Examination
○	5. Students have good interpersonal skills, adapt, and work under different conditions.	Homework and Examination

### 5. Quantitative Analysis, communication, and information technology

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students select and apply appropriate statistical and mathematical methods for data processing, interpretation,	Homework and Examination

	conclusions, and recommendations to resolve problems.	
○	2. Students communicate effectively and select appropriate presentation methods.	Homework and Examination
●	3. Students use information and communication technologies appropriately to gather data as well as process, interpret, and present results.	Homework and Examination

Remark: ● Primary expected outcome ○ Secondary expected

**Main Text:** Wooldridge, J. M. *Introductory Econometrics: A Modern Approach*. 3<sup>rd</sup> ed. Thompson: South-Western, 2006.

**Recommended Texts & Materials:** Gujarati, D.N., and D.C. Porter, *Basic Econometrics*. 5<sup>th</sup> ed., N.Y., McGraw-Hill, 2009.

**Suggested Readings:** Gujarati, D.N., and D.C. Porter, *Basic Econometrics*. 5<sup>th</sup> ed., N.Y., McGraw-Hill, 2009.

### Grading Criteria:

1. Homework	10%	
2. Quizzes and in-class Assignments	10%	
3. Paper Replication	5%	<b>(Due date to be announced)</b>
4. Midterm Exam	30%	<b>(Thursday, October 3, 2024 09.00-11.00 hrs.)</b>
5. Final Exam	45%	<b>(Friday, December 6, 2024 13.30-16.30 hrs.)</b>

**Homework** – submissions must be in each student's own handwriting. Late homework will receive 50% of the actual marks. Homework marks are effort-based, so if you attempt all the questions, you will receive full marks. I will also provide the solutions along with the homework.

**Quizzes** – there will be an in-class quiz right after you submit your homework. Quiz questions will be taken directly from your homework with some changes in numbers. Each quiz is scored out of 15 points. Your final quiz score will be the average score from all quizzes, dropping the two lowest scores.

**In-class assignments** – on the day that there is no quiz, there will be an in-class assignment.

**Absence policy** – there is no make-up quiz/in-class assignment. However, each student can miss up to 3 quizzes or in-class assignments without affecting their final grade. (e.g. a student who misses 1 quiz and 2 in-class assignments will have used up all their absence quota.)

**Paper Replication** – each student should find a paper of their interest and replicate the main findings (main results table) of the paper. Then, submit a replication report that explains the research question, research methodology, and results of the paper. This report should be between 5-10 pages, excluding the STATA code in the appendix.

\*If there is any handout or additional reading, it will be posted on Google Classroom prior to class. Students are responsible to review the topic ahead of the class for more effective learning.

## **Tentative Class Schedule:**

### **Introduction**

- Methodology of econometrics
- Types of economic data  
(Wooldridge, ch.1; Gujarati, ch. 1)

### **Review of Some Statistical Concepts**

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

### **Simple Regression**

- Principle, assumptions and derivation of ordinary least squares (OLS) estimators
- Properties of OLS estimators
- Statistical inference
- Prediction
- Regression Through the Origin  
(Wooldridge, ch. 2; Gujarati, chs. 2 – 6)

### **Multiple Regression Analysis (Estimation)**

- 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; 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; Gujarati: ch. 8)

### **Multiple Regression Analysis (Extensions)**

- Data scaling on OLS statistics
- More on functional forms  
(Wooldridge, ch. 6, (6.1 and 6.2))

### **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; Gujarati: ch. 15)

### **Limited Dependent Variables**

- Logit and Probit models
- The interpretation of the coefficients (Wooldridge, ch.17)

### **Matrix Algebra in Economics**

- Summary of Matrix Operations
- The Linear Regression Model in Matrix Form (Wooldridge Appendix D, Appendix E)

### **Heteroscedasticity Problem**

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

### **Specification Errors and Data Problems**

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

### **Multicollinearity Problem**

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

### **Autocorrelation Problem**

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

### **Instrumental Variables Estimation**

- Motivation
- The instrumental variables (IV) method (Wooldridge, ch.15; Dougherty, ch.8.1-8.3)

### **Simultaneous Equations Models (SEMs)**

- The Nature of simultaneous Equations Models
- Simultaneity Bias
- Identifying and Estimating Structural Equation (Wooldridge, ch.16)

<b>Semester 1/2024 (August 13 – December 2, 2024)</b>	
Create Plan from Quota via TU Greats App (*ID.64 – 66)	July 9 – 11, 2024
Registration via TU Greats App (*ID.64 – 66)	July 9 – 11, 2024
Tuition Fee Payment Period (Via TU Greats App) (*ID.64 – 66)	July 9 – August 9, 2024
Classes Begin	August 13, 2024
Add-drop period	August 13 – 26, 2024 <i>(from 9.00 AM of August 13 to 10.30 PM of August 26)</i>
Tuition Fee Payment Period (Via TU Greats App) <i>(All *ID)</i>	August 13 – 27, 2024 <i>(9 AM - 10.30 PM)</i>
Mid-term Examination Period	September 29 – 30, October 1 – 6, 2024
<i>Substitution for H.M. King Bhumibol Adulyadej The Great Memorial Day*</i>	<i>October 14, 2024</i>
<i>King Chulalongkorn's Day*</i>	<i>October 23, 2024</i>
Withdrawal period with "W" on record	August 29 – October 20, 2024 <i>(from 9.00 AM of August 29 to 10.30 PM of October 20)</i>
Special Withdrawal with "w" on record	October 21 – November 20, 2024
Last day of class for Semester 1/2024	December 2, 2024
Final exam period	December 3-4, 6-9, 11-19, 2024
<i>H.M. King Bhumibol Adulyadej The Great's Birthday*</i>	<i>December 5, 2024</i>
<i>Constitution Day*</i>	<i>December 10, 2024</i>
Submitting Forms for Degree Conferral	August 13 – 26, 2024

Remark \* Holiday, No classes during this period  
Updated: June 14, 2024