

## 《Introductory to Econometrics》 Course Syllabus

<b>Course Chinese Title:</b> 计量经济学导论	<b>Course Category (Compulsory/ Elective) :</b> Compulsory
<b>Total Hours/ Hours Per Week/ Credit(s):</b> 48/3/3	<b>Lab Practice/ Practical Hours:</b> 16
<b>Prerequisites:</b> Advanced Mathematics, Statistics	
<b>Follow-up course:</b> Research Methods, Graduate Thesis	
<b>Time:</b> 8:30-10:10 Monday 1-16weeks	<b>Classroom:</b> Room 1212, Guancheng Campus
<b>Class:</b> 2021 Economics and Finance (Financial Management Industry-University International Program)	
<b>College:</b> School of Economics and Management	
<b>Instructor Name/ Academic Title:</b> Joseph Chih-Yuan Hung/ Lecturer	
<b>Office Hour:</b> 10:30-11:30 Tuesday; 14:30-16:00 Thursday (if available) at Room 2303, Guanchen Campus/ <b>Online:</b> WeChat group	
<b>Course Assessment Method:</b> Open book test ( )    Close book test (✓)    Report (✓)    Other (✓), see <b>Assessment and Grading table below</b>	
<b>Required Textbook:</b> Stock, James H. and Mark W. Watson. <i>Introduction to Econometrics</i> , 3 <sup>rd</sup> edition, Pearson, 2015.	
<b>Supplementary Materials:</b> None	
<p><b>Course Description:</b></p> <p>This is an introductory course of econometrics for the junior students in the program of Financial Management. The real world of economics and business is a complicated and messy place, full of competing ideas and questions that demand answers. Can you make money in the stock market by buying when prices are historically low, relative to earnings, or should you just sit tight, as the random walk theory of stock prices suggests? Can we improve elementary education by reducing class sizes, or should we simply have our children listen to Mozart for 10 minutes a day? Econometrics helps us sort out sound ideas from crazy ones and find quantitative answers to important quantitative questions.</p> <p>For the first course of undergraduate econometrics, it is better to motivate the need for tools with a concrete application and then to provide a few simple assumptions that match the application. We believe that interesting applications must motivate the theory and the theory must match the applications. The practical hours provides the exercises of these applications.</p> <p>This course contains 3 parts.</p>	

Part I. Review of probability and statistics.

Part II. Fundamentals of regression analysis

Part III. Regression with panel data

We assume that the students have had a course in probability and statistics, although we review that material in Part I. We cover the core material of regression analysis in Part II. Parts III presents additional topics that build on the core treatment in Part II. We hope this provides you a background knowledge, especially the ones in Part II, which brings you a self-studying in other additional topics in textbook. Good luck!

**Course Learning Objectives and its supporting on the requirement for graduation:**

<b>Course Learning Objectives</b>	<b>Measurements on Requirement for Graduation</b>	<b>Requirement for Graduation</b>
<b>CO1:</b> Student will be able to well understand theories in econometric and relative concepts.	<b>2-3</b> Students should master the basic theoretical knowledge and literacy in humanities and social sciences, with the necessary knowledge of philosophy and methodology, law, etc..	<b>2 Students are able to systematically acquire the knowledge required for the discipline of applied economics.</b>
<b>CO2:</b> Student will be able to apply econometric theories and use the Statistical software to analyze, predict, and estimate for economic issues.	<b>3-2</b> Students shall have good ability to operate business data analysis software.	<b>3 Students are able to use quantitative and information technology (IT) tools to analyze problems.</b>

<b>CO3:</b> Student will be able to write an empirical economic paper with regression models.	<b>4-3</b> Students shall have the ability to retrieve and read foreign language literature in the major and properly cite references, writing research papers and reports.	<b>5</b> Students shall have the necessary verbal and written communication skills needed to work in a diverse business environment.
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#### Schedule of Theoretical Hours

Week	Topic	Instructor	Hours	Contents (Key Point, Difficulty, Ethical and Political Learning)	Instructional Mode (Blended/Offline)	Activities	Assignment	Supported Course Learning Objectives
1	Introduction of Econometrics	Joseph Chih-Yuan Hung	3	Key point: briefly introduces to the core set of methods used by econometricians. Difficulty: Ethical and Political Learnings: introduce the key person in the history of econometric theory and empirical economists who make huge influence on the change in methods of econometrics.	Offline	Lecturing, Discussion	None	CO3

2	Review of probability	Joseph Chih-Yuan Hung	3	Key point: Probability and randomness; random variables and its properties.  Difficulty: Central Limit Theorem (CLT); sampling distributions.	Offline	Lecturing, Discussion	None	CO1
3	Review of Statistics	Joseph Chih-Yuan Hung	1	Key point: Estimation.  Difficulty: The difference of the sample mean and population mean; treatment effect and the differences of means.	Offline	Lecturing, Discussion	None	CO1
4	Review of Statistics II	Joseph Chih-Yuan Hung	3	Key points: Hypothesis testing.  Difficulty: The proof of the sample mean as a least square estimator of population mean.	Offline	Lecturing, Discussion	Assignment 1	CO1
5	Linear Regression with One Regressor I	Joseph Chih-Yuan Hung	1	Key points: Introduction the concept of (linear) regression.  Difficulties: Regression as a conditional mean of the dependent variable.	Offline	Lecturing, Discussion	None	CO1
6	Linear Regression with One Regressor II	Joseph Chih-Yuan Hung	3	Key points: Ordinary Least Square (OLS) estimators; Key assumptions and the properties of linear models.	Offline	Lecturing, Discussion	None	CO1

				Difficulty: Derivation of the OLS estimators; Sampling distribution of the OLS estimator.				
7	Linear Regression with One Regressor III	Joseph Chih-Yuan Hung	3	<b>Midterm Exam, 2 hours</b>  <b>Ethical and Political Learnings:</b> Key points: p-value of a test; homoskedasticity and heteroskedasticity. Difficulty: formulas for OLS standard errors.; conditions and proof of Gauss-Markov Theorem.	Offline	Lecturing, Discussion	Assignment 2	CO1
9	Midterm Exam/Linear Regression with multiple Regressors I	Joseph Chih-Yuan Hung	3	Key point: Generalization of the OLS estimator(s).  Difficulty: Omitted variable bias; four least square assumptions; multicollinearity; fitness of the model.  <b>Ethical and Political Learnings:</b> Emphasize the academic integrity. Students will be punished when there is academic dishonesty.	Offline	Lecturing, Discussion	None	CO1

				The student will be able to know the most important assumption in the modern econometrics and distinguish between mathematical model and practical problems. Furthermore, the students will be able to apply these concepts with a critical thinking.				
10	Linear Regression with multiple Regressors II	Joseph Chih-Yuan Hung	3	Key point: Hypothesis testing and confidence intervals for the coefficient of regression.  Difficulty: Joint hypotheses and F test; specification problem.	Offline	Lecturing, Discussion	Assignment 3	CO1
12	Nonlinear regression functions	Joseph Chih-Yuan Hung	3	Key point: Variables with non-linear relationships; regression with interaction terms  Difficulty: Functional form of the non-linearities; the explanation of interception term.	Offline	Lecturing, Discussion	None	CO1

13	Regression with panel data	Joseph Chih-Yuan Hung	3	Key point: organization of the panel data; fixed effect; time fixed effect model. Difficulty: variables with autocorrelation and heteroskedasticity.	Offline	Lecturing, Discussion	Assignment 4	CO1
16	Review for final exam	Joseph Chih-Yuan Hung	3	Key points: review all the theoretical and analytical tools that distributed in this course. Difficulty: provide the correct answer in a time constrained situation. Ethical and Political Learnings: emphasize the importance of no cheating in exam.	Offline	Lecturing, Discussion	Review for final exam	CO1
合计			32					

**Schedule of Practical Hours**

Week	Topic	Instructor	Hours	Content (Key point、Difficulty、Ethical and political learning)	Practical Type (Verified / Integrated / Designed)	Activities	Supported Measurements
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3	Introduction to STATA with data process	Joseph Chih-Yuan Hung	2	Key points: operation interface of STATA Difficulties: familiar with the basic operations and coding in STATA.	Integrated	Application with computer software	CO2
5	Description statistics on STATA	Joseph Chih-Yuan Hung	2	Key points: Difficulty: Ethical and Political Learnings: Through discussion of Economics and Data, the student will be able to understand the importance of authentication of data and the data process.	Integrated	Application with computer software	CO2
8	Linear regression with one regressor on STATA	Joseph Chih-Yuan Hung	3	Key points: simple linear regression analysis in STATA Difficulties: mastering simple linear regression	Integrated	Application with computer software	CO2
11	Linear Regression with multiple regressors on STATA	Joseph Chih-Yuan Hung	3	Key points: multiple linear regression analysis in STATA Difficulties: Master multiple linear regression	Integrated	Application with computer software	CO2



14	Non-linear and panel data regression on STATA	Joseph Chih-Yuan Hung	3	Key point: advanced operation on STATA Difficulty: mastering panel data.	Integrated	Application with computer software	CO2
15	Assessing studies based on multiple regression	Joseph Chih-Yuan Hung	3	Key Point: internal and External Validity/ Statistical inference  Difficulty: understanding the assumptions of classic regression model and the problem when assumption was not hold.	Integrated	Discussion	CO3
Total			16				

Grading						
Course Learning Objectives	Measurements on Requirement for Graduation	Assessments and Grading Percentage (%)				Percentage (%)
		Assignment	Practical Report	Midterm Exam	Final Exam	
CO1	2-3	12	4	15	25	56
CO2	3-2	8	4	5	15	32
CO3	4-3	-	12	-	-	12

Total	20	20	20	40	100
<b>Note:</b> (1) According to examination regulations of DGUT, students who have missed 3 classes (or 6 hours) are not allowed to take the final examination of the <u>course</u> . (2) Homework is assessed according to the design of problem sets; for other assessment, refers to the rubrics in Appendix below					
<b>Syllabus Submission Date: 2024.03.02</b>					
<div><div>School Reviewal:</div><div>Approved</div><div>Signature: 范鹏</div><div>Data: 2024.03.02</div></div>					

## Appendix: Grading Criteria Rubrics

### Assignment

Measurement	Criteria			
	A (100)	B (85)	C (70)	D (0)
Questions about relevant principles, theories, and applications of Econometrics  Assignment 1, 2, 3, 4 CO1 (60%), CO2 (40%)	Shows a full understanding of relevant principles, theories, and applications of Econometrics.	Shows a good understanding of relevant principles, theories, and applications of Econometrics.	Shows a fair understanding of relevant principles, theories, and applications of Econometrics.	Shows no understanding of relevant principles, theories, and applications of Econometrics.

## Practical Report

Measurement	Criteria			
	A (100)	B (85)	C (70)	D (0)
Integration of Knowledge (CO1, 20%)	The paper demonstrates that the author fully understands and has applied concepts learned in the course. Concepts are integrated into the writer's own insights.	The paper demonstrates that the author, for the most part, understands and has applied concepts learned in the course.	The paper demonstrates that the author, to a certain extent, understands and has applied concepts learned in the course.	The paper does not demonstrate that the author has fully understood and applied concepts learned in the course.
Support (CO2, 20%)	Begins to offer proper analytical outcomes and reasons to support its points, perhaps using varied kinds of evidence. Begins to interpret the evidence and explain connections between evidence and main ideas. Its examples bear some relevance.	Often uses generalizations to support its points. May use examples, but they may be obvious or not relevant. Often depends on unsupported opinion or personal experience, or assumes that evidence speaks for itself and needs no application to the point being discussed. Often has lapses in logic.	Depends on cliches or overgeneralizations for support, or offers little evidence of any kind. May be personal narrative rather than essay, or summary rather than analysis.	Uses irrelevant details or lacks supporting evidence entirely. May be unduly brief.
Discussion and Analytics (CO2, 20%)	In-depth discussion & elaboration in all sections of the paper.	In-depth discussion & elaboration in most sections of the paper.	The writer has omitted pertinent content or content runs-on excessively.	Cursory discussion in all the sections of the paper

			Quotations from others outweigh the writer's own ideas excessively.	or brief discussion in only a few sections.
Organization (CO3, 20%)	Shows a logical progression and modeling thinking of ideas and uses fairly sophisticated transitional devices; e.g., may move from least to more important idea. Some logical links may be faulty, but each paragraph clearly relates to paper's central idea. The writer provides concluding remarks that show analysis and synthesis of ideas.	May list ideas or arrange them randomly rather than using any evident logical structure. May use transitions, but they are likely to be sequential (first, second, third) rather than logic-based. While each paragraph may relate to central idea, logic is not always clear. Paragraphs have topic sentences but may be overly general, and arrangement of sentences within paragraphs may lack coherence. Some of the conclusions, however, are not supported in the body of the paper.	May have random organization, lacking internal paragraph coherence and using few or inappropriate transitions. Paragraphs may lack topic sentences or main ideas, or may be too general or too specific to be effective. Paragraphs may not all relate to paper's thesis.	No appreciable organization; lacks transitions and coherence.
Style/Voice (CO3, 20%)	1. Style and voice are not only appropriate to the given audience and purpose, but also show originality and	1. style and voice appropriate to the given audience and purpose.	1. style and voice somewhat appropriate to given audience and purpose.	1. style and voice in appropriate or do not address given audience,

	<p>creativity</p> <p>2. word choice is specific, purposeful, dynamic and varied</p> <p>3. sentences are clear active (subject-verb-object), and to the point</p>	<p>2. word choice is specific and purposeful, and somewhat varied throughout.</p> <p>3. sentences are mostly clear, active (SVO), and to the point.</p>	<p>2. word choice is often unspecific, generic, redundant, and clichéd.</p> <p>3. sentences are somewhat unclear; excessive use of passive voice</p>	<p>purpose, etc.</p> <p>2. word choice is excessively redundant, clichéd, and unspecific.</p> <p>3. sentences are very unclear.</p>
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