SYLLABUS

COURSE

ECONOMETRICS I

(EKO1301)

Lecturer Team:

1. **Prof. Bambang Juanda**
2. **Dr. Iman Sugema**
3. **Dr. Syamsul Hidayat Pasaribu**
4. **Dr. Tony Irawan**
5. **Fahmi Salam Ahmad, M.Si**
6. **Sri Retno Wahyu Nugraheni, M.Si**

DEVELOPMENT ECONOMICS STUDY PROGRAM
DEPARTMENT OF ECONOMICS
FACULTY OF ECONOMICS AND MANAGEMENT
IPB UNIVERSITY
2024

IPB University — Bogor Indonesia	**IPB UNIVERSITY** **FACULTY OF ECONOMICS AND MANAGEMENT** **DEPARTMENT OF ECONOMICS** **DEVELOPMENT ECONOMICS STUDY PROGRAM**

SEMESTER LESSON PLANS (RPS)

Course Name (MK)	**Course Code**	**Course Cluster**	**Weight (credits)**		**Semester**	**Approval Date**
Econometrics I	EKO1301	Foundational Literasies, Academic Core Courses	Lecture: 2	Practicum: 1	4	August 12, 2024
	Total student workload:		**Face-to-face:**	**Independent learning:**	**Maximum class size:**	
	135 Hours		60 Hours	75 Hours	100 Students	
AUTHORIZATION / APPROVAL	**RPS Developer Lecturer**		**Course Coordinator**		**Head of Study Program**	
	Signature Prof. Bambang Juanda		Signature Prof. Bambang Juanda		Signature Dr. Tony Irawan	
Course Category	~~CCC~~/~~FC~~/FL/ACC/~~IC~~/~~Final Year Project~~					
Course Description	This course provides knowledge about the fundamental principles of econometrics and expertise in estimating standard (common) econometric models to represent various real-world problems. Topics covered include correlation analysis, linear regression analysis using the ordinary least squares (OLS) method, assumptions of the classical linear regression model, interval estimation, hypothesis testing, multicollinearity, heteroscedasticity, autocorrelation, logistic regression, as well as simultaneous equations. This course is project-based learning, utilizing a method that involves creating group mini-projects.					
Intended Learning Outcomes (ILOs) of the Study Program	**Study Program Learning Outcomes assigned to the Course**					
	ILO 1	Possessing skills in applying analytical methods, concepts, and economic theories according to the development of science and technology for decision-making, problem-solving, and planning, both on a micro and macro scale for development, social, and business interests.				
	ILO 2	Mastering the concepts, theories, and analytical methods in the field of economics both micro and macro, as well as their branches.				
	ILO 3	Able to communicate verbally and in writing in the field of economics logically, creatively, and innovatively by utilizing the development of science and technology, interact with the community, and make decisions responsibly both independently and in groups.				
Course Learning Outcomes	**Learning Outcomes (CLOs)**					
	CLO 1	Students are able to explain and apply the best regression model in their research.				
	CLO 2	Students are able to analyze econometric models using data processing software.				
	Sub-Learning Outcomes (Sub-CLOs)					
	Sub-CLO 1	Students are able to explain econometric concepts and the relationships between variables accurately				

	Sub-CLO 2	Students are able to perform estimation, interpretation of models, as well as hypothesis testing in linear regression accurately
	Sub-CLO 3	Students are able to apply logarithmic transformation to linear regression models accurately using data processing applications
	Sub-CLO 4	Students are able to conduct linear regression modeling with qualitative independent variables accurately using data processing applications
	Sub-CLO 5	Students are able to calculate multicollinearity conditions, test for heteroscedasticity, and test for autocorrelation in linear regression models accurately using data processing applications
	Sub-CLO 6	Students are able to analyze variations in other regression models such as logit regression, distributed lag regression, and simultaneous regression accurately using data processing applications

Relevance of CLO and Sub-CLO *Tick (✓) according to relevance*		**CLO 1**	**CLO 2**
	Sub-CLO 1	V	V
	Sub-CLO 2	V	V
	Sub-CLO 3	V	V
	Sub-CLO 4	V	V
	Sub-CLO 5	V	V
	Sub-CLO 6	V	V

Courses offered for	✔ Major
Main References	1. Ramanathan, R. 1998. Introductory Econometrics with Applications. 4th edition. The Dryden Press. Fort Worth. 2. Gujarati, D.N. 2004. Basic Econometrics. The McGraw-Hill Companies. 3. Juanda, B. 2009. *Ekonometrika: Pemodelan dan Pendugaan*. Bogor: IPB Press
Lecturers (Teaching Team)	1. Prof. Bambang Juanda 2. Dr. Iman Sugema 3. Dr. Syamsul Hidayat Pasaribu 4. Dr. Tony Irawan 5. Fahmi Salam Ahmad, M.Si 6. Sri Retno Wahyu Nugraheni, M.Si

Table 1. Lesson Plan for Each Meeting

Week	Basic Competence/ Final Skills (Sub-CLO)	Study Material	Learning Method	Estimated Time (Minutes)	Learning Experience	Indicator	Assessment Criteria	Assessment Weight (%)
Students are able to:								
1	Students are able to explain econometric concepts and the relationships between variables accurately	● Definition of econometrics ● Stages of empirical studies using econometric modeling ● Types of relationships between variables ● Correlation analysis ● Criteria for causation relationships	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning econometrics, econometric modeling methodology, types of relationships between variables, and correlation analysis	The accuracy and completeness of students in explaining the definition of econometrics and modeling methodology, as well as explaining, calculating, and interpreting the concept of correlation	● Project Results ● Cognitive / Knowledge: Midterm Exam	
2	Students are able to perform estimation, interpretation of models, as well as hypothesis testing in linear regression accurately	● Definition of econometrics ● Stages of empirical studies using econometric modeling ● Types of relationship patterns between variables ● Correlation analysis ● Criteria for causation relationships	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning simple linear regression models, estimation, and interpretation of parameter coefficients using the OLS method	The accuracy and completeness of students in manually calculating the estimate of simple regression coefficients and interpreting regression model coefficients.	● Project Results ● Cognitive / Knowledge: Midterm Exam	
3	Students are able to perform estimation, interpretation of models, as well as	● Definition of models and the purpose of modeling	● Lecture ● Q&A ● Assignment ● Group discussion	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning the methods and stages of hypothesis testing,	The ability of students to perform hypothesis testing and forecasting, the accuracy and completeness	● Project Results ● Cognitive / Knowledge: Midterm Exam	5

	hypothesis testing in linear regression accurately	● Simple linear regression model ● Regression models vs. reciprocal relationships: use of dependent and independent variables ● Estimation of coefficients ● Interpretation of coefficients	● Studying practical analysis videos with software		residual assumptions, and forecasting in simple linear regression	in explaining residual/error assumptions, and conducting estimation with software		
4	Students are able to perform estimation, interpretation of models, as well as hypothesis testing in linear regression accurately	● Residual assumptions ● Properties of OLS estimators ● Hypothesis testing and confidence intervals ● Forecasting dependent variables ● Analysis of variance ● F-test and t-test ● Residual analysis ● Analysis of variance	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning multiple linear regression models, estimation, and interpretation of coefficients in multiple linear regression with two independent variables	Students can manually calculate the values of multiple regression coefficients with two independent variables and accurately interpret regression model coefficients and conduct analysis of variance	● Project Results ● Cognitive / Knowledge: Midterm Exam	5
5	Students are able to perform estimation, interpretation of models, as well as hypothesis testing in linear regression accurately	● General multiple regression model and its assumptions ● Regression model with two independent/explanatory variables ● Overall model testing: analysis of variance	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning the methods and stages of hypothesis testing, residual assumptions, and forecasting in multiple linear regression	Students can perform hypothesis testing and forecasting, explain residual/error assumptions, select the best model, and conduct estimation with software and can explain computer output results	● Project Results ● Cognitive / Knowledge: Midterm Exam	5

6	Students are able to apply logarithmic transformation to linear regression models accurately using data processing applications	• Hypothesis testing and confidence intervals for regression coefficients • Coefficient of Determination / Goodness of Fit • Multiple regression in matrix form • Partial correlation and stepwise regression • R^2 and Adjusted R^2 • Interpretation of computer output	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning regression models with different functional forms to represent realities in economic theories.	Students can explain regression models with different functional forms	• Project Results • Cognitive / Knowledge: Midterm Exam	5
7	Students are able to conduct linear regression modeling with qualitative independent variables accurately using data processing applications	• Several functional forms of regression models • Marginal impacts and elasticity of various forms of regression model functions • Spurious nonlinearity • F-test and t-test involving more than one coefficient	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning regression models with qualitative variables as independent variables and applying them	Students can explain regression models with qualitative variables as independent variables and interpret the coefficients of dummy variables	• Project Results • Cognitive / Knowledge: Midterm Exam	5
8	Exams to evaluate material mastery by students on the material of Meeting 1 up to Meeting 7	Material from Meeting 1 to Meeting 7	Completing written exam questions	**2x60"**	Understanding the material taught, both in theory and in its practical	• Completeness and accuracy of explanations in answering exam questions	• Paper-based written exam to assess understanding of the material	8

					application in the real world.			
9	Students are able to calculate multicollinearity conditions, test for heteroscedasticity, and test for autocorrelation in linear regression models accurately using data processing applications	• Nature of multicollinearity • Multicollinearity and its impacts • Ways to detect multicollinearity • Ways to address multicollinearity issues	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning the concept of multicollinearity	Students can explain the concept of multicollinearity and its impacts, how to detect multicollinearity problems, and how to address them	• Project Results • Cognitive / Knowledge: Midterm Exam	5
10	Students are able to calculate multicollinearity conditions, test for heteroscedasticity, and test for autocorrelation in linear regression models accurately using data processing applications	• Nature of heteroscedasticity • Heteroscedasticity and its impacts • Ways to detect heteroscedasticity • Ways to address heteroscedasticity issues	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning the concept of heteroscedasticity as one of the Gauss-Markov assumptions	Students can explain the concept of heteroscedasticity and its impacts, how to detect heteroscedasticity both manually and using software, as well as how to address it.	• Project Results • Cognitive / Knowledge: Midterm Exam	5
11	Students are able to calculate multicollinearity conditions, test for heteroscedasticity, and test for autocorrelation in linear regression models accurately using data processing applications	• Nature of autocorrelation • Autocorrelation and its impacts • Ways to detect autocorrelation • Ways to address autocorrelation issues	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning the concept of autocorrelation as one of the Gauss-Markov assumptions	Students can explain the concept of autocorrelation and its impacts, how to detect autocorrelation problems both manually and using software, as well as how to address them.	• Project Results • Cognitive / Knowledge: Midterm Exam	5
12	Students are able to analyze variations in other regression models such as logit regression, distributed lag regression, and simultaneous regression	• Binary choice models • Linear probability model • Probit and Logit models • Estimation of the Logit model	• Lecture • Q&A • Assignment • Group discussion • Studying practical analysis videos with software	**Lecture Duration:** 2x50" **Practicum**: 3x50"	Learning qualitative choice models, estimating and interpreting coefficients, as well as applying them	Students can explain the differences between several qualitative choice models, interpret coefficients in logit regression, perform hypothesis testing, and choose the best model	• Project Results • Cognitive / Knowledge: Midterm Exam	10

	accurately using data processing applications	parameter coefficients ● Hypothesis testing and confidence intervals for regression coefficients ● Interpretation of Logit model coefficients ● Logit applications						
13	Students are able to analyze variations in other regression models such as logit regression, distributed lag regression, and simultaneous regression accurately using data processing applications	● Koyck model ● Adaptive Expectations model ● Stock Adjustment model ● Autoregressive model ● Testing for Autocorrelation	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning the use of the distributed lag method	Students can explain the impact of correlation between independent variables and the error term and explain the use of methods that enable this	● Project Results ● Cognitive / Knowledge: Midterm Exam	
14	Students are able to analyze variations in other regression models such as logit regression, distributed lag regression, and simultaneous regression accurately using data processing applications	● Introduction ● Identification problems: Order condition and Rank condition	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	Learning simultaneous equation models to represent dependencies among independent variables	Students can explain and provide illustrations of the use of simultaneous equation models and perform identifications to determine the appropriate estimation method	● Project Results ● Cognitive / Knowledge: Midterm Exam	
15	Students are able to analyze variations in other regression models such as logit regression, distributed lag regression, and simultaneous regression accurately using data processing applications	● Consistent parameter estimation ● ILS method ● 2SLS method ● Applications of simultaneous equation models	● Lecture ● Q&A ● Assignment ● Group discussion ● Studying practical analysis videos with software	**Lecture Duration:** 2x50” **Practicum**: 3x50”	estimation methods for simultaneous models	Students can explain the use of ILS and 2SLS estimation methods according to their applications	● Project Results ● Cognitive / Knowledge: Midterm Exam	

16	Students are capable of completing written exam questions to evaluate their mastery of the material from Meeting 9 through Meeting 15	Material from Meeting 9 to Meeting 15	Completing written exam questions	**2x60"**	Understanding the material taught, both in theory and in its practical application in the real world.	● Completeness and accuracy of explanations in answering exam questions	● Paper-based written exam to assess understanding of the material	

Table 2. Assessment Components

No	Assessment Component	Score Range	Weight (%)	Description
1.	Participatory Activities			
2.	Project Results		50	Students work in groups and individually to complete problem-solving assignments using an econometric model approach during the midterm exam (UTS) and final exam (UAS)
3.	Cognitive/Knowledge			
	● Assignment			
	● Quiz			
	● Midterm Exam		25	Exam is conducted to evaluate students' mastery of the material for Sub-CLO 1 to Sub-CLO 4
	● Final Exam		25	Exam is conducted to evaluate students' mastery of the material for Sub-CLO 5 to Sub-CLO 6
	Total Weight (%)		**100**	