KT02011: MATHEMATICAL ECONOMICS

1. General information

- o Term: 3,4
- o Credits: **Total credits 3 (Lecture: 3 – Practice: 0)**
- o **Self-study: 9** credits
- o Credit hours for teaching and learning activities: 45 hrs
- o Self-study: 135 hrs.
- o Department conducting the course:
  - ▪ Department: Department of Quantitative Analysis
  - ▪ Faculty: Faculty of economics and Rural development
- o Kind of the course:

Foundation ☒□		Fundamental □		Specialized	
Compulsory □	Elective ☒	Compulsory □	Elective □	Compulsory □	Elective □

- o Prerequisite course(s): Microeconomics – KT02001

2. Course objectives and expected learning outcomes

* Course objectives:

- Knowledge: The course aims to provide learners with in-depth knowledge about the difference between mathematical and econometric models, basic methods in analyzing econometric models, and agricultural economics.

- Skills: The course trains learners with basic mathematical knowledge and skills and optimal economic algorithms in analyzing, building plans and strategies for economic development by econometric models to clarify the principles of economic development. economic rules and regulations; Simulate micro-economic problems, macro-economic problems and problems arising in production using mathematical language. Building models and analyzing results of problems posed in the consumption and circulation of goods.

- Attitude: The module forms for learners the attitude of sense of responsibility, professional ethics and autonomy, creativity with different ideas in economic research, agricultural economics, management and business. , accounting, ... have a high sense of self-discipline in self-study and apply the subject to practice.

* Course expected learning outcomes

Notation	Course expected learning outcomes (CLOs) After successfully completing this course, students are able to	Program performance criteria (PPC)
Knowledge		
CLO1	**Apply** mathematical knowledge to simulate and explain problems arising in the practical economics and accounting.	1.1
Skills		
CLO2	**Apply** teamwork skills to solve and analyze the results of problems in production, consumption, linear programming	4.1

		and transportation problems effectively.	
Attitude			
	CLO3	**Set short-term and long-term** goals and plans for career development, be proactive and creative in learning, update information to approach science and practice.	10.1

3. Course description

Brief description of the course: This course consists of 6 chapters with the content of introducing econometric models; Static balance analysis; Comparative analysis. The application of derivatives and differentials in the analysis of micro- and macro-economic problems; The problem of optimizing production and consumption; Linear programming problem; Transport problem

4. Teaching and learning & assessment methods

CLOs	CLO1	CLO2	CLO3
Lecturing online and in person	x	x	x
Class discussion		x	
Assessment			
Rubric 1. Attendance (5%)			x
Rubric 2. Discussing assignments in class (5%)		x	x
Rubric 3. Midterm exam (30%)	X		x
Rubric 3. Final exam (60%)	x		x

5. Student tasks

Submission of assignments: Request to submit on time or take midterm exams, late submission will not be scored

Taking the final exam : If you don't take the final exam, you will get

Ethical requirements: Attend school fully (at least 75% in class), not be rude to teachers, do not cause disorder in the class

6. Text books and references

 * Text Books/Lecture Notes:

Textbook: Nguyen Tuan Son, Le Thi Long Vy, Do Truong Lam, Nguyen Anh Duc (2020), Textbook of Mathematical Economics, Publishing House of Agricultural Academy

* Additional references:

1. Hoang Dinh Tuan, Bui Duong Hai, Cao Xuan Hoa, Hoang Bich Phuong (2015). Textbook of econometric model theory, National Economics University Publishing House, Hanoi.

2 . Bui Minh Tri (2013). Mathematical Economics, Hanoi Polytechnic Publishing House, Hanoi

7. Course outline

Week	Content	Course expected learning outcomes

Week	Content	Course expected learning outcomes
1.2	**Chapter 1: Introduction to econometric models**	
	A/ The Main content in class: (4 hours) **Contents of theoretical education:** 1.1 Some concepts 1.2 Model structure 1.3 Some methods of analysis and use of models	CLO1, CLO3
	B/ Self- study contents: (12 hours) Students read materials related to chapter 1 by themselves	CLO1, CLO3
2.3	**Chapter 2: Static balance analysis**	
	A/ Main contents: (3 hours) **Theory:** 2.1. Microeconomic model 2.2. Macroeconomic model	CLO1, CLO3
	B/ Self- study contents: (9 hours) Students read the material related to chapter 2 on their own and prepare a group discussion	CLO1, CLO3
3,4.5	**Chapter 3: : Comparative analysis- Application of derivatives and differentials in economic analysis**	
	A/ Main contents: (6 hours) **Theory:** 3.1 Application of derivatives in economic analysis 3.2 Application of total differential and total derivative in economic analysis	CLO1, CLO3
	B/ Self- study contents: (18 hours) Students read the material related to chapter 3 on their own and prepare for lesson i discussion groups	CLO1, CLO3
5,6,7,8,9	**Chapter 4: Optimizing production and consumption**	
	A/ Main contents: (15 hours) **Theory:** (9 hours) 4.1 Problem modeling 4.2 The problem of optimizing free production and consumption 4.3 Constrained production and consumption optimization problem **Seminar/Discussion/Project/E-learning:** *(6 hours)* Group discussion about the results of the individual preparation Organize midterm exam	CLO1, CLO2, CLO3
	B/ Self- stusy contents: (45 hours) Students read the material related to chapter 4 on their own and prepare a group discussion	CLO1, CLO2, CLO3
10,11,12	**Chapter 5: Linear Programming Problem**	
	A/ The Main content in class: (9 hours) Contents of theoretical education: 5.1 Problem modeling 5.2 Methods to solve the problem of OSS	CLO1, CLO2, CLO3

Week	Content	Course expected learning outcomes
	5.3 The dual problem 5.4 Analysis of optimization results	
	B/ Contents to be self-study at home : (27 hours) Students read the material related to chapter 4 on their own and prepare a group discussion	CLO1, CLO2, CLO3
13, 14,15	**Chapter 6 : Transport problem**	

	A/ The Main content in class : (8 hours)
	Content of theoretical education: (6 hours)
	    6.1 Modeling the problem
	    6.2 Positional method to solve transport problem
	    6.3 Application of the work assignment model
	Content of the seminar/discussion: (2 hours)
	Group discussion about the results of the individual preparation
		CLO1, CLO2, CLO3

	B/ Contents to be self-study at home : (24 hours) Students read the material related to chapter 6 on their own and prepare a group discussion	CLO1, CLO2, CLO3