MINISTRY OF EDUCATION AND TRAINING

LAC HONG UNIVERSITY

COURSE SYLLABUS

< 102038 – PROBABILITY STATISTICS THEORY>

1. GENERAL INFORMATION

Course name (in Vietnamese):	Lý thuyết Xác suất & thống kê toán
Course name (in English):	Probability Statistics Theory
Course Code:	**102038**
Belongs to the knowledge area:	Basic
Department/Faculty responsible for the course:	Basic Courses Unit – Academic Affairs Office
Instructor in charge:	TS. Trần Văn Hoan (hoantran@lhu.edu.vn)
Lecturers involved in teaching:	TS. Đinh Thái Sơn (dinhthaison@lhu.edu.vn)
Number of credits:	2
Theory:	1
Practice:	0
Exercise:	1
Characteristics of the course:	Mandatory for students in this major.
Prerequisite course:	None
Prior course:	None

2. COURSE DESCRIPTION

This course provides fundamental knowledge of probability theory and statistics applied in economics, including probability and probability formulas, random variables and probability distributions, sampling theory, and parameter estimation.

3. Course learning outcomes

Table 1: Course Learning Outcomes (CLOs)

Course Learning Outcomes (CLOs)	Content learning outcomes for the course	Bloom domain/Bloom level	PLOs program output standards
CLO1	Apply probability formulas and probability distributions of random variables to solve economic application problems	Knowledge (3)	PLO1(PI1.1)
CLO2	Present and explain problem solutions in a logical, clear, and well-justified manner based on relevant knowledge and skills	Skills (3)	PLO4 (PI4.1)
CLO3	Value the selection and application of effective problem-solving methods in practical work situations	Attitude (3)	PLO9 (PI9.1)

COURSE CONTENT, LESSON PLAN

Table 2: Course content and teaching plan

Week	Chapter	Lesson / Chapter Title	Lesson Learning Outcomes (LLO)		Teaching and Learning Activities	Teaching Methods	Assessment Methods	References (*)
1	Chapter 1. Introduction to Probability	**Lesson 1** **1.1. Combinatorics**	LLO1.1	Clearly describe the procedure for performing a random experiment	**Classroom activities** The lecturer introduces the problem and provides an overview of the course Probability Theory and Mathematical Statistics; presents and explains fundamental concepts; guides discussions on the role of probability and statistics in solving practical problems; and illustrates the content with examples and exercises **Self-study activities**	Lecture Questioning	- Short-answer test - Essay Examination	[1], [2], [3], [4]

					Students review the learned content and practice solving probability and statistics exercises to reinforce their knowledge.			
2		**Lesson 2** **1.2. Random Experiments and Events**	LLO1.2	Explain events in relation to elementary events.	**Classroom Activities** The lecturer introduces the problem and presents the lesson Random Experiments and Events**;** explains the basic concepts of random experiments, sample space, and events; guides discussions and illustrates the concepts with examples and exercises. **Self-study Activities** Students review the concepts of random experiments and events and practice solving related exercises to reinforce their knowledge.	Lecture Questioning	- Quizzes and multiple-choice tests Essay - Examination	[1], [2], [3], [4]

3		**Lesson 3** **1.3. Probability of Events**	LLO1.3	Apply basic probability formulas to solve problems related to events	**Self-study Activities** Students read in advance the materials for the chapter "Probability of Events." Students study the lesson content on probability of events before class. **Classroom Activities** The lecturer answers students' questions related to the content on probability of events**.** The lecturer organizes and guides students in group discussions, analyzing and solving problems on the probability of events through specific examples	- Lecture -Group Discussion -Problem-Solving	Short-answer Test Essay Examination	[1], [2], [3], [4]
4		**Lesson 4** **1.4. Probability Formulas**	LLO1.4	Apply formulas to calculate the probability of events.	**Self-study Activities** Students read in advance the materials for the chapter "Probability Formulas." Students study the lesson content	- Lecture - Group Discussion - Problem-Solving	Short-answer Test Essay Examination	[1], [2], [3], [4]

					on probability formulas before class. **Classroom Activities** The lecturer answers students' questions related to probability formulas**.** The lecturer organizes and guides students in group discussions to analyze and apply probability formulas to solve specific problems.			
5	Chapter 2. Random Variables	**Lesson 1** **2.1. Basic Concepts**	LLO2.1	Apply probability rules to construct a probability distribution table	**Self-study Activities** Students read in advance the materials for the chapter "Concept of Random Variables." Students study the lesson content on random variables before class. **Classroom Activities** The lecturer answers students' questions related to the concept	Lecture Group Discussion Problem-Solving	Quizzes and Multiple-choice Tests Essay Examination	[1], [2], [3], [4]

					of random variables**.** The lecturer organizes and guides students in group discussions to analyze examples and identify random variables in specific problems.			
6		**Lesson 2** **2.2. Functions of Random Variables**	LLO2.2	Value accuracy when determining the characteristic parameters of random variables.	**Self-study Activities** Students read in advance the materials for the chapter **"Functions of Random Variables."** Students study the lesson content on **functions of random variables** before class. **Classroom Activities** The lecturer answers students' questions related to the prepared content. The lecturer presents and explains the concept of **functions of random variables** and	- Lecture - Group Discussion - Problem-Solving	Quizzes and Multiple-choice Tests	[1], [2], [3], [4]

					common types of such functions. The lecturer illustrates with examples and guides students in discussions and exercises on identifying and handling functions of random variables in specific problems			
7		**Lesson 3** **2.3. Random Variables with Special Probability Distributions**	LLO2.3	Apply probability definitions and formulas to determine the probability distribution of a random variable	**Self-study Activities** Students read in advance the materials for the chapter "Random Variables with Special Probability Distributions." Students study the lesson content on special probability distributions before class. **Classroom Activities** The lecturer answers students' questions related to the prepared content. The lecturer presents and explains the types of special	- Lecture - Group Discussion - Problem-Solving	Short-answer Test Essay Examination	[1], [2], [3], [4]

					probability distributions of random variables**,** illustrates them with examples, and guides students in discussions and exercises for application.			
8	Chapter 3. Statistics	**Lesson 1** **3.1. Sampling Theory**	LLO3.1	Use sample data to estimate characteristic parameters	**Self-study Activities** Students read in advance the materials for the chapter **"Sampling Theory."** Students study the lesson content on **sampling theory** before class. **Classroom Activities** The lecturer answers students' questions related to the prepared content. The lecturer presents and explains the basic concepts of **sampling theory**, illustrates them with examples, and guides	- Lecture - Group Discussion - Problem-Solving	Essay Examination	[1], [2], [3], [4]

					students in discussions and exercises for application.			
9		**Lesson 2** **3.2. Estimation of the Population Proportion**	LLO3.2	Accurately perform estimation problems.	**Self-study Activities** Students read in advance the materials for the chapter **"Estimation of the Population Proportion."** Students study the lesson content on **estimating the population proportion** before class. **Classroom Activities** The lecturer answers students' questions related to the prepared content. The lecturer presents and explains the method for **estimating the population proportion**, illustrates it with examples, and guides students in discussions and exercises for application.	- Lecture - Group Discussion - Problem-Solving	Short-answer Test Essay Examination	[1], [2], [3], [4]

10		**Lesson 3** **3.3. Estimation of the Population Mean**	LLO3.3	Accurately perform estimation in solving practical business problems	**Self-study Activities** Students read in advance the materials for the chapter "Estimation of the Population Mean." Students study the lesson content on estimating the population mean before class. **Classroom Activities** The lecturer answers students' questions related to the prepared content. The lecturer presents and explains the method for estimating the population mean, illustrates it with examples, and guides students in discussions and exercises for application.	- Lecture - Group Discussion - Problem-Solving	Short-answer Test Essay Examination	[1], [2], [3], [4]
11		**Lesson 4** **3.4. Hypothesis Testing**	LLO3.4	Value accuracy in hypothesis	**Self-study Activities** Students read in advance the materials for the chapter	- Lecture - Group Discussion	Short-answer Test	[1], [2], [3], [4]

				testing problems	“Hypothesis Testing.” Students study the lesson content on statistical hypothesis testing before class. **Classroom Activities** The lecturer answers students’ questions related to the prepared content. The lecturer presents and explains the procedure for statistical hypothesis testing**,** illustrates it with examples, and guides students in discussions and exercises for application.	- Problem-Solving		

4. MAPPING COURSE LEARNING OUTCOMES AND LESSONS

Table 3: Mapping of learning outcomes for modules and lessons

Lesson / Chapter	Lesson learning outcomes	Course learning outcomes			Assessment Components
		CLO1	CLO2	CLO3	đánh giá
Chapter 1	LLO1.1	X			A1, A2,A3
Chapter 1	LLO1.2	X			A1, A2,A3
Chapter 1	LLO1.3	x			A1, A2,A3
Chapter 1	LLO1.4	x			A1, A2, A3
Chapter 2	LLO2.1	x			A1, A2,A3
Chapter 2	LLO2.2			x	A1, A2
Chapter 2	LLO2.3	x			A1, A2, A3
Chapter 3	LLO3.1		x		A1, A3
Chapter 3	LLO3.2		x		A1, A3
Chapter 3	LLO3.3		x		A1,A3
Chapter 3	LLO3.4			x	A1, A2

5. Course assessment

Table 4: Course Evaluation

Assessment Components	Assessment Methods	CLOs	Weight (%)
A1. Continuous assessment	- Quizzes and Multiple-choice Tests - Essay Examination	CLO1, CLO2, CLO3	*30%*
A2. Midterm	- Quizzes and Multiple-choice Tests - Essay Examination	CLO1, CLO3	*30%*
A3. Final Exam	Essay Examination	CLO1, CLO2	*40%*

6. Course requirements and expectations

- Class attendance: In accordance with the regulations of the university.

- Students read and study the course materials provided by the lecturer before each class session.

- Homework, short-answer questions, and quick in-class exercises: These will be awarded bonus points and added to the Continuous Assessment (30%) or the Midterm score (30%) of students.

7. Textbook, References

7.1. Textbook

[1]. Tran Van Hoan, Dinh Thai Son (2023), *Probability and Statistics*, Lac Hong University. *(Internal textbook)*

7.2. References

[1]. Nguyen Tien Dung, Nguyen Dinh Huy (2020), *Probability, Statistics and Data Analysis*, Ho Chi Minh City National University Publishing House.

[2]. Dang Han (1996), *Probability and Statistics*, Statistics Publishing House. (Internal reference)

[3]. Dinh Van Gang (2001), *Exercises in Probability and Statistics*, Education Publishing House. (Internal reference)

[4]. Nguyen Thanh Son, Le Khanh Luan (2009), *Probability Theory and Mathematical Statistics*, Statistics Publishing House. (Internal reference)

[5]. Nguyen Thanh Son, Le Khanh Luan, Pham Tri Cao (2010), *Exercises in Probability Theory and Mathematical Statistics*, Statistics Publishing House. *(*Internal reference)

8. SOFTWARE OR PRACTICAL SUPPORT TOOLS

- Chalk and board

- Projector

- Zoom; Zalo; LMS

GENERAL CONVENTIONS

Symbol	Description
PLO/SO	Program Learning Outcomes
PI	Performance Indicators
CLO	Course Learning Outcomes
LLO	Lesson Learning Outcomes
GV	Lecturer
SV	Student

Head of Department/Course

Dong Nai, [date] [month] 2025

Compiled by lecturers

Tran Văn Hoan