

Course TH01007: PROBABILITY AND STATISTICS

1. General information

- Term: 1
- Credits: **Total credits 3 (Lecture: 3, Practice: 0, Self-study: 9)**
- Credit hours for teaching and learning activities: 45 hrs
- Self-study: 135 hrs.
- Department conducting the course:
 - Department of Mathematics
 - Faculty of Information Technology
- Kind of the course:

Foundation <input checked="" type="checkbox"/>		Fundamental <input type="checkbox"/>	
Compulsory	Elective	Compulsory	Elective
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Prerequisite course(s): none

2. Course objectives and expected learning outcomes

* *Course objectives:*

- Knowledge: Course provided for students with knowledge in the law of random phenomenon, statistical inferences based on sample data.
- Skills: Course provide students with skills in explaining how to perform statistical inferences based on sample data, applying scientific knowledge of statistical mathematics to biotechnology; thinking logically to detect and solve simple data analysis problems related in biotechnology.
- Attitude: Course provide students with attitudes in being honest with the research results.

* *Course expected learning outcomes*

Notation	Course expected learning outcomes After successfully completing this course, students are able to	PLO performance criteria
Knowledge		
CELO1	Apply the concept of probability, Descriptive Statistics and the problems of estimation, statistical hypothesis testing, correlation and regression to practical problems.	1.1
Skills		
CELO 2	Develop teamwork activities of using some statistical software (Excel/SPSS/R...) to solve statistical problems in the specialty.	4.1
Attitude		
CELO 10	Demonstrate the need of life-long learning.	10.2

3. Course description

This course consists of seven chapters: Descriptive statistics; Probability; Random variable; Sampling distributions; Estimation; Hypothesis testing; Simple linear regression model.

Prerequisite: No

4. Teaching and learning & assessment methods

CELOs	CELO1	CELO2	CELO3
Teaching and learning			
Lecturing	x	x	x
Teamwork		x	
Assessment			
Rubric 1. Participant (10%)			x
Rubric 2. Midterm exam (20%)	x		
Rubric 3. Teamwork (10%)		x	
Rubric 4. Final exam (60%)	x		

5. Student tasks

- Attendance: All students need to follow the general regulations of VNUA.
- Preparation for the lecture: All students taking this course must read the relevant book chapter and handout before the class.
- Assignment: All students taking this course must complete at least 70% of the assignments.
- Mid-term exam: All students taking this course must attend the midterm exam.
- Final exam: All students taking this course must attend the final exam.

6. Text books and references

* *Text Books/Lecture Notes:*

- Lê Đức Vĩnh (2014). Xác suất thống kê. Nhà xuất bản Đại học Nông nghiệp

* *Additional references:*

- Đào Hữu Hồ (2007). Hướng dẫn giải các bài toán Xác suất - Thống kê. Nhà xuất bản Đại học Quốc gia Hà nội.
- Gerald Keller. (11th edition 2018). Statistics for Management and Economics. South – Western Cengage Learning, 998p
- Moore/McCabe/Craig (2012). Introduction to the Practice of Statistics (7th edition). W. H. Freeman and Company, New York, 694p.

7. Course outline

Week	Content	Course expected learning outcomes
1	A/ Main contents: (5 periods) Theory: (4 periods) 1.1. Population and samples 1.2. Graphical Descriptive Techniques 1.2.1 Frequency Distribution 1.2.2 Histogram 1.3. Numerical Descriptive Techniques 1.3.1 Measures of Central Location 1.3.2 Measures of Variability Exercises: Guide the students to do exercises (1 period)	K1, K2
	B/ Self- study contents: (15 periods) Students do the exercises corresponding to theory contents in the class.	K1, K2

2-3	Chapter 2: Probability	
	A/ Main contents: (7 periods) Theory: (5 periods) 2.1. Trials and Events 2.1.1 Definitions 2.1.2 Complements, Intersections and Unions 2.2. Probability 2.2.1 Definition of probability 2.2.2 Conditional probability 2.2.3 Bayes's law Exercises: Guide the students to do exercises (2 periods)	K1
	B/ Self- study contents: (21 periods) Students do the exercises corresponding to theory contents in the class.	K1
4-6	Chapter 3: Random variables	
	A/ Main contents: (7 periods) Theory: (5 periods) 3.1. Distribution of random variables 3.2. Characteristics of random variables 3.3. Some discrete and continuous distributions Exercises: Guide the students to do exercises (2 periods)	K1
	B/ Self- study contents: (21 periods) Students do the exercises corresponding to theory contents in the class.	K1
7-10	Chapter 4: Estimation	
	A/ Main contents: (6 periods) Theory: (4 periods) 4.1. Concepts of estimation 4.2. Point estimation 4.3. Confidence Interval Exercises: Guide the students to do exercises (2 periods)	K1, K2
	B/ Self- study contents: (18 periods) Students do the exercises corresponding to theory contents in the class.	K1, K2
11-13	Chapter 5: Hypothesis testing	
	A/ Main contents: (10 periods) Theory: (8 periods) 5.1. Concepts of hypothesis testing 5.2. Inference about a population mean 5.3. Inference about a population proportion 5.4. Inference about comparing two population means 5.5. Inference about comparing two population proportions 5.6. One-way ANOVA 5.7. A- Chi-square Goodness-of-Fit Exercises: Guide the students to do exercises (2 period)	K1, K2
	B/ Self- study contents: (30 periods)	K1, K2

	Students do the exercises corresponding to theory contents in the class.	
	Chapter 6: Simple linear regression and correlation	
14-15	A/ Main contents: (4 periods) Theory: (3 periods) 7.1. Models 7.2. Estimating the coefficients 7.3. Assessing the model Exercises: Guide the students to do exercises (1 periods)	K1, K2
	B/ Self- study contents: (12 periods) Students do the exercises corresponding to theory contents in the class.	K1, K2