Course PTH01002: APPLIED PROBABILITY AND STATISTICS IN AGRICULTURAL SCIENCES

1. General information

- Term: 2
- Credits: **Total credits 3 (Lecture: 3 – Practice: 0)**
- **Self-study: 9** credits
- 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 ☑		Fundamental □		Option 1 □		Option 2 □	
Compulsory ☑	Elective □	Compulsory □	Elective □	Compulsory □	Elective □	Compulsory □	Elective □

- Prerequisite course(s): none

2. Course objectives and expected learning outcomes

**** Course objectives*:**

- Knowledge: Course provided for students with knowledge in descriptive statistics and statistical inferences based on sample data.

- Skills: Course trains learners in independent working skills and scientific research skills in their major.

- Attitude: Course forms learners a sense of lifelong learning and constantly fosters professional knowledge and competence.

**** 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 knowledge of descriptive statistics and inferential statistics.	1.1
Skills		
CELO2	Apply statistical softwares for basic statistical problems	5.6
CELO3	Detect and evaluate simple statistical models in practical problems of professional disciplines to analyze and process information for scientific research	6.2
CELO4	Make a logical conclusion to the research problem based on statistical data processing	6.4
Attitude		
CELO5	Students correctly identify their own limitations to the knowledge and competencies required in statistics	10.1

3. Course description

Brief description of the course: This course consists of seven chapters: Descriptive statistics; Population distributions; Sampling distributions; Estimation; Hypothesis testing; One-factor analysis of variance, correlation and regression.

4. Teaching and learning & assessment methods

CELOs	CELO1	CELO2	CELO3	CELO4	CELO5
Teaching and learning					
Lecturing	x	x	x	x	x
Assessment					
Rubric 1. Participant (5%)					x
Rubric 2. Doing homework (5%)	x	x	x	x	
Rubric 2. Midterm exam (30%)	x				
Rubric 3. 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.
- Moore/McCabe/Craig (2012). Introduction to the Practice of Statistics (7^{th} edition). W. H. Freeman and Company, New York, 694p.
- Gerald Keller. (9^{th} edition 2012). Statistics for Management and Economics. South – Western Cengage Learning, 810p

7. Course outline

Week	Content	Course expected learning outcomes
1-2	***Chapter 1:*** Descriptive statistics	
	A/* Main contents: *(6 hours)* **1. Theories:** (*5 hours)* 1.1. Population and samples 1.2. Numerical Descriptive Techniques 1.2.1 Measures of Central Location	CELO1

	1.2.2 Measures of Variability 1.2. Graphical Descriptive Techniques 1.2.1 Table and histogram of frequency 1.2.2 Box plot **Exercises:** Guide the students to do exercises *(1 hour)*	
	***B/* Self-study contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO1,2, 3
3-4	***Chapter 2:*** Population distributions	
	A/* Main contents: (6 hours)* **1. Theories:** *(5 hours)* 2.1 Distribution of the population 2.1.1 Discrete Distribution 2.2.2 Continuous distribution 2.2 Characteristic numbers of the population 2.2.1 The average of population. 2.2.2 The variance of the population 2.2.3 Standard Deviation of population 2.3 Some common population distributions 2.3.1 Binomial distribution 2.3.2 Poisson distribution 2.3.2 Normal distribution **Exercises:** Guide the students to do exercises *(1 hour)*	CELO1
	***B/* Self-study contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO1
5-6	***Chapter 3:*** Sampling distributions	
	A/* Main contents: (6 hours)* **1. Theories:** *(5 hours)* 3.1 Random sample and characteristics of random sample 3.2 Sampling distribution of the mean 3.3 Sampling distribution of a proportion 3.4 Normal Approximation to the Binomial Distribution 3.5 Student's *t*-distribution 3.6 Chi-squared distribution 3.7 F - Fisher distribution **Exercises:** Guide the students to do exercises *(1 hour)*	CELO1,5
	***B/* Self-study contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO1,2
7-8	***Chapter 4:*** **Estimation**	
	A/* Main contents: (6 hours)* **1. Theories:** *(5 hours)* 4.1 Point estimation 4.2 Confidence Interval 4.2.1 Interval Estimate of Population Mean 4.2.2 Interval Estimate of Population Proportion **Exercises:** Guide the students to do exercises *(1 hour)*	CELO1,5

	***B/* Self-study contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO1, 2, 4
9-11	**Chapter 5: Hypothesis testing**	
	A/* Main contents: (11 hours)* **Theories: (**9 *hours)* 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 Chi-square test **Exercises:** Guide the students to do exercises (2 *hours)*	CELO 1,4,5
	***B/* Self- stusy contents**: *(33 periods)* Students do the exercises corresponding to theory contents in the class.	CELO 1,2,4,5
12-13	***Chapter 6:*** One-factor Analysis of Variance	
	A/* Main contents: (6 hours)* **1. Theories:** *(5 hours)* 6.1 Completely randomized designs 6.2 One-factor Analysis of Variance model 6.3 The Analysis of Variance table **Exercises:** Guide the students to do exercises *(1 hour)*	CELO 1,4,5
	***B/* Self-study contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO 1,2,4,5
14-15	**Chapter 7: Simple linear regression and correlation**	
	A/* Main contents: (6 hours)* **Theories:** *(5 hours)* 7.1. Models 7.2. Estimating the coefficients 7.3. The coefficient of determination and correlation coefficient **Exercises:** Guide the students to do exercises *(1 hour)*	CELO 1,5
	***B/* Self- stusy contents**: *(18 hours)* Students do the exercises corresponding to theory contents in the class.	CELO 1,2,5