

## SYLLABUS

### 1. COURSE INFORMATION

- 1.1 Course title: **PROBABILITY and STATISTICS** Course code: MATH1304  
1.2 Provided by: School of Advanced Study  
1.3 Credits: 03  
Self-study hours: 90 hours

### 2. COURSE OVERVIEW

Statistics is an introductory undergraduate course. Providing the basic concepts of probability and statistical theory, this course introduces techniques to summarize numeric data collected from censuses, statistical reports, surveys or experiments with frequency distribution, central tendency, variability, probability theory, and estimation. Students will be able to differentiate inference statistics from descriptive ones. The course also helps students to understand real information implied in graphical and numerical data. Base on collected data and some statistical softwares, students can calculate the probability of variables and test for hypothesis of real business and economic phenomena and further, conduct some basic linear regression and diagnose correlation between economic variables.

### 3. TEACHING OBJECTIVES

#### 3.1. General objectives

This course is to equip students with main concepts of probability and statistics as well as the practical skills to apply this knowledge in the course of pursuing their own study objectives. By the end of the course students should have a strong understanding of the statistical procedures and tests used most often in economics and business. Students will be exposed to the computational aspects of statistics through the use of calculators and data analysis packages.

#### 3.2. Specific objectives:

##### 3.1.1. Knowledge

By the end of this course, students should be able to:

- Understand the basic concepts of probability and statistics

- Know different types of statistics (descriptive and inference statistics)
- Explain the meaning of graphic and numeric data
- Know the process to do hypothesis testing
- Interpret regression results and correlation analysis
- students can calculate the probability of variables and test for hypothesis of real business and economic phenomena

### 3.1.2. Skills

By the end of this course, students should be able to:

- Collect suitable data
- Use graph and numeric data to describe the real situations
- Test hypotheses in business and economics
- Analyze the relationship between two variables via simple regression and correlation coefficients
- Calculate basic probabilities
- Calculate estimation and confidence intervals
- Develop their modeling skills

### 3.1.3. Attitudes

The students are encouraged to raise their questions and involve into class discussion with real economic activities updated daily. Moreover, students should read through textbook and lecture notes before class.

## 4. TEACHING CONTENTS

No	Chapter	Details	Hours				Text book for self-study
			TT	T	E	P	
1	<b>Introduction to Probabilities and Statistics</b>	<ul style="list-style-type: none"> <li>• Why study Statistics?</li> <li>• What is meant by Statistics?</li> <li>• Types of Statistics</li> <li>• Levels of measurement</li> <li>• Computer applications</li> </ul>	4	4			[1] [2]

No	Chapter	Details	Hours				Text book for self-study
			TT	T	E	P	
2	<b>Describing data</b>	<ul style="list-style-type: none"> <li>Constructing a Frequency distribution</li> <li>A software example</li> <li>Relative frequency distribution</li> <li>Graphic presentation of a frequency distribution</li> <li>Cumulative frequency distributions</li> </ul>	4	4			[1] [2]
3	<b>Describing data: numerical measures</b>	<ul style="list-style-type: none"> <li>The mean</li> <li>Properties of the arithmetic mean</li> <li>The median</li> <li>The mode</li> <li>The relative positions of the mean, median and mode</li> <li>Why study dispersion?</li> <li>Measures of dispersion</li> <li>Software solution</li> </ul>	6	6			[1] [2]
4	<b>Displaying and exploring data</b>	<ul style="list-style-type: none"> <li>Introduction</li> <li>Dot plots</li> <li>Stem-and-leaf displays</li> <li>Other measures of dispersion</li> <li>Relative dispersion</li> <li>Skewness</li> <li>Describing the relationship between two variables</li> </ul>	4	4			[1] [2] [3]
5	<b>Probability concepts</b>	<ul style="list-style-type: none"> <li>Introduction</li> <li>What is a probability?</li> <li>Approaches to assigning probabilities</li> <li>Rules of addition</li> <li>Rules of multiplication</li> <li>Tree diagrams</li> </ul>	4	4			[1] [2] [3]
6	<b>Probability distributions</b>	<ul style="list-style-type: none"> <li>What is a probability distribution?</li> <li>Random variables</li> <li>The mean, variance and standard deviation of a probability distribution</li> </ul>	4	4			[1] [2] [3]

No	Chapter	Details	Hours				Text book for self-study
			TT	T	E	P	
7	<b>Sampling methods</b>	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Sampling methods: reasons to sample, simple random sampling, systematic random sampling, stratified random sampling, cluster sampling</li> <li>• Sampling error</li> </ul>	4	4			[1] [3]
8	<b>Estimation and confidence intervals</b>	<ul style="list-style-type: none"> <li>• Point estimates and confidence intervals</li> <li>• A confidence interval for a proportion</li> </ul>	2	2			[1] [2]
9	<b>One-sample test of hypothesis</b>	<ul style="list-style-type: none"> <li>• What is a hypothesis?</li> <li>• What is hypothesis testing?</li> <li>• Five-step procedure for testing a hypothesis</li> <li>• One-tailed and two-tailed test of significance</li> <li>• Testing for a population mean with a known population standard deviation</li> <li>• Testing for a population mean with an unknown population standard deviation</li> </ul>	4	4			
10	<b>Linear regression and correlation</b>	<ul style="list-style-type: none"> <li>• What is correlation analysis?</li> <li>• The coefficient of correlation</li> <li>• Regression analysis: Least squares principle, drawing the line of regression</li> <li>• The coefficient of determination</li> </ul>	4	4			
	<b>Review</b>		5	5			
	<b>TOTAL</b>		<b>45</b>	<b>45</b>			

*Note: TT: Total number of lessons; T: Theory; E: Exercises; P: Practices*

## 5. TEACHING MATERIALS

### 5.1. Textbooks

[1] Douglas A. Lind (2005), *Statistical techniques in Business and Economics*, Twelfth edition

### 5.2. Supplementary Readings

[2] Mark L. Berenson and David M. Levine (1999), *Basic Business Statistics*, Seventh edition, Prentice Hall, Englewood cliffs, New Jersey

[3] David Freedman, Robert Pisani and Roger Purves (1998), *Statistics*. Third edition, Viva books

## 6. ASSESSMENTS

No.	Assessment details	Percentage
1	Mid-Term Exam	50%
2	Final Exam	50%
	<b>Total</b>	<b>100%</b>

## 7. TEACHING SCHEDULES

Week	Topic	Learning materials and activities
1	Introduction to Probabilities and Statistics	Read chapter 1, page 2 Discussion
2	Describing data	Read chapter 2, page 24 Discussion, exercise, case study
3	Describing data: numerical measures	Read chapter 3, page 56 Discussion, exercise, case study
4	Displaying and exploring data Describing data: numerical measures (continuous)	Read chapter 4, page 97 Read chapter 3, page 56 Discussion, exercise, case study
5	Displaying and exploring data (continuous) Probability concepts	Read chapter 4, page 97 Read chapter 5, page 140 Discussion, exercise
6	Probability concepts (continuous) Probability distributions	Read chapter 5, page 140 Read chapter 6, page 181 Discussion, exercise, case study
7	Probability distributions (continuous)	Read chapter 6, page 181

	Sampling methods	Read chapter 8, page 251 Discussion, exercise
8	Sampling methods (continuous) Estimation and confidence intervals	Read chapter 8, page 251 Read chapter 9, page 282 Discussion, exercise
9	One-sample test of hypothesis	Read chapter 10, page 317 Discussion, exercise
10	Linear regression and correlation	Read chapter 13, page 429 Discussion, exercise, case study
11	Review	Review and exercise

**BY ORDER OF THE RECTOR  
AUTHORIZED BY DEAN OF THE SCHOOL  
VICE DEAN OF THE SCHOOL**

(signed)

**VÂN THỊ HỒNG LOAN**