

**COURSE SYLLABUS
FOR FULL-TIME UNDERGRADUATE PROGRAMS**

(Issued under Decision No.1380/QĐ-ĐHKTQĐ on 15/8/2016 by the University President)

1. COURSE NAME: Multivariate Statistical Analysis 1

Code: TOKT1108

Number of Credit: 02

2. DEPARTMENT IN CHARGE OF INSTRUCTION

Office: Faculty of Mathematics for Economics

Office Hours: Working hours, the working day

Office Telephone: (84) 04 3628 3007

3. PRE-REQUISITE

Mathematical Statistics, Econometrics 1

4. COURSE DESCRIPTION

This module provides deep specialized knowledge for training programs involving knowledge of Statistics. It is the next module in the training process after the module of Probability Theory and Mathematical Statistics. Two blocks of knowledge are:

The method described, evaluated data and multivariate statistical analysis, especially the non-parametric analysis;

Empirical analysis with data collected in Vietnam, the World and the region and theoretical knowledge of the sample and sample surveys.

5. COURSE OBJECTIVES

With this module students should acquire knowledge and skills at the following levels:

- Understand the methodology of socio-economic research with statistical models
- Understand the theoretical basis of formation and solving problems multivariate statistical analysis
- Understand the scope and conditions of use of the models and methods of analysis
- Proficiency in statistical analysis skills to good use models and specialized software

- Gain deeper understanding of the socio-economic situation of Vietnam and possibilities and ways to use the statistical analysis model through the use of empirical data sets Vietnam

6. COURSE CONTENTS

TENTATIVE SCHEDULE

<i>No</i>	<i>Contents</i>	<i>Total hours</i>	<i>In details</i>		<i>Notes</i>
			<i>Theory</i>	<i>Practice, Discussion, Exams</i>	
1	Chapter 1	4	4	0	<i>Students need to practice more on the computer</i>
2	Chapter 2	7	4	3	
3	Chapter 3	6	4	2	
4	Chapter 4	6	4	2	
5	Chapter 5	7	4	2+1	
	Total	30	20	10	

CHAPTER 1 – BASIC PROBLEMS IN PRACTICAL STATISTICS

This chapter introduces the statistical model method in social and economic research and the selection of models and supporting softwares.

1.1. Statistical Sciences and Mathematical Methods

1.2. The basic problems of practical statistics

1.2.1. Population and individual

1.2.2. Random samples

1.2.3. Sources of information

1.2.4. Statistical description

1.2.5. Statistical analysis on the different data

1.2.6. Multivariate statistical analysis and non-parametric analysis

1.2.7. Statistical analysis with non-observable criteria

1.2.8. Statistical software selection

1.3. Mathematical modeling and selection of analytical methods

1.3.1. Advantages of statistical modeling

1.3.2. Selection of analytical methods

References

- 1 - Ngo Van Thu, 2015, practice statistics, Published NEU, Chapter 1.
- 2 - Hoang Dinh Tuan, 2010, Mathematical Economic Model Theory, Science and Technology Publisher, Chapter 1.
- 3 - Nguyen Quang Dong, 2008, Econometrics, Science and Technology Publisher, chapter 1.
- 4 - Thomas H. Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistics for business and economics, Chapter 1.

CHAPTER 2 – SAMPLING THEORY

This chapter introduces:

- Methods to analyze data with different sampling methods
- Theoretical basis and the conditions of use of the sampling method
- The method of determining the sample size in different situations
- Outline of the questionnaire theory and manners to organize a survey

- 2.1. An overview of sampling
- 2.2. Basic problems of sampling
- 2.3. The sampling method
 - 2.3.1. Basic principles
 - 2.3.2. Methodology and selection criteria
 - 2.3.3. Determination of sample size
 - 2.3.4. Other sampling methods
- 2.4. Questionnaire theory
 - 2.4.1. Establishing basis of the questionnaire
 - 2.4.2. Classification questionnaire
 - 2.4.3. Structure of questionnaire and the types of questions

References

- 1 - Ngo Van Thu, 2015, Statistics Practice, Published NEU, Chapter 2.
- 2 - Nguyen Minh Thang, 1987, Survey Sampling, Statistical Publisher.
- 3 - Nguyen Quang Dong, 2008, Econometrics, Science and Technology Publisher, Chapter 1.
- 4 - Giuseppe Iarrossi, 2006, The power of survey design, National Political Publisher.
- 5 - Douglas A, Lind, William G. Marxhal, Robert D. Mason, 2001 in Business & Economics Statistical Techniques, McGraw-Hill. Chapter 1.
- 6 - Thomas H. Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistics for business and economics, chapter 6.

CHAPTER 3 - DESCRIPTIVE STATISTICS

This chapter:

- Equips students with tools for statistical description of synthetic targets
- Detects problems in service modeling and statistical analysis methods
- Multivariate statistical description of the meaning of these characteristics
- Explores the relationships described to evaluate statistical data.

3.1. Descriptive statistics for 1 variable

- 3.1.1. Character statistics
- 3.1.2. Frequency and relative frequency
- 3.1.3. Standardizing variables (Z) (Reference)
- 3.1.4. Correction and standardization of data

3.2. Simultaneous and Group description

- 3.2.1. Contingency table
- 3.2.2. Relationship description
- 3.2.3. Group description

3.3. Description by chart

- 3.3.1. Scattered plot
- 3.3.2. Line graph
- 3.3.3. Column chart
- 3.3.4. Pie chart
- 3.3.5. Box plot
- 3.3.6. Stem and leaf
- 3.3.7. Spider web chart (radar)
- 3.3.8. ROC chart

3.4. Checking, evaluating and Censoring data

- 3.4.1. Logic checking
- 3.4.2. Reliability checking

Appendix 1: Summary of SPSS for Windows and STATA

1. Stata version 7.0 for Windows
2. SPSS for windows
3. SPSS with descriptive statistics

1 - Ngo Van Thu, 2015, the statistical practice, Published NEU, Chapter 3.

2 - Nguyen Cao Van, Tran Thai Ninh, Ngo Van Thu, 2011, the theory of probability and mathematical statistics, Published by the University of National Economy, Chapter 7.

3 - Douglas A, Lind, William G.Marxhal, Robert D.Mason, 2001 in Business & Economics Statisstical Techniques, McGraw-Hill. Chapter 2-4.

4 - Thomas H.Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistis for business and economics , chapters 2-5.

CHAPTER 4 - ANALYSIS OF VARIANCE

- Introduction of model analysis of variance overall
- Method of analysis and data-handling skills for the analysis of variance model
- Introducing the use of softwares in solving problems of the analysis of variance with full, detailed tests in various cases.

4.1. Analysis of variance - factor analysis

4.1.1. Analysis of variance problem

4.1.2. Common method

4.2. Analysis of variance of an effective factor identified

4.2.1. Theoretical model

4.2.2. The types of data analysis and technical variance calculation

4.2.3. Regression model analysis of variance

4.2.4. Kruskal-Wallis test

4.2.5. Pairwise comparisons

4.3. Analysis of variance of an effective random factor

4.3.1. Model

4.3.2. Technical testing and analysis

4.4. Analysis of variance of two factors determine efficiency

4.4.1. Model analysis of variance of two factors separate impact

4.4.2. Technical testing and analysis

4.4.3. Model analysis of variance of two factors acting simultaneously

4.5. SPSS and STATA with analysis of variance

4.5.1. Analysis of variance 1 factor

4.5.2 Analysis of variance many factors

References

1 - Ngo Van Thu, 2015, the statistical practice. Published NEU, Chapter 4.

2 - Nguyen Cao Van, Tran Thai Ninh, and Ngo Van Thu, 2011, the theory of probability and mathematical statistics, Published by the University of National Economy, Chapter 11

3 - Thomas H.Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistics for business and economics , Chapter 10.

4 - Douglas A, Lind, William G.Marxhal, Robert D.Mason, 2001 in Business & Economics Statisstical Techniques, McGraw-Hill. Chapter 12

CHAPTER 5 - INSPECTION OF NON PARAMETERS

This chapter introduces a model class of non-parametric tests. . This program focuses on the application of the theory to solving common problems in practice rather than the theory itself. Its priority is to take advantage of the specialized softwares to create analytical skills.

5.1. Criterion of the Chi-squares

5.1.1. Test the fit of the experimental rules

5.1.2. Test of the independence of the two signs

5.1.3. Test mark (sign test)

5.2. Normal distribution tests (reference)

5.2.1. Standard Kolmogorov

5.2.2. Standard Jacque- Bera

5.3. The test on the basis of rank correlation

5.3.1. Wilcoxon test

5.3.2. Spearman rank correlation tests

5.3.3. Mann-Whitney tests

5.3.4. Testing is based on the correlation coefficient Kendall

5.3.5. Inspection of Friedman's k homogeneous samples

5.4. Stata with the non-parametric tests

5.4.1. The class-based testing

5.4.2. Criterion Chi-squared

5.5. SPSS with non-parametric tests

5.5.1. Chi Square

5.5.2. Binomial procedures

5.5.3. Runs Test Procedures

5.5.4. K-S test procedures

5.5.5. Test of the independence of the two samples (two samples Independent)

5.5.6. Test k independent samples (k Independent samples)

5.5.7. Test bivariate correlations (2 Relation samples)

5.5.8. Test of variable relations k (k Relation samples)

References of the chapter:

1 - Ngo Van Thu, 2015, the statistical practice, NEU, Chapter 5.

2 - Nguyen Cao Van, Tran Thai Ninh, and Ngo Van Thu, 2011, The theory of probability and mathematical statistics, the University of National Economy, Chapter 7

3 - Thomas H.Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistis for business and economics, Chapter 16.

4 - Douglas A, Lind, William G.Marxhal, Robert D.Mason, 2001 in Business & Economics Statisstical Techniques, McGraw-Hill, Chapter 15.

7. REQUIRED TEXTBOOKS & COURSE MATERIALS

- 1 - Ngo Van Thu, 2015, The statistical practice, NEU
- 2 - Database (as required by the lecturer)
 - Survey data 2002-2004-2006-2008 Living Standards
 - Enterprise Survey data 2000-2009
 - Data on the stock market from 2000 to 2010.
 - Data on a number of thematic surveys.
- 3- Statistical software: SPSS, STATA, EXCEL

8. RECOMMENDED TEXTS & OTHER READINGS

- 1 - Le Van Phong, Tran Trong Nguyen, 2011, Theory of Probability.
- 2 - Nguyen Cao Van, Tran Thai Ninh, and Ngo Van Thu, 2011, The theory of probability and mathematical statistics, NEU.
- 3 - Nguyen Quang Dong, 2008, Econometrics, Science and Technology. 4 - Nguyen Minh Thang, 1987, Survey Sampling, Statistical Publisher.
- 5 - Hoang Dinh Tuan, 2010, Mathematical Economic, Science and Technology Publisher.
- 6 - Thomas H. Wonnacott, Ronald J. Wonnacott, 1990, Introductory statistics for business and economics .
- 7 - Douglas A. Lind, William G. Marzhal, Robert D. Mason, 2001 in Business & Economics Statistical Techniques, McGraw-Hill.

9. ASSESSMENT & GRADING POLICY

- Scale (point) : 10
- Structure of points:
 - + Discussion point: 10%
 - + The exercise, check out: 30%
 - + The final examination period: 60%
- Conditions of attending the final exam:
 - + Must attend at least 80% of the course.

Hanoi, 2016

HEAD OF DEPARTMENT

(signed)

PhD. Nguyen Manh The

PRESIDENT

(signed)

Prof.Dr. Tran Tho Dat