



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF ECONOMICS AND STATISTICAL ENGINEERING
STATISTICAL ENGINEERING PROGRAM

ES211 – STATISTICS I

I. GENERAL INFORMATION

CODE	: ES211 Statistics I
SEMESTER	: 1
CREDITS	: 4
HOURS PER WEEK	: 7 (3 Theory – 2 Practice – 2 Laboratory)
PREREQUISITES	: EC314 Advanced Calculus
CONDITION	: Compulsory

II. COURSE DESCRIPTION

The course provides the student with the basic statistical language, as well as the basic knowledge of statistics for its application in the various sectors, addresses the tabular and graphical representation of the data, the description through the main measures of central tendency, dispersion, position, By means of the most important statistical software. It also bases the statistical task using the concept of probability. In the application of the concepts, methods and techniques of descriptive and differential statistics to describe and analyze groups of data and variables through their relevant statistical parameters.

III. COURSE OUTCOMES

At the end of this course students will be able to:

1. Knows, and correctly applies the basic terms of the statistical language (Population, sample, parameter, statistic and variables)
2. Organizes and tabulates the data for analysis and interpretation
3. Calculates and interprets the basic statistical properties of the data (mean value and variance).
4. Determines and explains the location of a data within the total set (Position Measures: quartiles, deciles, percentiles and other fractiles)
5. Determines and explains the form of data distribution (obtaining the asymmetry, kurtosis and concentration of the data)
6. Determines, explains and interprets the probability of various events.
7. Apply the concept of probability to solve various problems using the normal curve.

IV. LEARNING UNITS

1. INTRODUCTION TO STATISTICS

Statistic / Population, Parameter / sample and Statistician / Variable, Classification of variables / Experiment / Summations

2. DATA PRESENTATION / 8 HOURS

Data distribution tables / Graphical representations: Bars, circular sectors, radial, linear, histograms and pictograms.

3. OBTAINING BASIC STATISTICAL MEASURES

Measures of central tendency: average, median, Fashion / Measures of dispersion: variance, standard deviation, coefficient of variation / Position measurements: quartile, decile, percentile, Box diagrams / Measures of form: Asymmetry, Curtosis and Concentration.

4. PROBABILITY / 8 HOURS

Probability / Counting methods / Addition and multiplication rules / Permutations and combinations / Random experiments, sample space and events / Events operations / Probability conditional / Total probability / Bayes theorem / Tree diagram / Independent events / Discrete variable pattern distribution : The Bernoulli and Binomial / Normal Distribution and management of areas under the curve..

V. LABORATORIES AND PRACTICAL EXPERIENCES

- L1: Presentation of the use of the software to be used: Minitab, R or SPSS
- L2: Managing software to find sums and products
- L3: Obtaining different tables and graphs with Minitab, R or SPSS,
- L4: Finding the histogram of frequencies, polygons and warheads in Minitab, R or SPSS,
- L5: Obtaining the measures of central tendency in Minitab, R or SPSS
- L6: Obtaining the dispersion measures in Minitab, R or SPSS. Several exercises.
- L7: Finding quartiles, deciles and percentiles in Minitab, R or SPSS
- L8: Finding asymmetry and kurtosis measurements in Minitab, R or SPSS
- L9: Ratio of frequency distribution to probability
- L10: Events algebra applications
- L11: Applications of Counting Techniques
- L12: Uses of Independence and Probability
- L13: Management of areas under the normal curve
- L14: Applications of the Bernoulli distribution

VI. METHODOLOGY

The course is developed in sessions of theory, practice and computer lab. In theory sessions, the teacher presents concepts, theorems and applications. In the practical sessions, various problems are solved and their solution is analyzed. In laboratory sessions a general purpose statistical software such as Minitab, R or SPSS is used. To solve problems that require intensive calculation of data. At the end of the course the students present a group work that integrates the learned of a real case (no more than 05 students). In all the sessions the active participation of the student is promoted.

VII. EVALUATION FORMULA

Evaluation System "I". Calculation of Final Average: $PF = (1 EP + 1 EF + 2 PP) / 4$
EP: Partial Exam EF: Final Exam PP: Average of the qualified practices.

VIII. BIBLIOGRAPHY

1. ANDERSON, SWEENEY AND WILLIAMS (2011) ESSENTIAL STATISTICS for Business and economy. Sixth edition. South Western CENGAGE Learning.
2. MONTGOMERY AND RUNGER (1996) PROBABILITY AND STATISTICS Applied to Engineering. McGraw Hill. Interamericana Editorial S.A de C.V Mexico.