



STATISTICS A - L

SECS-S/01 - 9 CFU - 1° Semester

Teaching Staff

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LEARNING OBJECTIVES

1. **Knowledge and understanding:** The course provides basic concepts in statistics (summary statistics, probability calculus, statistical inference, linear statistical modelling). These essential tools of statistics theory are applied for data analysis in business and economics.
2. **Applying knowledge and understanding:** The student has to be able to perform basic statistical analyses of data in the areas of business and economics, using both descriptive and inferential statistical tools, as well as linear regression models.
3. **Making judgements:** The student has to be able to select the appropriate statistical tools to analyse data and draw conclusions based on the results of suitable statistical analyses.
4. **Communication skills:** The student is expected to learn the technical language needed to understand/write properly a statistical report in the areas of economics and business.
5. **Learning skills:** Ability to understand the logic of the statistical reasoning in the areas of business and economics, in connection with the objectives of the Economics degree.

COURSE STRUCTURE

Lectures.

DETAILED COURSE CONTENT

Simple Statistical Distribution. Data tables. Numerical and categorical data. Frequency distributions. Frequency density. Statistical ratios and index numbers. Arithmetic mean, geometric mean, harmonic mean. Median and percentiles. Variation. Variance, standard deviation, Relative variation: variation coefficient. Concentration. Box-plot. Asymmetry.

Multiple Statistical Distributions. Contingency Tables. Joint distributions, marginal and conditional distributions. Means and variance of marginal and conditional distributions. Association between statistical variables. Covariance and correlation.

Probability. Events. Probability. Rules for probability. Conditional events. Conditional probability. Independent events. Random variables. Association between random variables. Probability models for count data: uniform, Bernoulli, binomial, hypergeometric, Poisson, Gaussian.

Statistical inference. Sample distributions: Student-t. Point estimation. Properties of estimators. Methods of estimation: method of least squares, maximum likelihood estimation.

Confidence estimation. Confidence level. Confidence bounds for means, variances, proportions. Hypothesis testing. Null hypotheses and alternative hypotheses. Types of errors in testing hypothesis. Test rules. Significance level. Power of a test. Statistical tests for means and proportions.

Statistical models. The simple regression model. Goodness of fit. Analysis of the Residuals.

TEXTBOOK INFORMATION

Newbold, P., Carlson, W.L. and Thorne, B. (2013), *Statistics*, Pearson-Prentice Hall.
