

Course Title: Statistics II: Inference and Regression

Course Unit Code: 9068
Level of course: Undergraduate
Year of study: 1st year
Semester/trimester: Spring (2nd Semester)
Number of credits allocated: 6 ECTS credits
Name of lecturer: To be announced

Objectives of the course:

By completing the course the students will be able to:

Learn the fundamentals in statistical inference allowing them to understand which type of analysis is necessary and how it can be correctly implemented.

Learn about the theory and the accurate practice of regression analysis.

Prerequisites and co-requisites

Knowledge of Probability and (point/interval) Estimation Theory.

Recommended optional programme components

None

Course contents

Hypothesis testing, statistical hypothesis, test statistic, testing hypotheses for population parameters such as: means, proportions, variances, mean difference in two populations. Significance level, p-value, power of a statistical test, sample size calculation. Introduction to regression, simple linear model, statistical linear model, normal linear model. Inference in the normal linear model: confidence and prediction intervals, hypothesis testing. Transformations, residuals and diagnosis of violations of the linear model assumptions. Multiple linear model, variable selection, forward, backward, stepwise, all possible regressions, model selection with information criteria: AIC, BIC, Mallows Cp. One factor Analysis of Variance (ANOVA). Applications in R.

Recommended or required reading

- “An Introduction to Probability and Statistical Inference”, by G. Roussas, 2nd edition, 2014, Academic Press
- "Statistical Inference" by G. Casella and R.L. Berger, 2nd edition, Duxbury Press, 2001
- “Applied Linear Regression”, by S. Weisberg, 3rd edition, Wiley 2005
- “An R Companion to Applied Regression”, by J. Fox and S. Weisberg, 2nd edition, SAGE Publications Inc, 2011.

Planned learning activities and teaching methods

Teaching in Class

Assessment methods and criteria

Written final exam, Assignments