

STATISTICS FOR ENGINEERS

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Program:

The course is an introduction to statistical methods most frequently used for experimentation in Engineering. Lectures are planned both in the classroom and in computer lab also for an introduction to the use of the following statistical software:

- R
- MINITAB (licensed to University of Padova)
- RapidMiner

Topics:

1. Elements of univariate statistical methods:
 - a. Elements of descriptive statistics: frequency, indices of synthesis (position, variability and shape) and graphical representations (histogram, boxplot, scatterplot).
 - b. Elements of probability theory: discrete and continuous probability distributions.
 - c. Elements of statistical inference: sampling distributions, point and interval estimation, hypothesis testing, One-way ANOVA.
2. Linear and non-linear regression models:
 - a. Simple and multiple linear regression model
 - b. Logit model
3. DOE: Introduction to Factorial Designs, Two level and general factorial designs. Tutorials in MINITAB.
4. Supervised Machine Learning algorithms for regression (multiple linear regression model - review) and classification (logistic regression).
Unsupervised Machine Learning algorithms. Introduction to RapidMiner, Applications. Introduction to R, Applications.

References:

1. Stark, P.B., 1997. SticiGui: Statistics Tools for Internet and Classroom Instruction with a Graphical User Interface.
2. Montgomery DC, Design and Analysis of Experiments, 2010, Wiley.
3. Lattin J, Carroll JD, Green PE, Analyzing Multivariate Data, 2003, Duxbury Applied Series.
4. Adhoc material by Lecturer.

Examination and grading:

Attendance is required for at least 2/3 of the lecture hours. Final evaluation will be based on the discussion of a case study within the individual PhD project.

Course details:

Summer School that will be held in Monguelfo from 24 to 30 of June 2023 and 2 on-line lectures on 3 and 10 of February 2023.

Summer School lessons will be delivered in “casa Paul Troger/ Paul Troger Haus” (Via Paul Troger, 31 Monguelfo-Tesido) while meals and accommodation will be at “Villa San Giuseppe” (via del Sole, 1 Monguelfo-Tesido).