Multivariate data analysis

Lecturer
Mehrdad TERATANI (Coordinator)

Course mnemonic
STAT-H400

ECTS credits
5 credits

Language(s) of instruction
English

Course period
First term

Campus
Solbosch

Course content

This course contributes to several skills such as managing, exploring and analyzing medical data (medical records, imaging, genomics, statistics). To achieve those skills, the course will consist of two main parts: theoretical courses and practical exercises. Statistical tools are taught through a theoretical course, step by step from a review on the important statistical background that students should know, to advanced tools that are the main targets of the course. Through exercise sessions students learn the know-how in order to extract analytical discussion given raw data using unsupervised and supervised statistical analysis. The course detailed content will be as follows:

1. Reminders on basic statistical tools
2. Reminders on two-dimensional statistical tools
3. Hypothesis tests and their applications
4. Introduction to multivariate data analysis
5. Introduction to unsupervised methods
6. Introduction to supervised methods

Objectives (and/or specific learning outcomes)

1. Understanding the theoretical course by: Monitoring students' progress through short assignments, which can be small theoretical quizzes, or a review report on a topic taught in the lecture.
2. Extracting relevant information from data through practical exercises by: Use of statistical tools (visualization, hypothesis tests, discussion and understanding) and multivariate data analysis (factor analyses, clustering, classification and regression); and correct interpretation of the results provided by these tools. Currently, "STATISTICA", as an advanced analytics software package, is used in the course. This software will be gradually replaced with "R programming language".

Pre-requisits and co-requisits

Required knowledge and skills

MATH-H-2002: Calcul des probabilités et statistiques or equivalent [https://www.ulb.be/fr/programme/math-h2002]

Teaching method and learning activities

Teaching in English: Courses (with illustrations on biomedical data) and exercises on real databases using statistical software.

- Classroom teaching will be conducted. When needed, the course will be conducted online.
- There will be short assignments during the theoretical part.
- Submission of the exercises report.

Contribution to the teaching profile

This teaching unit contributes to the following skills:

- Manage, explore and analyze medical data (medical records, imaging, genomics, statistics)

References, bibliography and recommended reading

- J.H. Zar: Biostatistical analysis. Prentice Hall International.
- S. Siegel, N.J. Catellan: Nonparametric Statistics for the Behavioral Sciences. McGraw-Hill International Editions.
- L. Lebart, A. Morineau, M. Piron: Statistique exploratoire multidimensionnelle. Dunod.
- Duda, Hart et Stork, Pattern classification, John Wiley et Sons.

Course notes

Université virtuelle

Other information

Place(s) of teaching

Solbosch

Contact(s)

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Evaluation method(s)

Oral examination and Written report

Evaluation method(s) (additional information)

A period for preparation of the theoretical question without support is foreseen.

Determination of the mark (including the weighting of partial marks)

A theoretical question (0.5) and a series of practical questions based on the exercises report (0.5).

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the Brussels School of Engineering

MA-IRCB | Master of science in Biomedical Engineering | finalité Professional/unit 1