Multivariate data analysis

Titulaire
Mehrdad TERATANI (Coordonnateur)

Mnémonique du cours
STAT-H400

Crédits ECTS
5 crédits

Langue(s) d'enseignement
Anglais

Période du cours
Premier quadrimestre

Campus
Solbosch

Contenu du cours

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

Objectifs (et/ou acquis d'apprentissages spécifiques)

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. Any other programming language can be used.

Pré-requis et co-requis

Connaissances et compétences pré-requises

MATH-H-2002: Calculation of probabilities and statistics or equivalent

Méthodes d'enseignement et activités d'apprentissages

Theoretical courses, and exercises on real databases using statistical software (in English).

Contribution au profil d'enseignement

This teaching unit contributes to the following skills:

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

1 There will be short assignments during the theoretical part.
2 Submission of the exercises report.

Références, bibliographie et lectures recommandées

1) J.H. Zar: Biostatistical analysis. Prentice Hall International.

2) S. Siegel, N.J. Catellan: Nonparametric Statistics for the Behavioral Sciences. McGraw-Hill International Editions.

3) L. Lebart, A. Morineau, M. Piron: Statistique exploratoire multidimensionnelle. Dunod.

4) Duda, Hart et Stork, Pattern classification, John Wiley et Sons.

Support(s) de cours

Université virtuelle

Autres renseignements

Lieu(x) d'enseignement

Solbosch

Contact(s)

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Méthode(s) d'évaluation

Examen oral et Rapport écrit

Méthode(s) d'évaluation (complément)

Oral examination from question pool and written report:
1 A question from the pool will be randomly selected, and asked. The question pool will be shared in the UV. A period

for preparation of the theoretical question without support is foreseen.

2 Several questions will be asked from the exercise report.

Construction de la note (en ce compris, la pondération des notes partielles)

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

Langue(s) d'évaluation principale(s)

Anglais

Programmes

Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IRCB | Master : ingénieur civil biomédical | finalité Spécialisée/ bloc 1