



STATISTIC LAB

Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	SECS-S/02 (STATISTICS FOR EXPERIMENTAL AND TECHNOLOGICAL RESEARCH)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	EXPERIMENTAL AND APPLIED BIOLOGY
Curriculum	Bioanalisi
Year of study	1°
Period	1st semester (01/10/2019 - 14/01/2020)
ECTS	6
Lesson hours	72 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	GENTILINI DAVIDE (titolare) - 5 ECTS FAZIA TERESA - 1 ECTS
Prerequisites	
Learning outcomes	<p>The course is organized in lectures and computer exercises. The main objective of the course is to provide the theoretical skills and operational skills needed to manage and analyze data in the biological and biomedical field.</p> <p>The course aims to introduce students to the use of the open source R software for the management, analysis and graphical representation of the data. R is the most versatile statistical data analysis program used in science.</p>
Course contents	1- ANALYSIS OF TYPES OF STUDY, DESIGN OF THE STUDY AND

DATA COLLECTION

- a. CLASSIFICATION OF BIOMEDICAL STUDIES
- b. DEFINITIONS
- c. SAMPLING METHODS

2- INTRODUCTION TO THE R ENVIRONMENT FOR DATA ANALYSIS

- a. THE PROGRAMMING ENVIRONMENT IN R GENERAL
- b. THE MAIN OBJECTS OF THE ENVIRONMENT R

3- ANALYSIS OF RAW DATA, TABULATION OF DATA AND STATISTICAL INDICATORS

- a. PHASES OF STATISTICAL SURVEY
- b. FREQUENCY STATISTICAL TABLES
- c. THE STATISTICAL INDICATORS
- d. STATISTICAL SERIES
- e. CONCENTRATION MEASURES

4- DATA GRAPHIC REPRESENTATION

- a. DATA GRAPHIC DESCRIPTION AND ANALYSIS WITH R

5- STATISTICAL TESTS PARAMETRIC AND NOT HOW AND WHEN TO USE IT AND INFERENCE

- a. BIVARIATE ANALYSIS
- b. THE NORMAL DISTRIBUTION
- c. STATISTICAL TESTS
- d. STATISTICAL TESTS IN R PRACTICAL EXERCISES

6- THE STATISTICS AND THE BIOLOGY LABORATORY

- a. REGRESSION
- b. SCREENING SENSITIVITY AND SPECIFICITY OF A DIAGNOSTIC TEST, CURVE ROC AND BAYES THEOREM
- c. PRINCIPLES OF STATISTICS APPLIED TO GENETICS

Teaching methods

Lectures and practical exercises on the computer

Reccomended or required readings

Bland M. Statistica Medica, Ed. Apogeo 2009
Whitlock M.C., Schluter D. Analisi statistica per dati biologici, Ed. Zanichelli 2010
Villani S., Borrelli P. "Excel & Statistica Medica", Ed. Medea, 2013
La metodologia statistica nelle applicazioni biomediche , Rossi C., Serio G., Sprinter, Berlino, 1990.

Assessment methods

The exam will be performed on the computer and will consist of a series of exercises for the part of analysis and visualization of the data and a series of multiple choice questions related to the theoretical part.

Further information

Sustainable development goals - Agenda 2030

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