BIOSTATISTICS AND METHODOLOGY OF RESEARCH

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	MED/01 (MEDICAL STATISTICS)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOTECHNOLOGY
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	1st semester (01/10/2021 - 14/01/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	VILLANI SIMONA (titolare) - 6 ECTS
Prerequisites	The course of Biostatistics and methodology of research is an essential part of is an essential part of the Biotechnologist's training who will have to carry out own activity in the field of biomedical research. To best follow the course the student must have acquired an adequate mathematical and statistical preparation..
Learning outcomes	The course aims to develop the knowledge for proper planning, conducting and analysis of experimental research in the biotechnology field. Both the methodological principles for the proper planning of such studies and the theoretical-practical tools for biostatistics analyses and the interpretation of the results deriving from them will be provided. At the end of the course the student will be able to apply the drafting of experimental research protocol in the field of biotechnology, to carry out analyses of data from experimental studies and to interpret them critically. The student will have to explain the knowledge and skills

	acquired, knowing how to change their action according to the experimental situations proposed
Course contents	The program of course is composed by two part. 1st Part: methodology of research (16 hours) Experimental, experimental and observational epidemiological studies: starting points. How to ensure the validity of a study: - definition of bias - role of bias - bias control. The protocol of experimental research on human and animals: which are the essential points and how to lay it out. The protocol of observational case-control study and cohort study. Overview of the regulations on the Ethical Boards. 2nd Part: Biostatistics (32 hours) 1. Introduction to Excel use. 2. Descriptive statistics: - how compute and interpreter the main descriptive statistics for quantitative variables - pivot tables for one variable or crossing two variables - correlation coefficient - graphics 3. Inferential statistics: - Parametric unpaired and paired t-test. - Test on homogeneity of variance. - Oneway analysis of variance. - Chi-squared test. - Linear regression model - non parametric test.
Teaching methods	The teaching activity includes theoretical lectures and practical exercises applied to questions research to help the students in acquiring the skills necessary for planning new studies, conducting the statistical analyses, developing in them the critical sense. During practical lectures, students will be introduced to statistical analyses using Excel tool.
Reccomended or required readings	- Fondamenti di ricerca clinica. 2004. Springer Verlag - MC Whitlock, D Schluter. Analisi statistica dei dati biologici. 2010, Zanichelli (with elements both of Research Methodology and Biostatistics). e-book available - Triola, Triola. Fondamenti di Statistica per le discipline biomediche. 2017, Pearson (with elements both of Research Methodology and Biostatistics). e-book available - Daniel, Cross. Biostatistica. 2019, Edises. (with elements of Biostatistics). e-book available For the applied statistics in Excel:

	- Villani, Borrelli. EXCEL & Statistica Medica. Quaderni di Epidemiologia. 2013, Medea. e-book available. Additional material for individual study will be uploaded to the Kiro platform.
Assessment methods	The final examination is composed by written and oral test with problem solving approach. Only if 18/30 is achieved in the written test, it is possible to make the oral section. The result of the written part contributes for 67% to the final grade, while that of oral examination contributes for 33%. In the written part using laptop, the student must demonstrate not only the ability to know and apply the correct techniques of analysis (knowledge and skills), but to be able to interpret the results obtained and communicate in a scientifically correct way the evidence found (competence). In the oral examination which follows the written one, the student must demonstrate to have acquired both the adequate theoretical knowledge underlying the planning of a research protocol and the ability to write (knowledge and skills) and / or critically evaluate (competence) a research protocol applying it to the assigned project work at the end of lessons. The examination will be divide in two distinct part contributing with a different weight to the final written and performed using personal computer (problem solving approach).
Further information	The plan of the course is based on practical section using personal computer. So to each student is required to have a laptop with Excel.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile