BIOSTATISTICS

CU characterization:

CU name:
Biostatistics

Scientific area acronym:
SI

Duration:
Semiannual

Working hours:
78

Contact hours:
26

ECTS:
3

Observations:
Mandatory CU

Teacher in charge and respective teaching load in the CU:
Luzia Gonçalves – 36 hours

Other teachers and respective teaching load in the CU:
N/A

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

1. Understand the importance of statistics at the beginning of the design of biomedical research projects.
2. Know the sampling methods, emphasizing random methods.
3. Calculate, interpret and summarize the results of descriptive statistics and exploratory data analysis, organizing them according to the type of scientific publication.
4. Perform and critically interpret the results of statistical tests (parametric and non-parametric) and construction of confidence intervals, emphasizing the verification of their assumptions.
5. Identify situations of application of linear regression and logistic regression models.

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Syllabus:

Statistics in Biomedical Sciences. The importance of random sampling. Definition and classification of variables. Collection and computerization of data. Exploratory data analysis and descriptive statistics.

Statistical inference: Parameters, statistics and sample distributions; Point estimation and confidence intervals - mean values and proportions. Alternative methods of constructing intervals in the study of prevalence, sensitivities and specificities of laboratory techniques; concepts about parametric and non-parametric hypothesis testing; sample size calculation.

Comparison of populations from independent samples: assumptions of parametric tests: Kolmogorov-Smirnov, Shapiro-Wilk and Levene tests; T test vs Mann-Whitney-Wilcoxon test; Analysis of variance vs Kruskal-Wallis test. Multiple Comparisons, Chi-Square test for homogeneity (and independence); correlation and linear regression; introduction to logistic regression.

Teaching methodologies (including assessment):

The total contact hours (26 hrs.) will be divided into theoretical classes, theoretical-practical classes, tutorial sessions and assessment. The total number of students working hours is estimated at 78 hours. In theoretical-practical classes, statistical programs are used (SPSS, EpiTools or others) and other online resources and platforms are used (e.g. Moodle).

Attendance of 2/3 of the classes is mandatory. The assessment is carried out through an exam that includes multiple-answer, true/false and other developmental questions, lasting two hours.

References for consultation / mandatory existence:

- Altman, D. (2002) Poor-quality medical research. Journal of the American Medical Association, 287(21), 2765-2767.
- Armstrong, R.A., Hilton, A.C. (2010) Statistical Analysis in Microbiology: StatNotes. Wiley-Blackwell.
- Daniel, W.W. (2004) Biostatistics: a foundation for analysis in the health sciences. John Wiley & Sons, 8th Ed.
- Harrell, F. E. (2001) Regression Modeling Strategies with Applications to Linear Models, Logistic Regression, and Survival Analysis. Springer.
- Sheskin, D. J. (2007) Handbook of Parametric and Nonparametric Statistical Procedures. Chapman & Hall/CRC. 4th Ed.