BIOMATHEMATICS, COMPUTING and DOCUMENTATION

Study programme: MIMV **Curricular Year 1st** **Semester 1st** **Compulsory** **ECTS: 5**

Lecturers: Mª Isabel F. Neto C. Fonseca (CCP/R)

1. Contact hours: Lectures – 26; Practical - 26

2. Objectives:
At the end of the course, the student should be able to: use statistical methods to summarize data and perform exploratory data analysis; recognize assumptions and conditions underlying the applicability of the theoretical models used for statistical analysis; analyze and interpret the results; distinguish between cause-effect relationships and statistical association between variables; demonstrate basic research skills and critical reading of technical and scientific documentation; use the computer for: (a) word processing, construction of tables and graphs (b) store, capture, process and analyze data in spreadsheet programs and statistical application software (c) search for documentation on the Internet and online bibliographic databases.

3. Programme:
Theoretical: Descriptive methods and exploratory data analysis. Probability. Bayes' theorem applied to diagnostic tests. Probability distributions. Central Limit Theorem. Sample distributions of statistics. Hypothesis testing and estimation of confidence intervals. Type I and Type II errors. Power of a test. Parametric tests (t-tests and ANOVA-1 factor). Nonparametric tests for quantitative variables. Comparison of proportions. Goodness of fit, independence and homogeneity tests based on the chi-square distribution. Methods for bivariate quantitative data (scatterplots, Q-Q plots, covariance, Pearson correlation, and Spearman correlation. Simple linear regression (estimation of predicted values and associated errors). Introduction to sampling methods and experimental design.
Practical: use of hardware and software (Word, Excel, and SPSS) to solve problems and apply theoretical concepts; search for technical and scientific documents in bibliographic databases and application of citation and bibliography referencing styles.

4. Bibliography:

- Petrie A, Watson P. 2013. Statistics for veterinary and animal science. 3rd edition. Wiley-Blackwell.
- Pestana MH, Gajeiro JN. 2014.Análise de dados para ciências sociais – a complementaridade do SPSS. 6ª edição. Edições Sílabo.
- Lang TA, Secic M. 2006. How to report statistics in medicine: annotated guidelines for authors, editors and reviewers. 2nd edition. Philadelphia: American College of Physicians.

5. Assessment:
Students will be assessed by an individual written exam, at the end of the semester (55% of the final grade) and by the continuous evaluation of the practical component (45% of the final grade) which includes the following group work activities: (i) a written report of an exploratory data analysis and (ii) a video presentation of the results.