



University of Nicosia, Cyprus

Course Code BIOL-231	Course Title Biostatistics	ECTS Credits 6
Department Life and Health Sciences	Semester Fall	Prerequisites none
Type of Course Required	Field Biostatistics	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 2 nd	Lecturer Dr. Pouloukas Stavros
Mode of Delivery face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

This course will introduce biology and allied science students to statistical methods with emphasis on the application of statistical ideas to the design and interpretation of biological experiments and comparative data. The objectives of the course are to:

- Use examples, graphical and numerical data to discuss the concepts of randomness and probability with emphasis on variations.
- Teach the procedures and calculations needed to statistically analyze the results of experimental data.
- Train students on how to assess the nature of a biological question involving data analysis, formulate the null and alternative hypotheses, decide on the statistical procedure to use and on the assumptions to be made.
- Use examples from the health sciences fields for practice in applying statistics, assessing statistical significance and drawing conclusions.
- Train students on the use of statistics software through practice on examples derived from biological questions.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Define a hypothesis and differentiate the statistical concepts and statistical procedures to be used in descriptive and quantitative data.
2. Apply statistical calculations to solve problems based on biological studies.
3. Design biological experiments (single and two factors) and analyze using both parametric and non-parametric methods to test hypotheses.

4. Use goodness-of-fit and contingency hypotheses.
5. Calculate least-squares regression lines of biological data.
6. Use EXCEL and SPSS to compute descriptive, correlational, and analysis of means statistics.

Course Contents:

1. Introduction to statistics; data types and data coding (accuracy, precision, significant Figures frequency distribution)
2. Sampling, variables and Data; Continuous variations, Populations and samples
3. Descriptive Statistics: Central tendency, dispersion, variability
4. Probability Distributions I (Binomial, Poisson, Normal)
5. Probability Distribution II (normal: parameters, table, sampling, SE)
6. Statistical inference, Student's t-test
7. Two-sample hypothesis; t-tests: paired and unpaired
8. Non-parametric two-sample test; Goodness of fit
9. Hypothesis testing for relationships between two variables; correlation, regression
10. Multiple Regression I
11. Multiple Regression II
12. Understanding reliability and validity
13. Basic ANOVA; 2-way ANOVA; multi-way and nested ANOVA

Learning Activities and Teaching Methods:

Lectures; statistics problem solving exercises using EXCEL and the SPSS programs. Independent and cooperative activities on designing biological experiments for statistical analysis.

Assessment Methods:

Assignments, Quizzes, Mid-term Exam; Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
1. Daniel W.W.	Biostatistics (Basic Concepts and methodology for the Health Sciences)	Wiley	2010, 9 th ed.	ISBN: 978-0-470-413333
2. N.J. Salkind	Statistics for People Who (Think They) Hate Statistics with SPSS Student Version 13.0	Sage Publications, Inc.	2005, 2 nd ed. Bk & C	ISBN:1412917948

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
1. J. H. Zar	Biostatistical Analysis	Prentice Hall	2006, 5 th ed.	ISBN:0131008463
2. . Stanton A. Glantz	Primer of Biostatistics	McGraw-Hill Medical	2005, 6 th ed.	ISBN:0071435093