COURSE OUTLINE

(1) GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	BIOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BIO_BY01	**SEMESTER**	2nd
COURSE TITLE	BIOSTATISTICS		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
Lectures and Computer Laboratory	4	8
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	http://www.math.upatras.gr/~vpiperig/Biostatistics/index.html

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

With this course a student acquires the ability to select from, use and interpret results of, descriptive statistical methods effectively. He/she demonstrates understanding of the role of sampling distributions in testing hypotheses and of the interpretation of p-values. He/she can select appropriate types of statistical tests for practical problems. He/she becomes familiar with existing statistical methodologies such as parameters estimation, confidence intervals, hypothesis testing using parametric and non-parametric tests and linear regression.

On successful completion of the course a student will be able to: understand the central concepts of statistical theory and their probabilistic foundation; make appropriate use of statistical software; communicate the results of statistical analyses accurately; read and learn new statistical procedures independently.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Adaptation to new situations
- Decision making
- Autonomous Work
- Work in an interdisciplinary environment
- Exercise of criticism and self-criticism

Promotion of free, creative and inductive thinking

(3) SYLLABUS

- Introduction to the Theory of Probabilities
  Definition of probability, events, conditional probability, independence, theorem of total probability, Bayes theorem. Random variables (discrete, continuous), commonly used distributions (Bernoulli, binomial, Poisson exponential, normal), moments, central limit theorem.
- Introduction to Statistics
  Descriptive statistics, graphical representation of data, measures of location and dispersion, sampling techniques. Estimation, confidence intervals for the parameters of one population (mean & variance, percentage) or two independent populations (difference between two means, ratio of variances, difference between two percentages). Test of hypotheses for these parameters. Pearson's χ^2 test for goodness of fit, contingency tables for testing independence and heterogeneity. Regression model, parameter estimation, predictions.
- Computer Laboratory
  During the course, the concepts that are introduced in class are subsequently studied in practice in the computer lab, using the statistical package SPSS.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Lectures (face to face)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>1. In-class slides
2. Post-class support of the course via the web page and the computer Laboratory of the Department of Mathematics</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Computer Laboratory</td><td>13</td></tr>
<tr><td>Solving suggested exercises</td><td>70</td></tr>
<tr><td>Hours of personal study by the student</td><td>72</td></tr>
<tr><td>Final examination</td><td>6</td></tr>
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<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>200</td></tr>
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</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Assessment Language: Greek
Assessment Language for Erasmus students: English

Assessment methods
Final exams (100%) that includes
✓ Exercises

Minimum passing grade: 5
Maximum passing grade: 10</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

(in Greek)

- Κολυβά - Μαχαίρα, Φ., Μπόρα – Σέντα, Ε. (2013). *Στατιστική, Θεωρία και Εφαρμογές,* 2η Έκδοση, Εκδόσεις Ζήτη
- Παπαϊωάνου, Τ., Λουκάς, Σ.Β. (2002). *Εισαγωγή στη Στατιστική,* Εκδόσεις Σταμούλη

(in English)

- Zar, J.H. (2010). Biostatistical analysis (fifth edition), Prentice-Hall International

Sokal, R.R., and Rohlf, F.J. (2009). Introduction to Biostatistics, New York: Dover publications

- Related academic journals: