BIOSTATISTICS

General Medicine

Division of Biomathematics

Subject: BIOSTATISTICS
Year, Semester: 1st year/1st semester
Number of teaching hours:
Seminar: 28

Requirements

1. Aim of the course:

The aim of the subject is to give an introduction to biostatistical methods, which can be used in different branches of medicine to solve biostatistical problems and to evaluate experimental results. In addition, providing a solid theoretical foundation the course will also introduce the students to the art and science of performing the simplest calculations.

2. Short description of the course:

Mathematical introduction to the biophysics and biostatistics course (functions, plotting measurements data, fitting, determination of slope, area under the curve, integration). Set theory. Probability, conditional probability, marginalization, Bayes' theorem. Descriptive statistics (determination of mean, median, mode, standard deviation from data set; construction of histograms, box and whisker plot). Discrete and continuous random variables; cumulative distribution function, density function. Binomial, Poisson, normal, and standard normal distribution. Sampling techniques and characterization of samples; biased and unbiased estimate, the central limit theorem. Hypothesis testing (z, t, F and chi2 tests). Clinical implications of conditional probability; diagnostic methods with a statistical approach, epidemiologic investigations (relative risk, odds ratio, Kaplan-Meier curve).

3. Type of the exam:

Colloquium (written). The final exam can be taken during the exam period of the second semester, but only for those students whose signing of the lecture book has already been accepted.

4. Requirements for the Biostatistics course:

4.1. Lectures, seminars:

Attendance to lectures is not mandatory but strongly recommended. At the end of three lectures students write an electronic test of up to 5 minutes (containing true-false questions, multiple choice questions, etc.), related to the topics of the given/actual lecture for earning bonus points.

Seminars will be held for each group separately. During seminars the lecture topics will be discussed in more detail and sample problems, calculations will be solved. Attendance to seminars is mandatory. During the semester on three seminars students write an electronic test of up to 15 minutes for earning bonus points. Bonus points earned by the electronic tests written both in the lectures and seminars are added to the test result of part B of the final exam and/or the grade-offering test (only to part B, see section 4.3). Maximum 10 bonus points can be earned.

Students who complete the colloquium at the end of the second semester as part of the examination course will not be entitled to the bonus points, even if they have already completed the course and have a valid signature (see section 4.3).

4.2. Conditions for signing the lecture book:

Signing of the lecture book is denied if there are more than 2 absences from groupwise seminars. No certificates, including a medical certificate, are accepted for the absences. Making up for missed classes is not possible.

4.3. Grade-offering course test and final exam:

Students will write a grade-offering course test between weeks 12-13. The structure and the evaluation of the grade-offering test will be identical to that of the final exam. The grade-offering test does not count as an A chance exam, writing it is not mandatory. Writing the grade-offering test is only possible at the appointed time and there will not be any alternative appointments for writing it.

Usually, exams will be held once a week during the exam period. The exam is written.

Structure of the grade-offering test and the final exam:
•part A: minimum requirement questions and short calculations (descriptive statistics, binomial and Poisson distribution, normal distribution, etc.). Maximum score of part A is 40 points.
•part B: test questions (true or false questions, simple- and multiple-choice questions, fill-in questions etc.), calculations, graphs. Maximum score of part B is 100 points (without bonus points).

Evaluation of the grade-offering test and the final exam:
•If the score of part A is less than 75% (30 out of 40 points), the student fails the grade-offering test or the final exam. Bonus points earned by tests written in the lectures and seminars are not added to the result of part A.
•If a student passes part A (i.e., the score is larger than or equal to 75%) on an exam or the grade-offering course test, the result is valid for his/her subsequent exam chances, i.e., part A does not have to be retaken. But the exemption from retaking part A of the exam is not valid for repeated courses or exam courses, that is the exemption from retaking part A is valid only in the 1st semester.
•If the result of part A is less than 75%, part B is not evaluated.
•If the student passes part A, bonus points are added to the score of part B (max 100 points). Based on this final score (FS), that does not include the points earned in Part A, the following grades are offered:

- FS<60   fail (1)
- 60≤FS<70   pass (2)
- 70≤FS<80   satisfactory (3)
- 80≤FS<90   good (4)
- 90≤FS   excellent (5)

Evaluation of the grade-offering test and the final exam is identical.
A grade of 2 (pass) or better achieved on the grade-offering test is valid for the final exam.
The bonus points earned by tests written in the lectures and seminars and the exemption from retaking part A of the exam are only valid for the course in which they have been achieved, i.e., they are not valid for repeated courses or exam courses.
The grade of the grade-offering test or the final exam can be corrected only once, but in this case the final grade is determined by the result of the re-written test.

4.4. Rules for C chance exams:
Evaluation of C-chance exams is performed according to the following table:

	Result of part B is a fail	Result of part B is above the passing level

Result of the minimum require-ment questions (part A) is a pass ($\geq 75\% = 30p$)	final exam grade: FAIL	exam grade is according to the result of the 'B' test (see 4.3)
Result of the minimum require-ment questions (part A) is a fail, but at least 65% (≥ 26 p)	final exam grade: FAIL	oral exam
Result of the minimum require-ment questions (part A) is less than 65% (< 26 p)	'B' test not scored, final exam grade: FAIL	

5. Reading materials:

- Educational material published on the eLearning platform of the course can be downloaded as pdf format (elearning.med.unideb.hu – Department of Biophysics and Cell Biology/English Courses/1st semester/Biostatistics – AOBIST02T1)
- Wayne W. Daniel: Biostatistics, A foundation for Analysis in the Health Sciences, John Wiley&Sons

6. Recommended reading material:

- Practice problems in biostatistics (editors: Zoltán Varga and Tibor G. Szántó). University of Debrecen, Department of Biophysics and Cell Biology, Division of Biomathematics, 2022, ISBN 978-963-490-459-5. It can be downloaded as pdf format (elearning.med.unideb.hu – Department of Biophysics and Cell Biology/English Courses/1st semester/Biostatistics – AOBIST02T1)

7. Exemptions:

Requests for exemptions from the biostatistics course must be turned in to the Credit Transfer Committee. Such requests cannot be directly turned in to the Biomathematics Division or the Department of Biophysics and Cell Biology.

8. Information for repeaters:

For repeaters the attendance on seminars is not compulsory. Students repeating the course are subject to the same rules and requirements as those taking the course for the first time.

9. Rules for calculators:

Rules for calculator usage during course tests and the final examination. To ensure a fair evaluation, to avoid disturbances in the testing room, and to protect the security of the test material the following types of calculators are NOT permitted:
- calculators with built-in computer algebra systems (capable of simplifying algebraic expressions)
- pocket organizers, handheld or laptop computers
- any device capable of storing text. Calculators with a typewriter keypad (so-called QWERTY devices), electronic writing pads and pen-input devices are not allowed either. Calculators with letters on the keys (e.g., for entering hexadecimal numbers or variable names) are permitted if the keys are not arranged in QWERTY format.
- calculators or other devices capable of communicating with other devices
- calculators built into wireless phones
- calculators with paper tape or models that make noise

In general, students may use any four-function, scientific or graphing calculator except as specified above. Sharing calculators during tests is not allowed, and the test proctor will not provide a calculator.