MATEMATICS AND STATISTICS	
GENERAL INFORMATIONS	
Course coordinator	Assoc. Prof. Vesna Ilakovac, MEdMath, PhD
Assistant/Associate	Kristina Kralik, MEdMath
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	mandatory
Year of study, semester	1st year, 2nd semester
ECTS	**5**
Workload (hours)	Lectures: 25; Seminars: 15; Exercises: 25
Expected number of students	30

COURSE DESCRIPTION

Course objectives

To acquaint students with mathematical concepts and methods needed in further professional work, to improve students' logical and visual thinking and the ability to creatively solve problems. To acquaint students with types of data, basic statistical concepts and methods applied in the field of biomedicine and health care, and to provide students with the starting points for adopting advanced methods of biomedical data analysis and inference in statistics.

Enrolment requirements and entry competencies

High school level mathematics.

Learning outcomes at the Programme level

1.1, 2.6, 2.7

Learning outcomes at the course level

After completing lectures, seminars and exercises, independent study and passing the exam, students will be able to:

1. recognize and apply basic forms of mathematical terminology.
2. identify elementary functions and their essential features.
3. define the key concepts of mathematical analysis (convergence, continuity, derivation, integral) and interpret them using examples.
4. analyze the flow and display the graph of the function using differential calculus method.
5. recognize individual types of data and appropriate measurement scales for real problems, organize data, show their distribution, choose appropriate measures to describe given data and present them in a way that is appropriate for a real problem.
6. apply the basic rules of probability calculus and theoretical distributions in estimating the probability of a given problem.
7. calculate and interpret the standard error and confidence range of measurements on a given sample.
8. explain the concept of *P* value and make a conclusion about the result of a statistical test.

Course content

Lectures: 1. Sets of numbers. Vectors, scalar and vector product.2. Functions (domain and image, composition, inverse). 3. Elementary functions and periodicity. Limes and continuity. 4. Derivation of a function. Examining function. 5. Primitive function, indefinite and definite integral. 6. Types of data and measurement scales. Empirical distributions, describing the empirical distribution of data. 7. Probability, basic rules of probability. Theoretical distributions. 8. Sample and population. Estimation of population parameters. Statistical tests. 9. Analysis of contingency tables. Testing

differences of numerical data. 10. Correlation and regression. Comparison of two measurement methods.

Seminars and Exercises: 1. Sets of numbers. Vectors, scalar and vector product. 2. Functions (domain and image, composition, inverse). 3. Elementary functions and periodicity. Limes and continuity. 4. Derivation of a function. Examining function. 5. Primitive function, indefinite and definite integral. 6. Data types, data preparation for computer processing, data description. 7. Basic rules of probability. Application of theoretical probability distributions. 8. Estimation of population parameters. Software for data analysis, preparation and data entry. 9. Analysis of contingency tables. Testing differences of numerical data. 10. Correlation and regression. Comparison of two measurement methods.

Mode of teaching

Lectures, Problem solving seminars and exercises

Student obligations

Attending all forms of classes is mandatory, and the student must attend all knowledge tests. A student can excuse himself from 30% of classes.

Monitoring student work *(Connectivity of learning outcomes, teaching methods and grading)*

Methods of taking the exam: continuous monitoring, repeated exam at the exam period

Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Attending classes	0.25	1 - 8	Class attendance	Attendance record (min. 70%)	0	5
Exercises	0.75	1 - 8	Performing exercises	Homework presentation	10	15
Seminars	0.5	1 - 8	Preparation of seminar	Seminar presentation	4	10
1st partial exam	1	1 - 4	Studying for partial exam	Written exam	10	20
2nd partial exam	1	5 - 6	Studying for partial exam	Written exam	10	20
Final exam	1,5	7 - 8	Studying for final exam	Written exam	16	30
Total	**5**				**50**	**100**

Final grade:

Grade points earned in the final exam are added to the grade points earned during the course. Grading in the ECTS system is done by absolute distribution, i.e. based on total achievement and is compared to the numerical system in the following manner: A - excellent (5): 90-100 grade points; B - very good (4): 80-89.99 grade points; C - good (3): 65-79.99 grade points; D - sufficient (2): 50-64.99 grade points.

Repeated exam during the exam period

After the end of the semester in which the course is taught, repeated exams will be organized for students who did not pass the exam in the regular way, but have exercised the right to get the signature. Repeated exams will be organized according to the schedule of exam dates determined by the course plan.

The repeated exam covers the entire material and consists of a written exam. In the written exam, students can achieve a maximum of 100 grade points. The final grade is formed in the same way as with continuous monitoring.

Required reading (available in the library and through other media)

Title	Number of copies in the library	Availability through other media
Jukić D, Scitovski R. Matematika 1. Osijek: 2017.		http://www.mathos.unios.hr/images/uploads/707.pdf
Demidovič BP. Zadaci i riješeni primjeri iz matematičke analize. Tehnička knjiga Zagreb.	7	
Ivanković D. i sur. Osnove statističke analize za medicinare. Udžbenik. Biblioteka Udžbenici i priručnici Medicinskog fakulteta Sveučilišta u Zagrebu, 1988.	7	
Course material		Merlin E-learning system

Additional reading

1. Kurepa S. Matematička analiza I i II dio. Zagreb: Školska knjiga; 1997.
2. Ivo Pavlić : Statistička teorija i primjena, Tehnička knjiga,Zagreb 1970.
3. Daniel W.W. Biostatistics: a foundation for analysis in the health sciences. Udžbenik. John Wiley& Sons, Inc. 2013.

Course evaluation procedures

Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Medicine Osijek.

Note /Other

E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available on websites.