

**Course Syllabus****I. General Information**

Course name	Mathematics with statistics in biology
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BSc
Form of studies (full-time, part-time)	full-time
Discipline	Mathematics
Language of instruction	English

Course coordinator/person responsible	dr Armen Grigoryan
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Type of class ( <i>use only the types mentioned below</i> )	Number of teaching hours	Semester	ECTS Points
lecture	30	I, II	4
tutorial			
classes	30	I, II	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Knowledge of basic mathematics at the secondary school level
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**II. Course Objectives**

To acquaint the mathematical apparatus necessary for further education.
To familiarize students with the basic tools of higher mathematics.
To educate students of precise formulation of problems and their solutions.

### III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
<b>KNOWLEDGE</b>		
W_01	The student has a basic knowledge of mathematics necessary for further education.	K_W02
W_02	The student has a basic knowledge of statistics necessary for describing and interpreting biotechnological processes.	K_W03
<b>SKILLS</b>		
U_01	The student can solve basic problems in mathematical analysis and linear algebra.	K_U17
U_02	The student is able to draw the correct inference on the basis of data from different sources.	K_U18

### IV. Course Content

<p>Semester 1.            Functions. Sequences and series of real numbers. The Fibonacci sequence. Limit of a function at a point. Continuity. The derivative and its geometric interpretation. Extrema of functions. Indefinite integral. The Riemann definite integral and its applications. Matrices and determinants. Systems of linear equations.</p> <p>Semester 2.            Introduction to the theory of probability. Random variable and its distribution. Descriptive statistics: frequency distribution, histogram, measures of central location, standard deviation, quantiles. kurtosis, skewness. Introduction to the theory of inference: estimation theory, confidence intervals, tests of hypotheses. Elements of the statistical analysis of multidimensional measurements. Covariance. Correlation coefficient. Linear regression.</p>
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### V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods <i>(choose from the list)</i>	Forms of assessment <i>(choose from the list)</i>	Documentation type <i>(choose from the list)</i>
<b>KNOWLEDGE</b>			
W_01	Conventional lecture	I Semester, pass, II Semester exam	Evaluated test, protocol
W_02	Conventional lecture	I Semester, pass, II Semester exam	Evaluated test, protocol
<b>SKILLS</b>			
U_01	Practical classes	Test	Evaluated test, protocol
U_02	Practical classes	Test	Evaluated test, protocol

## VI. Grading criteria, weighting factors.....

### I Semester

#### Classes

Graded pass. 1 test – 100%

91% - 100% – 5.0

81% - 90% – 4,5

71% - 80% – 4,0

61% - 70% – 3,5

51% - 60% – 3,0

0% - 50% - 2,0

#### Lecture

Pass. 1 test – 100%

51% - 100 % passed

0% - 50% not passed

### II Semester

#### Classes

Graded pass. 1 test – 100%

91% - 100% – 5.0

81% - 90% – 4,5

71% - 80% – 4,0

61% - 70% – 3,5

51% - 60% – 3,0

0% - 50% - 2,0

#### Lecture

Exam – 100%

91% - 100% – 5.0

81% - 90% – 4,5

71% - 80% – 4,0

61% - 70% – 3,5

51% - 60% – 3,0

0% - 50% - 2,0

## VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	60
Number of hours of individual student work	40

## VIII. Literature

<b>Basic literature</b>
1. Edwards C.H., Penny D.E., Calculus with analytic geometry, Prentice Hall, 1998.
2. Freund J.E., Statistics, a first course, Prentice - Hall, INC., New Jersey, 1970.
3. Sincich T., Statistics by example, Dellen Publishing Company, Santa Clara, California 1982.
<b>Additional literature</b>
1. Zill D. G., Calculus with analytic geometry, PWS Publishers, 1985.