HIGHER MATHEMATICS AND PROBABILITY THEORY

<table>
<tr><td>Credit points</td><td colspan="3">6 CP</td></tr>
<tr><td>Duration of the course</td><td colspan="3">1st, 2nd semesters</td></tr>
<tr><td>Study course annotation</td><td colspan="3">The course provides the basic knowledge of higher mathematics and probability theory necessary for every student-economist, and also develops the skills needed in the construction of mathematical proofs and processing statistical data. During the study process, students should acquire such knowledge, skills and abilities that will allow them to use mathematical and statistical methods productively and creatively in special economic courses, to interpret the results of calculations made with the help of mathematical models.</td></tr>
<tr><td>Aim of the study course</td><td colspan="3">• Development of mathematical thinking, formal notations of geometric properties and relationships, including so that the necessary calculations can be used in economic disciplines;
• Learning the mathematical apparatus that is applicable in economic disciplines and used in economic literature;
• Learning mathematical methods of economic analysis, developing students' intelligence.
• types of maintenance and presentation of statistical information, as well as the most important statistical indicators describing the empirical distribution;
• the basics of probability theory, creating an understanding of the application possibilities of probability theory;</td></tr>
<tr><td rowspan="2">Study course results</td><td>Knowledge</td><td>Skills</td><td>Competences</td></tr>
<tr><td>1. Knows various concepts related to algebra and to probability theory questions - matrices, determinants, functions, polynomials.
2. Knows vectors and related things. Knows three different vector multiplications and their differences.
3. Knows various types of geometric figures - both in the plane and in space, their definitions and properties.
4. Knows the concept of a function and related things - composite function, inverse function, sequence of numbers, limits of</td><td>1. Can perform operations with matrices, determinants.
2. Able to solve LVS with several techniques.
3. Can multiply and divide polynomials.
4. Able to divide a rational part into partial parts.
5. Can perform operations with vectors. Able to solve problems related to vector multiplication.
6. From the given equation, you can determine plane and space figures. Can solve planimetry and stereometry problems.
7. Can create composite functions from basic functions. Can find the limits of various functions and number strings both by definition and by various properties of functions, number strings and also</td><td>1. Able to apply his knowledge in solving various problems related to mathematics.
2. Able to use the mathematical apparatus in solving scientific problems related to the profession, the student has acquired the ability to use mathematical methods in practice.
3. By successfully studying, the student acquires practical competence in mathematics as a tool for solving natural science problems, in mathematical methods as a tool in conducting research,</td></tr>
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	functions and sequence of numbers. 5. Knows the derivative of a function and its geometric interpretation.	limits. 8. Can find the derivative of a function both by definition and by basic formulas.	and in the connection between natural sciences and theoretical mathematics.

Study course content	**Topics**	
	1	Elements of financial mathematics
	2	Matrices. Determinants
	3	Systems of linear equations
	4	Functions. Borders
	5	Derivative
	6	Vectors, vector space
	7	Integral calculations
	8	Multi-argument function
	9	Differential equations
	10	Basic concepts of probability theory. Events. Elements of combinatorics. Definitions of probability
	11	Point estimates and interval estimates of distribution parameters
	12	Sampling methods. Sampling errors
	13	Statistical hypothesis testing
	14	Analysis of variance. Regression analysis
Form of assessment:	Differentiated written assessment, during which the teacher can ask questions	

Obligatory literature:

1. Fundamentals of Business Mathematics and Statistics (FMS). Foundation / The Institute of Cost Accountants of India (ICAI). - 2nd ed. - 2014. - 426 p.: fig., table.
2. Probability Theory. A First Course in Probability Theory and Statistics / Werner Linde. - Berlin: De Gruyter, 2010. - 395 p. - (+CD)
3. Probability, Random Processes, and Statistical Analysis / Hisashi Kobayashi, Brian L. Mark and William Turin. - Cambridge, University Press, 2012. - 780 p

Additional reading:

1. Mathematics of the financial markets. Financial instruments / Alain Ruttiens. - 2013. -351 p.
2. Discrete Mathematics and its Applications / Kenneth H. Rosen. - 6th ed. - McGraw-Hill, 2007. - 843

Other sources of information:

1. Electronic database of the BSA library (www.bsa.edu . lv):
2. EBSCO (ENG): http://search.ebscohost.com
3. Databases of the Latvian National Library http://www.lnb.lv).

Changes and additions to the program and literature list are possible during the study process