

Subject code	ECTS credits
MAT3001	6

Course title in Lithuanian

TIKIMYBIŲ TEORIJA

Course title in English

PROBABILITY THEORY

Short course annotation in Lithuanian (up to 500 characters)

Įgyjamos esminės tikimybių teorijos žinios, susipažįstama atsitiktiniais įvykiais, tikimybės apibrėžimu, tikimybe erdve, sąlygine tikimybe, atsitiktiniais dydžiais, daugiamačiais atsitiktiniais dydžiais, nepriklausomais atsitiktiniais dydžiais, pagrindiniais tikimybiniais skirstiniais, atsitiktinių dydžių skaitinėmis charakteristikomis, charakteringomis funkcijomis, didžiųjų skaičių dėsniumi, centrine ribine teorema.

Short course annotation in English (up to 500 characters)

Acquired fundamental knowledge of basic concepts of probability theory: random events, probability space, conditional probability, random variables, distribution functions, density functions, multivariate random variables, independent random variables, characteristics of random variables, characteristic functions, main probabilistic distributions, the law of large numbers, and the central limit theorem.

Prerequisites for entering the course

Mathematical Analysis.

Course aim

Course aim is to provide knowledge of basic concepts of probability theory.

Links between course outcomes, criteria of learning achievement evaluation, study methods and methods of learning achievement assessment

No	Course outcomes	Criteria of learning achievement evaluation	Study methods	Methods of learning achievement assessment
1	Knowledge and understanding of random events and probability of random event.	Student demonstrates the ability to calculate probability of a particular random event.	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
2	Knowledge and understanding of random variables and distribution functions of random variables.	Student demonstrates the ability to solve a given task.	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
3	Knowledge and understanding of main characteristics (moments) and characteristic function of random variables.	Student demonstrates the ability to calculate main characteristics and characteristic function in a given particular case.	Lectures, practical works, individual work, consulting	Final exam, assessment of practical work

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome		
	1	2	3
Know and comprehend concepts and propositions of fundamental mathematical subjects, recognize and apply them solving practical/theoretical tasks	+	+	+
Identify the problem, collect and analyze real/theoretical data using various mathematical methods, tools and IT technologies	+	+	+

Operating with formal mathematical symbols and terms, determine mathematical connections between various mathematical quantities; conceive mathematical propositions and logical proofs, construct and prove new statements	+	+	+
Think logically and analytically, evaluate alternative ways of task solving and implement optimal solutions	+	+	+

Content

No	Content (topics)
1.	Algebra of events. Probability space.
2.	Conditional probability.
3.	Independent events.
4.	Definition and classification of random variables.
5.	Multivariate random variables.
6.	Moments and cumulants.
7.	Characteristic functions.
8.	Binomial distribution.
9.	Poisson distribution.
10.	Normal distribution.
11.	Other discrete and continuous probabilistic distributions (geometrical, exponential, gamma, Weibull)
12.	The law of large numbers.
13.	The central limit theorem.

Distribution of workload for students (contact and independent work hours)

Lectures	45 hours
Practical work	30 hours
Individual students work	85 hours
Total:	160 hours

Structure of cumulative score and value of its constituent parts

Final written exam (50%), mid-term written exam (25%), assessment of two practical works (25%).

Recommended reference materials

No	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	Self study rooms	Other libraries
<i>Basic materials</i>						
1	1996	Kubilius J. Tikimybių teorija ir matematinė statistika. (Probability Theory and Mathematical Statistics)	Vilnius, Mokslas	50	1	
2	2000	Aksomaitis A. Tikimybių teorija ir statistika. (Probability Theory and Statistics)	Kaunas, Technologija	19	2	
3	2004	Bačinskas A., Janilionis V., Jokimaitis A. Tikimybių teorijos ir statistikos praktikumas (Tasks for Probability Theory and Statistics)	Kaunas, Technologija	5	1	
<i>Supplementary materials</i>						
1	2008	Ash R.B. Basic Probability Theory	Dover Publications INC.			

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Course programme designed by

Assoc. prof. dr. Inga Žutautaitė
