Subject code	ECTS credits
MAT6008	6

Course title in Lithuanian

IMČIŲ TEORIJA

Course title in English

SAMPLE THEORY

Short course annotation in Lithuanian (up to 500 characters)

Imčių teorijos sąvokos. Paprastasis atsitiktinis ėmimas. Bernulio ėmimas. Fundamentalioji J.Hajeko lema. Normališkumo būtinos ir pakankamos sąlygos. Saviskaidūs tikimybiniai skirstiniai. Ėmimas su nelygiomis tikimybėmis. Sluoksniniai ir lizdiniai ėmimai. Sisteminis ėmimas. Dviejų fazių ėmimas. Duomenų kokybė.

Short course annotation in English (up to 500 characters)

Sampling theory principal notions. Simple random sampling. Bernoulli sample. Fundamental J.Hájek lemma. Necessary and sufficient conditions for normal (Gaussian) law. Self-decomposable probability distributions. Sample with different probabilities. Stratified and cluster samples. Systematic sampling. Two-phase sampling. Data quality.

Prerequisites for entering the course

Probability Theory, Mathematical Statistics

Course aim

Course aim is to provide understanding of Sample 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.	Provide knowledge on how to construct and substantiate plan of experiment.	Student demonstrates the ability to construct and substantiate plan of experiment.	Lectures, practical works, individual work, consulting	Mid-term exam, Assessment of practical works
2.	Knowledge and understanding how to analyse data and corollary of experiments	Student demonstrates the ability to analyse data and corollary of experiments	Lectures, practical works, individual work, consulting	Mid-term exam, Assessment of practical works
3.	Knowledge and understanding how to perform mathematical analysis of various experiments	Student demonstrates the ability to perform mathematical analysis of various experiments	Lectures, practical works, individual work, consulting	Final exam, assessment of practical works
4.	Provide knowledge on applying sample methods in statistical researches	Student demonstrates the ability to apply sample methods in statistical researches	Lectures, practical works, individual work, consulting	Final exam, assessment of practical works

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome			
	1	2	3	4
1. Deepen and expand general knowledge of mathematics and apply it in a new non-standard environment		+	+	+
3. Broaden and apply the knowledge of reliability analysis and statistical methods for data analysis	+	+	+	
4. Identify, select and understand the state-of-the-art literature of mathematics and apply the gained knowledge to specific scientific and practical tasks	+	+	+	+

5. Develop mathematical models integrating the knowledge from various fields and different mathematical modelling techniques, and analyse the modelling results assessing the model adequacy and accuracy		+	+	+
7. Analyse, understand and use mathematical methods	+	+	+	+

Content

No	Content (topics)
1.	Sampling theory principal notions.
2.	Simple random sampling.
3.	Bernoulli sample.
4.	Fundamental J.Hájek lemma.
5.	Necessary and sufficient conditions for normal (Gaussian) law.
6.	Self-decomposable probability distributions.
7.	Sample with difference probabilities.
8.	Stratified and cluster samples.
9.	Systematic sampling.
10.	Two – faze sampling.

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

Lectures	**45 hours**
Practical work	**15 hours**
Individual students work	**100 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 practical work (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*
Basic materials						
1.	2005	Krapavickaitė D., Plikusas A. Imčių teorijos pagrindai.	VGTU, Technika	5	1	
2.	1981	Hájek J. Sampling from a Finite Population	New York: Marcel Dekker		1	
Supplementary materials						
1.	2016	Bhattacharya R., Lin L., Pantrangenaru V. A Course in Mathematical Statistics and Large Sample Theory	Springer, New York			
2.	2010	Bhattacharya R. N., Rao R.R. Normal Normal Approximation and Asymptotic Expansions	John Wiley and Sons, New York			

Course programme designed by

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