Subject code	ECTS credits
MAT6006	6

Course title in Lithuanian

TIKIMYBINIAI SKIRSTINIAI STATISTIKOJE

Course title in English

PROBABILISTIC DISTRIBUTIONS IN STATISTICS

Short course annotation in Lithuanian(up to 500 characters)

Atsitiktiniai klaidžiojimai. Arksinuso dėsnis. Martingalai. Markovo grandinės. Ergodiškumas. Atsitiktinių dydžių sekos (martingalai ir jų apibendrinimai). Išgyvenamumo analizė (cenzūruotų imčių analizė): cenzūravimas ir nupjovimas, didžiausio tikėtinumo metodas cenzūruotoms imtims. Skaičiuojančiųjų procesų teorijos elementai. Neparametrinis išgyvenamumo funkcijos vertinimas. Išgyvenamumo funkcijų lygybės tikrinimas. Semiparametrinė regresinė išgyvenamumo duomenų analizė, naudojant Kokso modelį.

Short course annotation in English(up to 500 characters)

Random walks. Arcsine law. Martingale. Markov chains. Ergodicity. Sequence of random variables (martingales and their generalization). Survival analysis (censored sample analysis): censored and truncated data. Maximum likelihood method for censored samples. The elements of counting process theory. Non – parametric survival functions evaluation. Verification of equality of survival functions. Semi – parametric regression survival data analysis by using Cox model.

Prerequisites for entering the course

Probability Theory, Mathematical Statistics, Random Processes

Course aim

Course aim is to provide understanding of probabilistic distributions in statistics

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 about different random processes and their classifications	Student knows different random processes and their classifications	Lectures, practical works, individual work, consulting	Mid-term exam, Assessment of practical works
2.	Knowledge about random processes in survival analysis	Student knows random processes in survival analysis	Lectures, practical works, individual work, consulting	Final exam, Assessment of practical works
3	Knowledge how to construct and analyse mathematical models of specific tasks	Student is able to construct and analyse mathematical models of specific tasks	Lectures, practical works, individual work, consulting	Mid-term exam, 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
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.	Random walks
2.	Arcsine law
3.	Martingale. Markov chains
4.	Ergodicity
5.	Sequence of random variables
6.	Survival analysis: censored and truncated data
7.	Maximum likelihood method for censored samples
8.	The elements of counting process theory
9.	Non – parametric survival functions evaluation
10.	Verification of equality of survival functions
11.	Semi – parametric regression survival data analysis by using Cox model

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

Lectures	**45 hours**
Seminars	**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.	2004	Shiryaev A. N. Probability	Springer		1	
2.	1984	Cox D. R., Oakes D. Analysis of Survival Data	New York: Mathuen		1	
Supplementary materials						
1.	2017	Augutis J., Bikelis A. Diskrečių matų sąsūkų skleidiniai, (monografijos rankraštis)	VDU			

Course programme designed by

Prof. habil. dr. J. Augutis, Prof. habil. dr. A. Bikelis