Subject code	ECTS credits
MAT3015	6

Course title in Lithuanian

RIZIKOS ANALIZĖS PAGRINDAI

Course title in English

FUNDAMENTALS OF RISK ANALYSIS

Short course annotation in Lithuanian (up to 500 characters)

Įgyjamos esminės rizikos analizės žinios, susipažįstama su rizikos vertinimo procesu, sistemų pavojų ir sutrikimų identifikavimo metodais, gedimų ir įvykių medžių sudarymu ir analize, sistemų gedimų duomenų analizės metodais, įsisavinami pagrindiniai sistemų patikimumo vertinimo principai.

Short course annotation in English (up to 500 characters)

Acquired fundamental knowledge of risk analysis, risk assessment procedure, hazards and failure identification methods, fault and event trees construction and analysis, analysis of system failure data, the basic principles of application of system reliability evaluation methods.

Prerequisites for entering the course

Mathematical analysis, probability theory and mathematical statistics.

Course aim

Course aim is to provide knowledge of basic concepts of risk analysis.

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 main concepts of risk analysis.	Student knows the definitions of main concepts of systems risk analysis.	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
2	Provide knowledge on hazard identification techniques.	Student demonstrates the ability to identify hazards in a particular case using at least one of hazard identification technique.	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
3	Provide knowledge on a fault and event tree analyses	Student demonstrates the ability to construct a fault and event trees in a particular case and perform their analysis.	Lectures, practical works, individual work, consulting	Final exam, assessment of practical work
4	Provide knowledge on reliability of simple systems.	Student demonstrates the ability to calculate main reliability characteristics of a particular system.	Lectures, practical works, individual work, consulting	Final exam, assessment of practical work
5	Ability to work in a group for a common case study analysis.	Student demonstrates the ability to formulate task, present solution process, justify received results, present research work.	Individual and team work, self-study of literature, discussions, consulting	Assessment of practical work

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome				
	1	2	3	4	5

Comprehend and be able to apply probabilistic and statistical methods for data analysis	+	+	+	+	+
Summarize and evaluate critically scientific and professional literature, as well as use various tools for collecting of information for the study process and for solving fixed practical/theoretical problems	+	+	+	+	+
Identify the problem, collect and analyze real/theoretical data using various mathematical methods, tools and IT technologies	+	+	+	+	+
Having good foundations of mathematics, logically and critically recognize and describe relations between quantities of real life and mathematical concepts	+	+	+	+	+
Think logically and analytically, evaluate alternative ways of task solving and implement optimal solutions	+	+	+	+	+
Work individually and/or in groups by developing and adopting appropriate mathematical models and tools for use in case analysis	+	+	+		+

Content

No	Content (topics)
1.	Basic concepts of risk analysis.
2.	Qualitative and quantitative definitions of risk.
3.	Risk analysis procedure.
4.	Failures and failure classification.
5.	Failure mode, effect and criticality analysis (FMECA).
6.	Hazard and operability analysis (HAZOP).
7.	Fault tree analysis.
8.	Event tree analysis.
9.	Reliability of simple systems.
10.	Series, parallel and r-out-of-n systems.
11.	Component importance.

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 (35%), assessment of practical work (15%).

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	2006	Augutis J., Ušpuras E. Technologijų rizika (Technology Risk)	Aušra		40	
2	2007	Zio E. An introduction to the basics of reliability and risk analysis	Singapure by World Scientific Papers		1	Google books
3	2001	Bedford T., Cooke R. Probabilistic Risk Analysis:	Cambridge University Press		1	

		Foundations and Methods				
4	2003	Aven T. Foundations of Risk Analysis	John Wiley & Sons Inc.		1	
5	2004	Haimes Y.Y. Risk modeling, Assessment, and Management	John Wiley & Sons Inc.			Google books
Supplementary materials						
1	2004	Rausand M. System Reliability Theory - Models and Statistical Methods and applications	John Wiley & Sons Inc.			

Course programme designed by

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