



1. Subject name	Transport automation				
2. Subject name in Hungarian	Közlekedési automatika				
3. Code	BMEKOKAM202	4. Evaluation type	mid-term grade	5. Credits	4
6. Weekly contact hours	2 (9) Lecture	1 (5) Practice	0 (0) Lab		
7. Curriculum	Transportation Engineering MSc (K)	8. Role	Mandatory (mc) at Transportation Engineering MSc (K)		
9. Working hours for fulfilling the requirements of the subject					120
Contact hours	42	Preparation for seminars	8	Homework	22
Reading written materials	42	Midterm preparation	6	Exam preparation	0
10. Department	Department of Control for Transportation and Vehicle Systems				
11. Responsible lecturer	Dr. Sághi Balázs				
12. Lecturers	Dr. Baranyi Edit, Dr. Bede Zsuzsa, Lövétei István				
13. Prerequisites					
14. Description of lectures					
<p>Basic definitions.</p> <p>Development of safety-related systems (concept, system definition, hazard- and risk -analysis, specification of system requirements, architecture and apportionment of system requirements, design and implemetation, manufacture, integration, system validation, system acceptance, certification, authorization).</p> <p>Failure management of safety-critical systems. Syafety criterias: system requirements, the safety case.</p> <p>Hazard analysis: FMEA, FMEDA, FMECA, FTA, HTA, HAZOP; hazard analysis during the lifecycle.</p> <p>Risk analysis. Consequences of the faulty operation - severity. Probability of the faulty operation. Risk classification. Safety Integrity Levels.</p> <p>Development process of safety-related systems. System lifecycle models and management. Failure management. Human aspects of the safety. Safety analysis. Safety management.</p> <p>Safety-critical softwares. Programming of safety-critical softwares. Data security. Program protection Plan. Protection of the RAM.</p> <p>Safety-critical hardware. Hardware redundancy. Safety strategies.</p> <p>Formal methods and its application in safety-related systems.</p>					
15. Description of practices					
In practices, students must be mastered in hazard- and risk analysis methods (FMEA, FMEDA, FMECA, FTA, HTA, HAZOP).					
16. Description of labortory practices					
17. Learning outcomes					
<p>A. Knowledge</p> <ul style="list-style-type: none"> • is familiar with the concepts and mathematical apparatus of safety, and risk analysis • is familiar with the development methods of safety-critical systems and safety architectures • is familiar with the numerical descriptive tools of reliability and the related calculation methods <p>B. Skills</p> <ul style="list-style-type: none"> • capable of performing safety calculations based on a specification • can perform risk analysis calculations <p>C. Attitudes</p> <ul style="list-style-type: none"> • is interested in the safety and risk issues of sifferent transport means <p>D. Autonomy and Responsibility</p> <ul style="list-style-type: none"> • is able to consult in a team in algorithmic and programming tasks, to make independent decision 					
18. Requirements, way to determine a grade (obtain a signature)					
Students must carry out individually a hazard and risk analysis of a designated system.					

One midterm exam need to be written. The midterm grade is the average of the results from individual analysis and the midterm exam.

19. Opportunity for repeat/retake and delayed completion

The midsemester exam can be retried once, the individual analysis can be delayed completed.

20. Learning materials

Storey: Safety-Critical Computer Systems Addison-Wesley 1996

Braband, J.: Risikoanalysen in der Eisenbahn-Automatisierung Eurailpress 2005

Lecture Notes

Effective date	10 October 2019	This Subject Datasheet is valid for	2024/2025 semester I
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