

COURSE DESCRIPTION

1. Course title: THEORY OF RELIABILITY AND SAFETY		2. Course code MK2_9		
3. Validity of course description: 2015/2016				
4. Level of studies: BA, BSc programme / MA, MSc programme - 1 st cycle / 2 nd cycle of higher education				
5. Mode of studies: intramural studies / extramural studies				
6. Field of study: Transport		(FACULTY SYMBOL) RT		
7. Profile of studies: general academic				
8. Programme:				
9. Semester: 1				
10. Faculty teaching the course: Chair of Traffic Engineering				
11. Course instructor: Wiesław Pamuła DSc PhD Eng				
12. Course classification: common courses				
13. Course status: compulsory / elective				
14. Language of instruction: English				
15. Pre-requisite qualifications: applied mathematics, statistics				
16. Course objectives: gain basic skills and competence in reliability analysis of technical systems				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	identifies basic concepts in the field of reliability theory and understands their relations with statistics	written test	lecture	K_W11(++) K_U23(++)
2.	identifies the reliability model of a technical system and is able to evaluate the model's parameters	written test	lecture	K_W11(++) K_U23(++)
3.	is able to assess which parts of a complex system contribute to failures and how the parts reliability determine the systems resultant reliability	written test	lecture	K_W11(++) K_U23(++)
4.	is able to indicate methods for enhancing systems reliability	written test	lecture	K_W11(++) K_U23(++)
18. Teaching modes and hours				
Lecture / BA / MA Seminar / Class / Project / Laboratory				
Lecture - 30 h.				
19. Syllabus description:				
Lecture: Definition and discussion of basic terms used for reliability evaluation. Basic life time distribution models used for non-repairable populations. Basic repair rate models used for repairable systems. Reliability block diagrams and fault trees. Complex systems. Redundancy. Analysis of repairable systems by Markov methods. System failure analysis based on FMECA. Safety and critical systems. Analysis of safety using HAZOP.				
20. Examination: none				
21. Primary sources:				
1. W.Pamuła: Niezawodność i bezpieczeństwo. Wybór zagadnień. Wydawnictwo Pol.Śl. Gliwice 2011.				
2. Standard PN-EN 60812:2006 FMECA.				
3. Standard PN-EN 61882 HAZOP, Badania zagrożeń i zdolności do działania.				
22. Secondary sources:				
1. Szopa T.: Niezawodność i bezpieczeństwo. Oficyna Wydawnicza Politechniki Warszawskiej, 2009.				
2. B.Bertsche: Reliability in Automotive and Mechanical Engineering Determination of Component and System Reliability, Series: VDI-Buch Springer Verlag 2008.				
3. Podstawy konstrukcji maszyn pod red M.Dietricha t.1 rozdz.4, WNT Warszawa 2006.				
4. J.Jaźwiński, K.Ważyńska-Fiok: Bezpieczeństwo systemów, PWN, W-wa, 1993.				
5. D.Bobrowski: Modele i metody numeryczne teorii niezawodności w przykładach i zadaniach, WNT, Warszawa, 1985.				

23. Total workload required to achieve learning outcomes		
Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	/
3	Laboratory	/
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	30/30
24. Total hours: 60		
25. Number of ECTS credits: 2		
26. Number of ECTS credits allocated for contact hours: 1		
27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 0		
26. Comments:		