COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="6"></td><td colspan="2">Degree level and programme type</td><td></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td colspan="2">Study profile</td><td>academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Reliability of environmental engineering systems</td><td colspan="2">Course code</td><td>IS-FCEE-00211S</td></tr>
<tr><td colspan="2">Course type</td><td>Erasmus</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>summer</td></tr>
<tr><td>30</td><td></td><td></td><td>30</td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>3</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Basics of water supply and sewerage systems</td></tr>
<tr><td>Course objectives</td><td colspan="9">To familiarize students with the problems of reliability of water supply and sewage systems. Teaching the use of reliability theory for the design of environmental engineering systems, as well as preparation for scientific research..</td></tr>
<tr><td>Course content</td><td colspan="9">Lecures: Basic concepts of reliability theory. Reliability structures. Failure analysis of environmental engineering facilities. Possibilities to increase the reliability of water and sewage systems.
Project: Development of the concept of increasing the operational reliability of the selected env. engineering object. Defining the reliability structure of the designed object. Determining the reliability indicators of the elements. Determining the level of operational reliability of the object. Proposal of design solutions to increase the reliability of the object.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">informative lecture, case studies, design</td></tr>
<tr><td>Assessment method</td><td colspan="9">Lecture - written test; project – completion and discussion of the project</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">Student knows and understands the applications of reliability theory</td><td colspan="2">IS2_W06</td></tr>
<tr><td>LO2</td><td colspan="7">knows how to assess the level of system reliability</td><td colspan="2">IS2_U09</td></tr>
<tr><td>LO3</td><td colspan="7">is able to obtain and use the data necessary for reliability calculations</td><td colspan="2">IS2_U08</td></tr>
<tr><td>LO4</td><td colspan="7">is prepared to analyze the problems of reliability of environmental engineering systems</td><td colspan="2">IS2_K01</td></tr>
<tr><td>LO5</td><td colspan="7"></td><td colspan="2"></td></tr>
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Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	written test	L	
LO2	written test, evaluation of the project	L, P	
LO3	evaluation of the project	P	
LO4	evaluation and discussion of the project	P	
LO5			
Student workload (in hours)		No. of hours	
Calculation	lectures attendance	30	
	project attendance	30	
	working on the project	10	
	preparation for the test	6	
	participation in student-teacher sessions related to the classes/seminar/project	4	
	TOTAL:	80	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		64	2,5
Student workload – practical activities		40	1,8
Basic references	1) S. Nikolaidis. et all: Engineering design reliability: handbook. CRC Press, 2005. 2) B.S. Dhillon: Reliability, Quality and Safety for Engineers. CRC Press, 2005		
Supplementary references	1) Kwietniewski M. et al. Reliability of water supply and sewage systems (in Polish: Niezawodność wodociągów i kanallzacji), Arkady 1993/ .		
Organisational unit conducting the course	Department of Water Supply and Sewage Systems	Date of issuing the programme	
Author of the programme	Dariusz Andraka, PhD	2020.02.28	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar