COURSE DESCRIPTION CARD

<table>
<tr><td colspan="11">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 colspan="2"></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td colspan="2">Study profile</td><td colspan="2">Academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Road earthworks and drainage</td><td colspan="2">Course code</td><td colspan="2">IS-FCEE-00172W</td></tr>
<tr><td colspan="2">Course type</td><td colspan="2">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 colspan="2">Semester</td><td colspan="2">winter</td></tr>
<tr><td>15</td><td></td><td></td><td>30</td><td></td><td></td><td></td><td colspan="2">No. of ECTS credits</td><td colspan="2">4</td></tr>
<tr><td>Entry requirements</td><td colspan="10">Basics of road engineering</td></tr>
<tr><td>Course objectives</td><td colspan="10">Acquainting students with the principles of calculating and performing earthworks, as well as the principles of types, design and construction of road surface and subsurface drainage systems.</td></tr>
<tr><td>Course content</td><td colspan="10">Characteristics of construction soils, assessment of soil suitability for road purposes. Technology of excavation and embankment works. Mechanization of earthworks - characteristics of machines used for excavation, transporting and building. Calculations of earthworks volumes - characteristic of cross-sections for earthworks purpose, distribution and transport of earth masses - haul mass diagram. Surface and subsurface drainage of highways. Dimensioning of surface drainage facilities. Characteristic and dimensioning of road culverts.</td></tr>
<tr><td>Teaching methods</td><td colspan="10">Lecture - informative lecture, problem lecture</td></tr>
<tr><td>Assessment method</td><td colspan="10">Lecture - written exam
Project classes – evaluation of student's projects and preparation for the classes, written test</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="8">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="8">Student identifies problems in the field of earthworks</td><td colspan="2">K_B1_W11, K_B1_U02</td></tr>
<tr><td>LO2</td><td colspan="8">Student knows the specifics of work and classifies machinery for earthworks</td><td colspan="2">K_B1_W18, K_B1_U18</td></tr>
<tr><td>LO3</td><td colspan="8">Student calculates the volume of earthworks</td><td colspan="2">K_B1_W07, K_B1_U13</td></tr>
<tr><td>LO4</td><td colspan="8">Student designs elements of road surface drainage</td><td colspan="2">K_B1_U13, K_B1_U16</td></tr>
<tr><td>LO5</td><td colspan="8">Student can use internet sources and work in team</td><td colspan="2">K_U23, K_K03</td></tr>
</table>

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	written test	L
LO2	evaluating student's projects and preparation for the classes , tests on the lecture content	L, P
LO3	evaluating student's projects and performance in classes	P
LO4	written test	L
LO5	evaluating student's performance in classes	P
LO6		

Student workload (in hours)		No. of hours
Calculation	participation in lectures	15
	participation in classes, laboratory classes, etc.	30
	preparation for classes, projects,	20
	participation in student-teacher sessions related to the classes	5
	implementation of project tasks	20
	preparation for and participation in exams/tests	10
	TOTAL:	**100**

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	50	2,0
Student workload – practical activities	70	2,8

Basic references	Handbook of transportation engineering, Myer Kutz, 2011 Transporetation infrastructure engineering, L.A. Hoel, N.J. Garber, 2010 Traffic and highway engineering, N.J. Garber, L.A. Hoel, 2009	
Supplementary references	Wright P.H., Dixon K.: Highway Engineering, John Wiley&Sons, Inc. 2004 Edel R.: Odwodnienie dróg, WKiŁ, Warszawa, 2010	
Organisational unit conducting the course	**Department of Construction and Road Engineering**	**Date of issuing the programme**
Author of the programme	**Robert Ziółkowski, PhD. Eng.**	**25.02.2020**

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