

Faculty of Civil Engineering and Environmental Sciences				
Study programme:	ISE Civil Engineering		Degree level: full-time programme: Master's degree	
Specialization	General Construction		Diploma path: -	
Module name:	Bridges			
Module type:	obligatory	Semester: 2	ECTS 5	Module ID:19282158H
No. of hrs in semester:	L - 16	C -	LC- P- 32	SW- S-
Prerequisites:	<i>Monolithic constructions, Prestressed concrete structures</i>		<i>Complex metal structures Concrete engineering structures</i>	
Teaching methods:	<i>lecture, project</i>	Assessment:	<i>Evaluation must be relevant to the intended learning outcomes</i>	
		lecture - written final test, project - completion, presentation and discussion of the project		
Aims and objectives:	<i>Make students familiar with the history and technology development of bridge construction. Learning the principles of bridge shaping and methods of dimensioning of their main components. Getting skills of critical choice of design and technological solutions.</i>			
Module content:	<i>Lecture</i> <i>Historical outline. The influence of aesthetics and economy on formation the bridges. Onomastics and systematics. Connection with communication routes. Hydraulic and hydrological calculation. Materials applied in bridge construction. Loadings. Calculation of internal strengths. Transverse co-operation of spans. Detailing of concrete, steel and composite bridges. Wooden and stone bridges. Temporary bridges. Culverts. Supports of bridges. Code reflecting bases' of projecting.</i> <i>Project</i> <i>Choice of individual foundations of the design case-study. Qualification of light and width of bridges. The selection of transverse section and qualification of spread of spans for two of following constructional materials: concrete, steel, wood, stone or steel and concrete (composite bridge). Calculational reason of dimensions of main construction elements. The conceptional drawings of bridge for above mentioned material versions.</i>			
Learning outcomes	<i>Write min. 4, max. 8 learning outcomes in the following order: knowledge - skills - competences. Each learning outcome must be verifiable.</i>			<i>Relevance to the programme learning outcomes</i>
LO1	Student has theoretically based knowledge of structure analysis, interaction issues and designing of bridges.			K_ B2_W07
LO2	Student has profound knowledge regarding analysis, designing and construction of bridges.			K_ B2_W12
LO3	Student can design bridges.			K_ B2_U08
LO4	Student understands importance of non-technical aspects and consequences of bridge engineering activity, including its influence on the environment and related responsibility for decisions.			K_ B2_K02
LO5				
LO6				

L07			
L08			
student workload	lecture attendance	15 x1h =	16
	participation in classes, laboratory classes, etc.	15 x 2h =	32
	preparation for classes, laboratory classes, projects, seminars, etc.	5 x1h =	5
	work on projects, reports, etc.	15 x1h =	15
	participation in student-teacher sessions related to the class / seminar /	5 x1h =	5
	implementation of project tasks	15 x1h =	15
	preparation for and participation in exams/tests	5 x1h =	5
		TOTAL:	93
quantitative indicators	Student workload - activities that require direct teacher participation	54h	ECTS 2,5
	Student workload - practical skills activities	60h	2,5
basic references:	1. Brown D. J. <i>Bridges. Three Thousand Years of Defying Nature</i> , Octopus publishing Group, London 2005 2. Leonhardt F. <i>Bridges: Aesthetics and Design</i> , Architectural Press, London 1982, 3. Zhao J., Tonia D. <i>Bridge Engineering</i> , Mc Graw Hill, New York ... 2012, 4. Blockley D. <i>Bridges</i> , Oxford University Press 2010		
supplementary references:	1. Ritter M. A. <i>Timber Bridges Design, Construction, Inspection and Maintenance</i> , Washington D.C.,1990, 2. Svensson H. <i>Cable - Stayed Bridges</i> , Wiley 2012, 3. Chen W.F., Duan L. <i>Bridge Engineering: Construction and Maintenance</i> , CRC Press 2003 4. Bennett D. <i>The Creation of Bridges</i> , 1999		
learning outcomes	<i>methods of assessing learning outcomes</i>	type of class (if more than one) where the outcomes are assessed	
L01	written final test on lecture content	L	
L02	written final test on lecture content, evaluating the student's project	L, P	
L03	completion, presentation and discussion of the project	P	
L04	written final test on lecture content, presentation and discussion of the project	L, P	
L05			
L06			
L07			
L08			
Department:	Department of Building Structures	Group instructors:	Aleksander Wawrusiewicz, Ph.D
Date:	03.02.2019	Coordinator:	Aleksander Wawrusiewicz, Ph.D

L - lecture C - class LC - laboratory class P-project
 SW - specialization workshop S - seminar