

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Concrete Bridges		Code 1010102121010120221
Field of study Civil Engineering Second-cycle Studies	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty Bridges and Underground Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 45 Classes: 30 Laboratory: - Project/seminars: 30		No. of credits 7
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 7 100% 7 100%
Responsible for subject / lecturer: dr hab.inż. Arkadiusz Madaj email: arkadiusz.madaj@put.poznan.pl tel. 61 647 5830 Wydział Budownictwa i Inżynierii Środowiska 61-138 Poznań, ul. Piotrowo 5		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The basics of construction statics and the strength of materials. The rules of loads determination. The cross-section formation of concrete bridges. The construction systems of concrete bridges. The basics of reinforced concrete and prestressed concrete constructions design.
2	Skills	The determination of influence lines and internal forces. The determination of loads acting on bridge constructions. The design of a reinforced concrete and prestressed concrete cross-section. The ability to prepare and read construction drawings.
3	Social competencies	The awareness of constant gaining knowledge. The ability to form ideas and communicate among the group. The proper use of polish language. Cultural behavior.
Assumptions and objectives of the course: Expansion of knowledge concerning constructional materials used in concrete bridges. The design of statistically undetermined prestressed concrete bridges. The design of concrete bridges of a complex constructional systems. The design concerning fatigue.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The features of constructional materials used in concrete bridges. - [K_W04] 2. The design of concrete bridges of a complex constructional systems. - [K_W16] 3. The design of statistically undetermined prestressed concrete bridges. - [K_W09] 4. The basics of strength analysis concerning fatigue. - [K_W04] 5. The design of compound bridges type concrete ? concrete. - [K_W16]		
Skills:		
1. To design a statistically undetermined prestressed concrete bridge. - [K_U09] 2. To form a concrete bridge of a complex constructional system. - [K_U03] 3. To design a concrete bridge concerning fatigue. - [K_U04] 4. To design a compound bridge type concrete ? concrete. - [K_U09]		
Social competencies:		
1. The awareness of constant gaining knowledge. - [K_K03] 2. Communication among the group concerning civil engineering. - [K_K01] 3. The ability to justify the established construction solutions. - [K_K09]		

Assessment methods of study outcomes		
Current examination of the designing practice and oral exam concerning it. Written exam (lectures).		
Course description		
Information about the requirements concerning materials used in concrete bridges. The design of statistically undetermined prestressed concrete bridges. The losses of prestress. The anchorage zone. The design of concrete bridges of a complex constructional systems in cross and longitudinal sections. Building of bridges of a complex constructional systems and the influence of the building technique on internal forces distribution. Strength analysis concerning fatigue. The design of compound bridges type concrete ? concrete.		
Basic bibliography:		
<ol style="list-style-type: none"> 1. A.Madaj, W.Wołowicki: Mosty betonowe. Wymiarowanie i konstruowanie, WKŁ, 2002 2. A.Madaj, W.Wołowicki: Projektowanie mostów betonowych, WKŁ, Warszawa, 2010 3. A.Madaj, W.Wołowicki: żelbetowe konstrukcje mostowe. Wymiarowanie. Wyd. PP, Poznań, 1995 4. PN-EN 1991-2 Eurokod 2. Projektowanie konstrukcji z betonu. Część 2: Mosty z betonu. Obliczanie i reguły konstrukcyjne 5. PN-EN-1991-1-1 Eurokod 2. Projektowanie konstrukcji z betonu. Część 1-1 Reguły ogólne i reguły dla budynków 6. PN-91/S-10042 Obiekty mostowe . Konstrukcje betonowe, żelbetowe i sprężone. Projektowanie 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. Szczygieł J. Mosty z betonu zbrojonego i sprężonego, WKŁ, Warszawa, 1978 2. Leonhardt F.: Podstawy budowy mostów betonowych. WKŁ, Warszawa 1982 3. Kmita J.: Mosty betonowe. Cz. I, Podstawy kształtowania, Cz. II, Podstawy wymiarowania, WKŁ, Warszawa 1994 4. Wasutyński Z.: Budownictwo Betonowe. T. XIV Mosty, Arkady, Warszawa 1967, 1973 		
Result of average student's workload		
Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	175	7
Contact hours	110	4
Practical activities	70	3