

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Maintaining bridges		Code 1010102111010106026
Field of study Civil Engineering Second-cycle Studies	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
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: - Laboratory: - Project/seminars: 15		No. of credits 5
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 %) 5 100% 5 100%
Responsible for subject / lecturer: dr hab inż. Arkadiusz Madaj email: arkadiusz.madaj@put.poznan.pl tel. 61 647 5830 Budownictwa i Inżynierii Środowiska 61-138 Poznań, ul. Piotrowo 5		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The basics information concerning engineering constructions (components, classification, loads). The chemistry of construction materials. Materials science. The basics of chemistry and physics.
2	Skills	The ability to make a cause-result analysis. The use of research equipment. The rules of preparing design records.
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: -Getting to know the concept of construction durability and the methods of its controlling. Getting to know the range of research of the construction during its realization and exploitation. Getting to know the causes of bridge degradation and the methods of their prevention. The methods of bridges diagnostics. The ability to evaluate the technical state of a bridge construction. The ability to prepare the repair technology.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The methods of bridge constructions diagnostics. - [K_W16] 2. The basic damages of used constructions, their causes and results. - [K_W16] 3. The methods of protection steel and concrete bridges against corrosion . - [K_W16] 4. The basic methods of repair of constructions damaged during their usage. - [K_W16]		
Skills:		
1. To make an evaluation of the technical state of a bridge construction. - [K_U04] 2. To carry out the basic research which enable the evaluation of technical state and the threat to safety of exploitation of bridges. - [K_U12] 3. To work out a method of protection against corrosion of steel and concrete bridges. - [K_U12] 4. To work out a method of repair of a steel and concrete bridge. - [K_U04]		
Social competencies:		
1. The awareness of constant gaining knowledge. - [K_K06] 2. Communication among the group. - [K_K01] 3. The ability to justify the established construction solutions. - [K_K07]		

Assessment methods of study outcomes		
-An exam in the field of knowledge presented during the lectures.		
Course description		
-The requirements for materials used in bridge construction. The maintenance services. Bridges documentation. Bridges inspections. Bridge and its surrounding maintenance. The damages of used bridges. Corrosion of steel and concrete. Protection against corrosion of steel and concrete bridges. Materials for bridges repairs. Materials for steel and concrete bridges repairs.		
Basic bibliography:		
1. A. Madaj, W. Wołowicki. Budowa i utrzymanie mostów. WKiŁ. 2013.		
Additional bibliography:		
1. A.Madaj, W.Wołowicki: Podstawy projektowania budowli mostowych, WKŁ, Warszawa		
2. M. Jasakow: Ochrona mostów przed korozją, WKiŁ, 1981		
3. L. Czarnecki, T. Broniewski, O. Henning: Chemia w budownictwie. Arkady, 1994		
4. M. Gruener: Korozja i ochrona betonu, Arkady, 1983		
5. G. Wranglen: Podstawy korozji i ochrona metali, WNT, 1985		
Result of average student's workload		
Activity	Time (working hours)	
Student's workload		
Source of workload	hours	ECTS
Total workload	125	5
Contact hours	30	1
Practical activities	40	2