STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Bridge maintenance and operation**			Code **1010125141010127762**
Field of study **Structural Engineering**	Profile of study (general academic, practical) **(brak)**		Year /Semester **2 / 4**
Elective path/specialty **Road-Train Engineering**	Subject offered in: **Polish**		Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **part-time**		
No. of hours Lecture: **10** Classes: **-** Laboratory: **8** Project/seminars: **-**			No. of credits **2**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**		
Education areas and fields of science and art **technical sciences**			ECTS distribution (number and %) **2 100%**

Responsible for subject / lecturer:

dr hab inż. Arkadiusz Madaj
email: arkadiusz,madaj@put.poznan.pl
tel. 61 647 5830
Budownictwa i Inzynierii 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. Bride 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	60	2
Contact hours	22	1
Practical activities	28	1