STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Concrete Bridges		**1010104171010120221**
Field of study	Profile of study (general academic, practical)	Year /Semester
Civil Engineering First-cycle Studies	**general academic**	**4 / 7**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**elective**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**part-time**	
No. of hours		No. of credits
Lecture: **22** Classes: **10** Laboratory: **-** Project/seminars: **10**		**6**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
other	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**6 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of the strength of materials, structural mechanics and concrete structures in the field of engineering degree studies
2	**Skills**	Skills related to the static calculations and design of reinforced concrete bridge structures, self-learning skills
3	**Social competencies**	Ability to adapt of the type of any civil engineering structure to the communication requirements and social expectations, respect for the Polish language, understand the need for lifelong learning and group collaboration

Assumptions and objectives of the course:

Familiarizing of students with the issues of conceptual design, structural analysis and mechanical design of different types of RC-concrete and prestressesd bridges according to the system of European standards PN-EN

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the basics of the concrete structures - [K_W05, K_W10]
2. Student knows the basics of technology of different types of concrete structures used in civil engineering - [K_W07, K_W09]
3. Student knows the procedure for the static-strength calculations of concrete structures according to the system of the PN-EN code - [K_W06]

Skills:

1. Student can structurally form simple concrete bridge structures - [K_U07]
2. Students can perform static-strength calculations of simple concrete bridge structure - [K_U02, K_U04]
3. Student can conduct calculations in accordance with the principles set out in the new system of European standards PN-EN - [K_U08]

Social competencies:

1. Student can adapt the type of structure to the communication requirements and social expectations - [K_K08]
2. Student can collaborate and work together in a group, is aware of the need for self-education - [K_K01, K_K03]
3. Student complies with the principles of the Polish language and the rules of preparation of technical documentation - [K_K07]

Assessment methods of study outcomes

1. Preparation of the design exercise in accordance with guidelines
2. Ongoing monitoring of the student's knowledge on every part of preparation of the design during the consultation
3. Oral test (talk) on completed design (demonstrating knowledge of issues relating to the formulation and calculation of bridge construction in the technology of post-tensioned concrete)
4. Written test of the student's knowledge in the field of material presented during the lectures

Course description

1. Rules of formation of bridge concrete structures
2. Various assembling systems of concrete bridges
3. Dimensioning rules of simple concrete bridge structures according to the PN-EN code
4. Ultimate and serviceability limit states of concrete bridge structures
5. Basic static-strengths calculations of concrete bridge girders
6. Prestressed concrete structures - pre- and post-tensioned concrete structures in civil engineeging applications, technology, analysis of losses of prestressing force.
7. Concrete slab decks - the static-strength analysis of bridge decks and cantilevers according to the PN-EN code

Basic bibliography:

1. Arkadiusz Madaj, Witold Wołowicki, Mosty betonowe WKŁ 1980/2002/...
2. Arkadiusz Madaj, Witold Wołowicki, Projektowanie mostów betonowych, WKiŁ Warszawa 2010
3. Andrzej Ajdukiewicz, Jakub Mames, Konstrukcje sprężone, Państwowe Wydawnictwo Naukowe, Warszawa 1979
4. Jacek M. Skarżewski, Witold Wołowicki, Krzysztof Sturzbecher, Mosty sprężone, Przewodnik do ćwiczeń projektowych, Wydawnictwo PP, Poznań, 1989

Additional bibliography:

1. Arkadiusz Madaj, Witold Wołowicki, Podstawy projektowania budowli mostowych, WKiŁ Warszawa 2003/2007
2. Andrzej Łapko, Bjarne Christian Jensen, Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady, Warszawa 2005
3. Włodzimierz Starosolski, Konstrukcje żelbetowe wg PN-B-03264:2002 i Eurokodu 2, Wydawnictwo Naukowe PWN, Warszawa 2009

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	42
2. Studying	40
3. Project realization	34
4. Preparation to the final test	34

Student's workload

Source of workload	hours	ECTS
Total workload	150	6
Contact hours	42	2
Practical activities	20	1