STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Concrete Structures II		**1010115121010110127**

Field of study	Profile of study (general academic, practical)	Year /Semester
Civil Engineering Extramural Second-cycle	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Structural Engineering	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**part-time**

No. of hours				No. of credits
Lecture: **10**	Classes: **8**	Laboratory: **-**	Project/seminars: **18**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

dr inz. Piotr Frąszczak
email: piotr.fraszczak@put.poznan.pl
tel. 0616652057
Wydział Budownictwa i Inżynierii Środowiska
ul. Piotrowo 5, 60-965 Poznań

Responsible for subject / lecturer:

dr inż. Michał Pikos
email: piotr.fraszczak@put.poznan.pl
tel. 0616652057
Wydział Budownictwa i Inżynierii Środowiska
ul. Piotrowo 5, 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student has knowledge of mathematics, physics and chemistry. He/she knows the rules of analysis, design and dimensioning of reinforced concrete elements of any construction works and knows the standards and guidelines for the design of buildings and their components
2	**Skills**	The student is able to make the evaluation and ranking of loads acting on buildings. He/she can classify buildings, knows how to design elements in complex concrete structures, and can choose the tools (analytical or numerical) to solve engineering problems
3	**Social competencies**	Awareness of the need to constantly update and supplement knowledge and skills

Assumptions and objectives of the course:

Introduction to the principles of design and analysis of reinforced concrete coating

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

Knowledge:

1. The student knows the rules determining the combination of fixed and variable loads - [K_W05]
2. The student knows the principles of dimensioning reinforced concrete sections in the complex load. - [K_W03, K_W09]
3. The student knows the principles of constructing complex reinforced concrete structures. - [K_W09]
4. The student knows the principles of dimensioning of reinforced concrete sections. - [K_W09]

Skills:

1. The student can determine the loads acting on constructions and determine the most unfavorable cases. - [K_U01, K_U07]
2. The student can design cross-sections with shear force load. - [K_U05]
3. The student can design cover structures with membrane state and bending moments. - [K_U09]
4. The student can perform Serviceability Limit State (SLS) calculations. - [K_U12]
5. The student can design reinforcement for chosen elements and thin-walled structures. - [K_U09]

Social competencies:

1. The student understands the need for continuous learning throughout their professional career, can co-organize the learning process; - [K_K06]
2. The student can work in a team; - [K_K01]
3. The student recognizes and solves job-related problems. - [K_K07, K_K09]

Assessment methods of study outcomes

-Credit of exercise classes
Credit in written form (1.0h)
Credit of projects
Estimation of individual projects on the basis of calculations and structural drawings with a defence of submitted work
Number of evaluation

[%]	(grade)
100- 91	A excellent
90- 75	B very good
74- 65	C good
64- 51	D sufficient
< 50	E failed

Course description

1. Construction analysis with Eurocode 2.
2. Coating covers ? spherical and cylindrical covers.
3. Cylindrical covers.

Basic bibliography:

1. Konstrukcje żelbetowe, J. Kobiak, W. Stachurski, Arkady, tom I-IV, 1984-1991
2. Żelbetowe konstrukcje cienkościenne, K. Grabiec, PWN, 1999
3. Budownictwo betonowe t.XIII, Zbiorniki zasobniki, kominy, maszty, Praca zbiorowa, Arkady 1966
4. Zbiorniki na ciecze, Cz. Kłoś, A. Mitzel, J. Suwalski, Arkady, 1961
5. Silosy, W. Nowacki, K. Dąbrowski, Arkady 1955
6. Chłodnie kominowe i wentylatorowe, J. Ledwoń, M. Golczyk, Arkady 1967
7. Projektowanie zbiorników żelbetowych cz. 1, 2, A. Halicka, D. Franczak, PWN 2011-2013

Additional bibliography:

1. Teoria płyt i powłok, S. Timoshenko, Arkady 1962
2. Konstrucje żelbetowe t.1-5, W. Starosolski, PWN 2012-2015

Result of average student's workload

Activity	Time (working hours)
1. Udział w wykładach	10
2. Prace projektowe wykonywane w domu	15
3. Udział w konsultacjach związanych z realizacją projektu	5
4. Przygotowanie się do zaliczenia końcowego z ćwiczeń projektowych	5
5. Przygotowanie się do egzaminu i obecność na egzaminie	10

Student's workload

Source of workload	hours	ECTS
Total workload	100	2
Contact hours	65	1
Practical activities	40	1