STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Concrete Structures II		**1010102121010110127**
Field of study: **Civil Engineering Second-cycle Studies**	Profile of study (general academic, practical): **general academic**	Year /Semester: **1 / 2**
Elective path/specialty: **Structural 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: **15** Classes: **-** Laboratory: **-** Project/seminars: **30**		No. of credits: **4**
Status of the course in the study program (Basic, major, other): **other**	(university-wide, from another field): **university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	A student has knowledge of: general mechanics and strength of materials, basis of theory of concrete structures, knows analysis principles of simple and complex RC elements design with taken RC two-way reinforced slabs into consideration.
2	**Skills**	A student can estimate and report loads acting on building structures. Student can classify building structures, design RC structure elements with taken two-way reinforced slabs into consideration and choose analytical or numerical solution of engineering problems.
3	**Social competencies**	A student understands the need for lifelong learning and knows how to interact in a group.

Assumptions and objectives of the course:

The gaining of knowledge concerning design of prestressed structures.

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

Knowledge:

1. A student knows the basic type of loads acting on shell covers, he knows analysis principles rotational shells and spherodial shells whose performance is a complex state of stress. - [- K_W01, K_W02, K_W04, K_W05, K_W14, K_W09, K_W14,]
2. A student knows different type of loads in design situations concerning prestressed structures. - [K_W01, K_W02, K_W04, K_W05, K_W14, K_W09, K_W14,]
3. A student knows principles of designing, dimensioning and reinforcing sections in prestressed structures. - [K_W04, K_W07, K_W09, K_W14]
4. A student knows principles of designing and dimensioning prestressed structures - [K_W07, K_W08, K_W11]

Skills:

1. A student is able to calculate loads acting on ground and underground shell structures. - [K_U01, K_U02, K_U03, K_U04]
2. A student is able to characterize different type of shell covers, liquid tanks, silos and he is able to calculate reinforcement. - [K_U02, K_U03]
3. A student is able to calculate losses of prestress and loads acting on sections in prestressed structures. - [K_U04, K_U05, K_U07, K_U08]

Social competencies:

1. A student understands the need of lifelong learning, is able to organize the learning process of others. - [K_K01, K_K02, K_K06]
2. A student is able to cooperate and work in a group. - [K_K01]
3. He correctly identifies and resolves problems associated with his profession. - [K_K07, K_K09]

Assessment methods of study outcomes

Credit in written form (exam) 1,5h

Credit of projects

Estimation of individual projects on the basis of calculation 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. Introduction to the design of prestressed concrete structures.
2. Basic material properties and methods of production of prestressed structures.
3. Basic principles of designing prestressed structures.
4. Rules for selecting the shape of the cross-section.
5. Compressive forces.
6. Immediate losses of prestress for pre- and post-tensioning and time dependent lossess of prestress for pre- and post-tensioning and their determination.
7. Ultimate Limit State in basic computational situations.
8. Anchorage zones in prestressed concrete structures.
9. Serviceability Limit State

Basic bibliography:

1. Konstrukcje z betonu sprężonego ? Andrzej Ajdukiewicz, Jakub Mames, Polski Cement, Kraków 2004.
2. PN-EN 1992-1-1: wrzesień 2008 ? Eurokod 2. Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków.
3. PN-B-03264:2002 ? Konstrukcje betonowe żelbetowe i sprężone. Obliczenia statyczne i projektowanie.

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in design classes	30
3. Complete (at home) works involved in project	15
4. Participation in the consultations associated with the exercises and design classes	5
5. Preparing to the final test of lectures	5
6. Preparing to the final test of exercise classes	15

Student's workload

Source of workload	hours	ECTS
Total workload	85	4
Contact hours	45	2
Practical activities	40	2