

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Concrete Structures II		Code 1010115121010110127
Field of study Civil Engineering Extramural Second-cycle	Profile of study (general academic, practical) (brak)	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) part-time	
No. of hours Lecture: 10 Classes: 8 Laboratory: - Project/seminars: 18		No. of credits 4
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		ECTS distribution (number and %)
Responsible for subject / lecturer: dr inż. Adam Uryzaj email: adam.uryzaj@put.poznan.pl tel. 0616652058 Wydział Budownictwa i Inżynierii Środowiska ul. Piotrowo 5, 60-965 Poznań		Responsible for subject / lecturer: dr inż Piotr Frąszczak 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	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 spheroidal 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		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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	10	
2. Participation in auditorium exercises	8	
3. Participation in design classes	36	
4. Complete (at home) works involved in project	15	
5. Participation in the consultations associated with the exercises and design classes	5	
6. Preparing to the final test of lectures	5	
7. Preparing to the final test of exercise classes	15	
Student's workload		
Source of workload	hours	ECTS
Total workload	94	4
Contact hours	54	2
Practical activities	40	2