

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Concrete Structures</b>		Code <b>1010115111010110072</b>
Field of study <b>Civil Engineering Extramural Second-cycle</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Structural Engineering</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>part-time</b>	
No. of hours Lecture: <b>18</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>10</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b> dr inż. Piotr Frąszczak email: piotr.fraszczak@put.poznan.pl tel. +48 061 665 2057 Faculty of Civil and Environmental Engineering 60-785 Poznań, ul.Piotrowo 5		<b>Responsible for subject / lecturer:</b> dr inż. Piotr Frąszczak email: piotr.fraszczak@put.poznan.pl tel. + 48 061 665 2057 Faculty of Civil and Environmental Engineering 60-785 Poznań, ul.Piotrowo 5
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	A student has the knowledge of general mechanics and strength of materials, basis of theory of reinforced concrete structures, knows analysis principles of simple and complex RC elements design. A student knows building standards and requirements concerning design of building structures and their elements.
2	<b>Skills</b>	A student can estimate and report permanent and variable loads acting on building structures. Student can classify building structures, design RC structure elements and choose analytical or numerical solution of engineering problems.
3	<b>Social competencies</b>	A student understands the need for lifelong learning and knows how to interact in a group.
<b>Assumptions and objectives of the course:</b> -The gaining of knowledge and skills concerning design of RC slab elements (working in different way) in ULS and SLS. Analysis of building structures. Preparing for modeling of RC structures by the Autodesk Robot Structural Analysis Program.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. A student knows the basic design method of RC slab elements in RC structures - [K 2 W02, K 2 W04, K 2 W14] 2. A student presents the design issues of spatial RC structures - [K 2 W04, K 2 W09, K 2 W14 ] 3. A student knows the range applying of computers program needed to analyse and design RC structures. - [K 2 W08, K 2 W16 ]		
<b>Skills:</b>		
1. A student uses building standards of loads on building structures as well as in the static calculation and dimensioning of RC structures. - [K 2 W01, K 2 W02, K 2 W03, ] 2. A student is able to design RC slab structures with taken frames into consideration - [K 2 W03, K 2 W13]		
<b>Social competencies:</b>		
1. A student understands the need of lifelong learning, is able to organize the learning process of others. - [K 2 W02, K 2 W03] 2. A student is able to cooperate and work in a group - [K 2 W01, K 2 W06] 3. He correctly identifies and resolves problems associated with his profession - [K 2 W07]		

<b>Assessment methods of study outcomes</b>		
-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		
<b>Course description</b>		
-Form of teaching: classes Method of designing and dimensioning RC slab structures especially two-way reinforced slabs Load report in two-way reinforced slabs Dimensioning of reinforced concrete slab structures to bending and shear ULS, SLS. Form of teaching: projects Project of two-way reinforced slab		
<b>Basic bibliography:</b> 1. PN-EN 1992-1-1: wrzesień 2008 ? Eurokod 2. Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków. 2. PN-B-03264:2002 ? Konstrukcje betonowe żelbetowe i sprężone. Obliczenia statyczne i projektowanie. 3. Kobiak J. Stachurski W.: Konstrukcje żelbetowe, Arkady 4. Starosolski W.: Konstrukcje żelbetowe według PN-B-03264:2002 i Eurokodu 2. PWN 5. Knauff M.: Obliczanie konstrukcji żelbetowych według Eurokodu, PWN Warszawa 2012 6. Halicka A, Franczak D.: Projektowanie zbiorników żelbetowych. Tom 1: Zbiorniki na materiały sypkie. Tom 2 Zbiorniki na ciecze, PWN, 7. Ajdukiewicz A.: Eurokodu 2. Podręczny skrót dla projektantów konstrukcji żelbetowych. 8. Knauff M., Golubińska A.: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń, PWN Warszawa 2013		
<b>Additional bibliography:</b> 1. Łapko A., Jansen B.C.: Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady, Warszawa 2005 2. Knauff M., Golubińska A.: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń, PWN Warszawa 2013		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Lectures	18	
2. Participation in design classes	10	
3. Complete (at home) works involved in the project	30	
4. Participation in the consultations associated with the audience and design classes	10	
5. Preparing to the final test	12	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	80	4
Contact hours	28	1
Practical activities	52	3