

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Technology of Concrete		Code 1010101131010111404
Field of study Civil Engineering First-cycle Studies	Profile of study (general academic, practical) general academic	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: 15 Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: Dr hab. inż. Krzysztof Zieliński, prof. nadzw. PP email: krzysztof.zielinski@put.poznan.pl tel. 61 665 21 68 Faculty of Civil and Environmental Engineering ul. Piotrowo 5, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of the following subjects: mathematic, physics, chemistry. Knowledge concerning classification and assessment of construction materials.
2	Skills	Ability to obtain information from literature and other sources. Capability to select optimum building material for a particular building/ structure.
3	Social competencies	Understanding the need to continue education throughout the professional career. Understanding the necessity of co-operation and team work.
Assumptions and objectives of the course: Passing on engineering knowledge regarding design of concrete mixes, classification and scope of applications in construction as well as carrying out standard concrete work.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows basic principles of designing concrete mixes - [[K_W14]]		
2. Student knows construction materials used with concrete (their classification and application range) - [[K_W06, K_W14]]		
3. Student knows the principles of preparing, transporting and applying concrete mix - [[K_W12, K_W14]]		
Skills:		
1. Properly perform standard concrete works - [[K_U20, K_U21]]		
2. Design concrete mixes for making common concrete meeting required characteristics - [[K_U20, K_U21]]		
3. Carry out simple laboratory tests of aggregates and cements - [[K_U13]]		
Social competencies:		
1. Student is capable of working individually as well as co-operating within a team on a given assignment - [[K_K01]]		
2. Student is responsible for the accuracy of results obtained and is able to provide interpretation - [[K_K02]]		
3. Student individually expands his/ her knowledge concerning modern techniques and technologies - [[K_K03]]		
Assessment methods of study outcomes		

<p>Lectures: - oral or written test, Laboratory classes: - oral test of knowledge before the start of laboratory classes, - preparation and defence of concrete mix, - final test after completing the classes.</p>		
Course description		
<p>Lectures Basic information on standardization and classification of cement concrete types. Concrete composition/ ingredients, properties of concrete mix and hardened concrete. Methods of designing concrete composition. Basic technological processes connected with preparation, transport, application and maintenance of concrete. Quality control of concrete. Admixtures (division, study methods, evaluation and discussing major varieties). Additives (ashes, bits, complex admixtures). Design of concrete with additives and admixtures, concrete application at low temperatures, application of large masses of concrete. Special concretes. Light concrete (distribution, application, basic components). Basic principles of lightweight concrete design.</p> <p>Laboratory classes Design of concrete mix (one of the four methods) with selected characteristics of consistency and strength class. Study of ingredients (aggregates, cement, water) with focus on suitability (compliance with relevant standards) to make concrete. Preparation of concrete mix. Study of basic characteristics of the mix (texture, volume) preparation of concrete samples. Testing the impact of various types of additives on the mix characteristics (plasticizing, binding time). Study of the compressive strength of concrete by destructive method. Determining the actual strength of the designed concrete.</p>		
<p>Basic bibliography: 1. Jamróży Z., Beton i jego technologie, Warszawa ? Kraków, Wydawnictwo Naukowe PWN 2000 2. Zieliński K., Podstawy technologii betonu, Wydawnictwo Politechniki Poznańskiej, Poznań 2012</p>		
<p>Additional bibliography: 1. Neville A. M., Właściwości betonu, Kraków, Stowarzyszenie Producentów Cementu 2012 2. Szymański E., Materiałoznawstwo budowlane z technologią betonu, cz. 2, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 1999 3. Technical magazines dealing with concrete technology, Internet.</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in lectures	15	
2. participation in laboratory classes.	15	
3. preparation/ revision for laboratory classes	10	
4. designing concrete mix composition (in volume and quality terms) ? during classes and at home	10	
5. participation in consultations	5	
6. preparation/ revision for summary test and presence during the test	10	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	35	2
Practical activities	25	1