

## MODULE SPECIFICATION

Module code	
Module title in Polish	<b>Technologia betonu</b>
Module title in English	<b>Technology of Concrete</b>
Module running from the academic year	<b>2016/2017</b>

### A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	<b>Civil Engineering</b>
Level of qualification	<b>First cycle</b> <i>(first cycle, second cycle)</i>
Studies profile	<b>Academic</b> <i>(academic/practical)</i>
Mode of study	<b>Full-time</b> <i>(full-time / part-time)</i>
Specialism	
Organisational unit responsible for module delivery	<b>Department of Civil Engineering Technology and Organization</b>
Module co-ordinator	<b>Wojciech Piasta, PhD D.Sc., Eng., Professor of the University</b>
Approved by	<b>Marek Iwański, Professor</b>

### B. MODULE OVERVIEW

Module type	<b>Core module</b> <i>(core/programme-specific/elective HES*)</i>
Module status	<b>Compulsory module</b> <i>(compulsory / non-compulsory)</i>
Language of module delivery	<b>English</b>
Semester in the programme of study in which the module is taught	<b>Semester 3</b>
Semester in the academic year in which the module is taught	<b>Winter semester</b> <i>(winter / summer)</i>
Pre-requisites	<b>None</b> <i>(module code/module title, where appropriate)</i>
Examination required	<b>No</b> <i>(yes / no)</i>
ECTS credits	<b>3</b>

Mode of instruction	lectures	classes	laboratories	project	others
<b>Total hours per semester</b>	<b>15</b>		<b>30</b>		

\* elective HES – elective modules in the Humanities and Economic and Social Sciences

### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aim of the module is to acquaint students with: concrete components, the methods of designing concrete mixture; the dependencies of properties and durability on qualitative and quantitative composition; acquiring the abilities of theoretical and experimental designing the composition of mixture and assessing the quality of fresh and hardened concrete.
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student is familiar with basic norms and guidelines with respect to requirements concerning concrete. A student has acquired knowledge on the fundamentals of technology and properties of concrete. A student has general knowledge on modern and special mixtures and concrete.	l/l	B_W08 B_W18	T1A_W02; T1A_W03; T1A_W04; T1A_W05; T1A_W07; T1A_W08
W_02	A student knows the requirements concerning concrete. the methods of designing aggregate mix and composition of concrete mix.	l/l	B_W18	T1A_W02; T1A_W03; T1A_W04; T1A_W05; T1A_W07; T1A_W08
W_03.	A student knows concrete properties, classes of exposition and the methods of technical examination concerning concrete mixture, and concrete itself. Additionally, a student knows basic standards for tests.	l/l	B_W18	T1A_W02; T1A_W03; T1A_W04; T1A_W05; T1A_W07; T1A_W08
U_01	A student can determine the requirements concerning concrete. In addition, a student can analyse the requirements; select and apply concrete with properties according to the needs.	l/l	B_U24	T1A_U03; T1A_U05; T1A_U08; T1A_U09; T1A_U13; T1A_U14; T1A_U15; T1A_U16
U_02	A student can design the composition of aggregate and concrete mixture.	l/l	B_U24	T1A_U03; T1A_U05; T1A_U08; T1A_U09; T1A_U13; T1A_U14; T1A_U15; T1A_U16
U_03	A student can select appropriate test methods of concrete structure and concrete (together with concrete components); a student can conduct technical control tests and analyse the obtained results.	l/l	B_U24	T1A_U03; T1A_U05; T1A_U08; T1A_U09; T1A_U13; T1A_U14; T1A_U15; T1A_U16
K_01	A student can work individually and in a team.	l/l	B_K01	T1A_K01;

				T1A_K03; T1A_K04
K_02	A student formulates conclusions correctly.	I/I	B_K04	T1A_K01; T1A_K07
K_03	A student is aware of the responsibility for work safety.	I/I	B_K02 B_K05	T1A_K02; T1A_K05; T1A_K07

### Module content:

#### 1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Basic concepts, terms, and definitions as regards concrete technology. Normative classes of concrete mixture and concrete.	W_01 U_01
2	Concrete components.	W_01 U_01
3	The methods of designing the composition of concrete mixtures.	W_02 U_02
4	The properties of concrete mix and tests concerning concrete mixes.	W_03 U_03
5	Chemical and physical properties of concrete. The microstructure of concrete.	W_01 U_01
6	Strength and deformation properties and performance properties of concrete.	W_01 U_01
7	Durability of concrete.	W_01 U_01
8	High performance and self-consolidating concretes. Special concrete types.	W_01 U_01

#### 2. Topics to be covered in the classes

No.	Topics	Module outcome code
1	Standards concerning testing components, concrete mixtures, and concrete. Normative tests for designing the composition of concrete mixture.	W_01 U_01 K_01 K_03
2	Laboratory tests concerning geometrical properties of aggregates, the analysis of results.	W_03 U_03 K_01 K_02 K_03
3	Determining water demand of coarse and fine aggregate.	W_03 U_03 K_01 K_03
4	Laboratory tests and calculation determining optimal grain composition of coarse aggregate.	W_03 U_03 K_01 K_03
5	Designing aggregate mixture with the use of test results. Determining sand content.	W_02 U_02 K_01 K_02 K_03
6		W_02

	Designing the composition of concrete mixture with the use of test results.	U_02 K_01 K_02 K_03
7	Designing the composition of concrete mixture with mineral and chemical addition.	W_02 U_02 K_01 K_03
8	Making concrete mix. Laboratory tests concerning the consistency, density of mix and air content in the mix. Casting specimens for tests of concrete properties	W_03 U_03 K_01 K_03
9	The test methods of hardened concrete.	W_03 U_03 K_01 K_03
10	Testing strength of concrete with the sclerometric method and analysis of the test results.	W_03 U_03 K_01 K_03
11	Testing strength of concrete with the ultrasonic method and analysis of the test results.	W_03 U_03 K_01 K_03
12	Testing the modulus of elasticity and transverse deformation	W_03 U_03 K_01 K_03
13	Testing strength of concrete and analysis of test results; determining the strength class of concrete.	W_03 U_03 K_01 K_03
14	Correcting the composition of concrete mix.	W_02 U_02 K_01 K_02 K_03

3. Topics to be covered in the laboratories

4. Topics to be covered in the projects

### Assessment methods

<b>Module outcome code</b>	<b>Assessment methods</b> <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	A project and a test
W_02	A project and a test
W_03	A project and a test
U_01	A project and a test
U_02	A project and a test
U_03	A project and a test
K_01	A project and a test
K_02	A project and a test
K_03	A project and a test

## C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	<b>15</b>
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	<b>30</b>
4	Contact hours: attendance at office hours (2-3 appointments per semester)	<b>3</b>
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	<b>2</b>
7	Contact hours: attendance at an examination	
8		
9	<b>Number of contact hours</b>	<b>50</b> <i>(total)</i>
10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>2</b>
11	Private study hours: background reading for lectures	<b>5</b>
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	<b>5</b>
14	Private study hours: preparation for laboratories	<b>5</b>
15	Private study hours: writing reports	
16	Private study hours: preparation for a final test in laboratories	
17	Private study hours: preparation of a project/a design specification	<b>10</b>
18	Private study hours: preparation for an examination	
19		
20	<b>Number of private study hours</b>	<b>25</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>1</b>
22	<b>Total study time</b>	<b>75</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>3</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	<b>50</b>
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>2</b>