STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Concrete Structures		**1010104161010110072**
Field of study: **Civil Engineering First-cycle Studies**	Profile of study (general academic, practical): **general academic**	Year /Semester: **3 / 6**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **part-time**	
No. of hours: Lecture: **20** Classes: **10** Laboratory: **-** Project/seminars: **12**		No. of credits: **6**
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 knows the basic physical sense: a force, stress, strain, strength. A student has the knowledge of mathematics, physics, chemistry, general mechanics and strength of materials in the field of study Civil Engineering.
2	**Skills**	A student converts algebraic and arithmetic expressions. A student uses mathematical analysis and basic formulae fluently in the field of structural mechanics and strength of materials. A student is able to compose possible loads. A student knows how to use simple software.
3	**Social competencies**	A student understand the need for lifelong learning and knows how to interact and work in a group.

Assumptions and objectives of the course:

-The aim of the subject is to teach students how to according to obligatory standards calculate concrete and reinforced concrete elements working in different ways.

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

Knowledge:

1. History of concrete and reinforced concrete, examples of carried out RC structures, basic properties of concrete and steel. - [K_W04, K_W14]
2. Ultimate limit state ? rules of calculation: bending, shear and compression elements. - [K_U07]
3. Serviceability limit state - rules of calculation: width of vertical cracks, deflections of RC elements. - [K_U07]
4. Basic requirements of concrete elements reinforcement - [K_U08]

Skills:

1. A student is able to compose possible loads - [K_U02]
2. A student can calculate internal forces at designed RC section of beams, columns and slabs - [K_U04]
3. A student can calculate rectangular and T-beam sections of bending beams with tension steel and tension and compression steel - [K_U06, K_U07]
4. A student can calculate RC sections loaded by moment and compression force - [K_U05, K_U07]
5. A student can calculate and design one-way slabs, beams, columns - [K_U06, K_U07]

Social competencies:

1. A student understand the need for lifelong learning; able to inspire and organize the learning process of others - [K1_K06]
2. A student able to interact and work in a group - [K1_K01]
3. A student correctly identifies and resolves dilemmas associated to his profession - [K1_K07]

Assessment methods of study outcomes

-Lectures ? test in written form ? 1,5h

Exercises classes ? test in written form (1,5h ? per semester)

Design classes - evaluation of individual student projects combined with an oral defense of the thesis, test in the exercises (1 per semester - 1.5 hours)

test in the lectures. (1 per semester - 1.5 hours)

The evaluation scale:

more than 100 excellent

91-100 very good (A)

81 - 90 good plus (B)

71 - 80 Good (C)

61 - 70 is sufficient plus (D)

51 - 60 satisfactory (E)

insufficient under 50 (F)

Course description

-Material properties ? concrete and steel

Issue: the bond, the anchorage

Behavior of RC beam under increasing load, design situations.

Method of calculation RC sections

Ultimate limit state ? (calculation according equivalent rectangular stress distribution method)

Design of bending beams with tension steel and tension and compression steel.

Shear

Method of calculation RC sections loaded by moment and compression force

Serviceability limit state ? cracking and deflection

Detailing of reinforcement ? general rules.

Basic bibliography:

1. PN-EN 1992-1-1 Eurokod 2. Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków.

2. Knauff M.: Obliczanie konstrukcji żelbetowych według Eurokodu, PWN Warszawa 2012

3. Knauff M., Golubińska A.: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń, PWN Warszawa 2013

Additional bibliography:

1. Sekcja Konstrukcji Betonowych KILiW PAN Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2. Dolnośląskie Wydawnictwo Edukacyjne.

2. Łapko A., Jansen B.C.: Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady, Warszawa 2005

3. Mosley B., Bungey J., Hulse R.: Reinforced concrete design to Eurocode 2, Palgrave Macmillan New York 2009.

4.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	20
2. Participation in exercise classes	10
3. Participation in design classes	12
4. Complete (at home) works involved in the project	30
5. Participation in the consultations of the exercise and design classes	10
6. Preparing to the test in the field of exercise and design classes	25
7. Preparing to the exams test	25

Student's workload

Source of workload	hours	ECTS
Total workload	150	6
Contact hours	52	2
Practical activities	80	3