Course code: …….. **Plan position:** ……

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	**CONCRETE STRUCTURES**
Field of studies	civil engineering
Level of studies	bachelor's degree
Profile of studies	general academic
Form of studies	full-time
Specialty	common part
Unit responsible for the field of studies	Faculty of Civil And Environmental Engineering and Architecture
Name and academic degree of teacher(s)	Ph.D. Łukasz Mrozik
Introductory courses	-
Introductory requirements	-

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
winter	30						6

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	has an orderly and theoretically founded knowledge in the field of design, shaping and implementation of concreto structures; has elementary knowledge of calculating and constructing frame and hall buildings, prestressed structures and engineering structures	K_W14	P6S_WG
SKILLS			
U1	is able to develop documentation regarding the implementation of an engineering task and prepare a text containing an overview of the results of this task	K_U03	P6S_UW, P6S_UK
U2	is able to make an appropriate selection of construction products to the assumed technological and structural solutions, taking into account construction and physical requirements	K_U16	P6S_UW

U3	understands the essence of the work of concrete structures, can design and verify the load capacity of selected concrete elements	K_U21	P6S_UW
U4	is able to apply the method of limit states and partial factors, identify the loads on structures and determine the effects of their impact using appropriate standards	K_U33	P6S_UW
SOCIAL COMPETENCES			
K1	is aware of the responsibility for the effects of the adopted design and engineering solutions in terms of safety of the designed and constructed building and its impact on the natural environment	K_K07	P6S_KK, P6S_KO, P6S_KR
K2	is aware of the benefits of using numerical computational techniques in solving mathematical problems, including engineering issues related to construction, related to the processing of experimental data, design, optimization as well as the analysis of the behavior of materials and structures	K_K08	P6S_KK
K3	is aware of the probabilistic nature of the work of building and engineering structures	K_K09	P6S_KK

3. TEACHING METHODS

A. Traditional methods used ***

multimedia lecture, discussion, examples

B. Distance learning methods used ***

Synchronous method:
remote lecture in the form of videoconference, remote discussion

Asynchronous method:
online multimedia presentations

4. METHODS OF EXAMINATION

colloquium

5. SCOPE

Lectures	Introduction to concrete structures. Reinforcement durability and coverage, spacing and anchorage. Bendable single and double reinforced sections, rectangular and T-sections. Design for shear force. Serviceability limit states. Idealization of the structure. Constructing of reinforcement and elements. Structure analysis methods. Introduction to geometrical imperfections and second-order effects. Elements loaded with bending moment and longitudinal force. Torsion and puncture. Designing unreinforced and weakly reinforced structures. Designing concrete and reinforced concrete foundations. Fundamentals of designing lightweight concrete structures. Basics of designing prefabricated structures. Outline of the theory of designing prestressed structures.
Laboratories	-

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

	Form of assessment

LEARNING OUTCOME	Oral examination	Written exam	Colloquium	Project	Presentation	……
W1			x			
U1			x			
U2			x			
U3			x			
U4			x			
K1			x			
K2			x			
K3			x			

7. LITERATURE

Basic literature	1. Knauff M.: Obliczanie konstrukcji żelbetowych według Eurokodu 2. Wyd. Naukowe PWN, Warszawa 2012 2. Łapko A., Jensen B. Ch.: Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych. Wyd. Arkady, Warszawa 2006 3. Pędziwiatr J.: Wstęp do projektowania konstrukcji żelbetowych wg PN-EN 1992-1-1:2008. Dolnośląskie Wydawnictwa Edukacyjne, Wrocław 2010
Supplementary literature	1. Kamiński M., Pędziwiatr J., Styś D.: Projektowanie konstrukcji żelbetowych. DWE, Wrocław 2004

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	30
	Supervision hours	10
Student's own work	Preparation for classes	40
	Reading assignments	50
	Other (preparation for exams, tests, carrying out a project etc)	50
Total student workload		180
	Number of ECTS points	6