

COURSE DESCRIPTION CARD

Faculty of Civil Engineering and Environmental Sciences									
Field of study								Degree level and programme type	
Specialization/ diploma path								Study profile	Academic profile
Course name	Prestressed concrete structures							Course code	IS-FCEE-00011S
								Course type	Erasmus
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	summer
	30			30				No. of ECTS credits	5
Entry requirements	Concrete Technology, Concrete Structures, Strength of Materials								
Course objectives	Increased knowledge of the design and construction of prestressed concrete structures. The skills necessary to analyze, design and construct of prestressed objects. The skills to identify the issues related to the design and construction of prestressed structures.								
Course content	Idea of prestressed structures. History of prestressed structures. Comparison of prestressed structures and reinforced concrete structures. Properties of concrete for prestressed structures and prestressing reinforcement. Technology of prestressed concrete (pre-tensioned and post-tensioned elements). Grout. Losses of prestress. Effects of prestressing on concrete elements and structures, design of prestressing. Limitation of stress due to service load, limiting zone for the location of the tendons. Cross-section forming. Crack resistance. Limiting zone for the pressure line. Ultimate resistance of elements subjected to axial force and bending moment. Elements subjected to shear. Analysis of the anchorage zone. Stress in the anchorage zone. Calculation model and check of zones under anchors. Reinforcement of the anchorage zone. Serviceability Limit State. Crack control. Deflection control. Examples of civil engineering prestressed structures.								
Teaching methods	traditional lecture, tasks for self-solution, group discussion of solutions proposed								
Assessment method	lecture – written exam; project – project completion, presentation and discussion								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Student knows the rules of elements and objects prestressing							K_B2_W02, K_B2_W03	
LO2	selects the technology of prestress and the materials for structure forming							K_B2_W05, K_B2_U01	

L03	identifies and assesses the losses of prestress	K_B2_W07, K_B2_U04
L04	analyses and designs the prestressed concrete structures	K_B2_W02, K_B2_W03, K_B2_W07, K_B2_U04
L05	works out and verified the project documentation	K_B2_U10, K_B2_K02
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
L01	written exam, project evaluation, project discussion	L, P
L02	written exam, project evaluation	L, P
L03	written exam, evaluation of calculations	L, P
L04	project evaluation and discussion	P
L05	evaluation of project documentation	P
Student workload (in hours)		No. of hours
Calculation	lecture attendance	30
	participation in classes	30
	participation in student-teacher sessions related to the classes/seminar/project	1
	working on projects	30
	preparation for and participation in exams/tests (28+2)	30
	implementation of project tasks	9
	TOTAL:	130
Quantitative indicators		HOURS
Student workload – activities that require direct teacher participation		No. of ECTS credits
		63
Student workload – practical activities		70
		2,5
Basic references	1. Collins M.P., Mitchell D.: Prestressed concrete structures. Prentice Hall, New Jersey, 1991 2. Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings, 2004 3. Navratil J.: Prestressed concrete structures. Akademie Nakladelstvi CERM. Brno, 2006	
Supplementary references	4. Nilson A.: Design of concrete structures. McGraw-Hill, Incorporated, New York, USA, 1997. 5. ACI Structural Journal 6. Engineering Structures, Elsevier Science.	
Organisational unit conducting the course	Department of Building Structures	Date of issuing the programme
Author of the programme	Marta Kosior-Kazberuk, DSc, PhD, Eng Julita Krassowska PhD, Eng	17.03.2021

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar