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	**Strength of materials**						**Course code**		**IS-FCEE-00001-1W**
							Course type		**Erasmus**
Forms and number of hours of tuition	**L**	**C**	**LC**	**P**	**SW**	**FW**	**S**	**Semester**	**winter**
	30		**15**	**30**				**No. of ECTS credits**	**6**
Entry requirements	**Theoretical mechanics**								
Course objectives	Students become familiar with the mechanical properties of basic construction materials. Students can determine geometric characteristics of plane sections; indentify strength cases, analyze stresses and deformations of bar elements. Students become familiar with the relationships between deformations and stresses.								
Course content	Lecture: Mechanical properties of materials, geometric characteristics of plane sections; simple and complex strength cases: axially loaded members, pure bending, shearing, torsion, eccentric compression / tension, complex bending and shearing, beam deflection and slope, column buckling. Project: geometric characteristics of plane sections; application of simple and complex strength cases – computational problems; beam deflection and slope - computational problems. Laboratory: laboratory tests of mechanical properties of construction materials; illustration of the laws of mechanics using the physical models.								
Teaching methods	Informative lecture, solving practical problems, discussion on the project, performing laboratory tests								
Assessment method	Lecture – written exam, project - discussion on the project, test, laboratory – reports, test								
Symbol of learning outcome	**Learning outcomes**								**Reference to the learning outcomes for the field of study**
LO1	Student has knowledge about the strength of materials and the general principles of designing of building structures,								K_B1_W03
LO2	Student knows simple and complex strength cases - the principles of analysis, modeling and designing of construction elements. Is able to define computational models of structures and their elements for analytical analysis of structures, and carry out analysis.								K_B1_W05 K_B1_U06
LO3	Student knows the physical and mechanical properties of materials used in construction and testing methods. He can make a choice and correctly use building materials.								K_B1_W01 K_B1_U05

LO4	Student can critically assess his knowledge in the field of strength of materials.	K_B1_K01

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture – written exam,	L
LO2	Lecture – written exam, project – discussion and tests	L, P
LO3	Lecture – written exam, project – discussion and tests, laboratory - reports, test	L, P, LC
LO4	Lecture – written exam, project – discussion and tests	L,P

Student workload (in hours)		No. of hours
Calculation	lecture attendance	30
	participation in project, laboratory classes	45
	preparation for laboratory classes	15
	Laboratory reports, homework	25
	participation in student-teacher sessions related to the course	5
	Solving project tasks (including preparation of multimedia presentations)	30
	preparation for exam and participation in it	15
	Preparation for the project	15
	TOTAL:	180

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	85	2,8
Student workload – practical activities	135	5

Basic references	1. BY R. Subramanian: Strength of materials, Oxford University Press, 2010. 2. Vitor Dias da Silva: Mechanics and strength of materials, Springer-Verlag Berlin Heidelberg 2006. 3. Surya N. Patnaik Dale A Hopkins; Surya Hopkins,Dale Patnaik,: Strength of materials, Burlington Butterworth-Heinemann, 2004.
Supplementary references	1. Jastrzębski P., Mutermilch J., Orłowski W.: Wytrzymałość materiałów, cz.1 i cz.2. 2. Aleksander J. M.: Strength of Materials, Vol. 1. 3. Bandyszewski W, Ibiańska-Jarmoc D.: Wytrzymałość materiałów, przykłady obliczeń Część II, Wydawnictwo Politechniki Białostockiej, Białystok, 2008.

Organisational unit conducting the course	Department of Geotechnics and Structural Mechanics	Date of issuing the programme
Author of the programme	Joanna Krętowska, PhD. Eng.	8.03.2021

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