

Faculty of Civil and Environmental Engineering						
Study programme:	Agro-food and forestry engineering		Degree level: First degree undergraduate full-time courses			
Specialization			Diploma path:			
Module name:	Technical mechanics		Module ID: IR1202			
Module type:	obligatory	Semester: 2	Points ECTS ¹⁾ 6			
No. of hrs in semester:	W - 30	C- 15	L-15 0	P- 0	Ps- 0	S- 0
Prerequisites:	<i>Mmathematics, physics</i>					
Aims and objectives:	Students become familiar with general problems of theoretical mechanics and strength of materials covering the general rights and principles. Get to know the methodology of solving simple technical issues in the way of analytical and experimental analysis. Students know how to use principles and methods of mechanics and strength of materials to understand and describe the phenomena occurring in the engineering problems. Develop creative skills and activities in the field of performing and analyzing the results of a simple experiment using known methods and procedures.					
Teaching methods:	Lecture - written exam, exercises – tests, laboratory - reports, tests					
Module content:	<p>Statics general notions and principles. Force system resultants. Static equilibrium. Centre of figure and solid. Static and kinetic friction. Basis of kinematic and dynamic analysis of problems of particle and rigid bodies. Types of rod structures. Strength of material. Internal forces diagrams for beams and frames. Moment of inertia of an area. Parallel axis theorem. Principal axes and principal moment of inertia. Stress, strain, and deformation of axially loaded bar, analysis of torsion of circular bars, bending and transverse shear stress. Elastic curve of neutral axis of the beam. Evaluation of beam deflection and slope: Double integration method. Strain energy. Column buckling. Euler's theory of long columns. Strength hypothesis Laboratory:</p> <ol style="list-style-type: none"> 1 A simple static tensile test for steel. 2 Strict static tensile test for steel - Young's modulus determination 3 A static compression test: steel, cast iron, wood. 4 Torsion test - Kirchhoff's modulus determination. 5 Elastic buckling - Critical loads determination. 6 Study of metal hardness Brinell and Rockwell method. <p>The Charpy impact test 7 Experimental methods of stress determination</p>					
Learning outcomes	<i>student who passed the exam:</i>			<i>Relevance to the programme learning outcomes</i>		
EK1	he student has theoretical knowledge concerning the general mechanics and strength of materials problems			K_1A_W02, K_1A_W05		
EK2	knows how to formulate a technical problem by the transposition of the actual object to the computational schema and vice versa			K_1A_U01, K_1A_U06		
EK3	knows how to formulate and solve simple analytical problems of the mechanics and strength of materials			K_1A_U01, K_1A_U04		

EK4	performs measurements of mechanical coefficients	K_1A_W08, K_1A_U05
EK5	knows how to design an experiment and evaluate its results	K_1A_U01, K_1A_U05
EK6	able to work in a team, shall apply the principles of OCCUPATIONAL SAFETY and HEALTH	K_1A_K01, K_1A_K03
EK7	.	
EK8		

student workload	participation for lectures	15 x 2h =	30
	participation for exercises	15 x 1h =	15
	participation for laboratory	15 x 1h =	15
	preparation for laboratory	7 x 3h =	21
	preparation for the exercises	7 x 2h =	14
	preparation laboratory report	7 x 3h =	21
	homework	7 x 3h =	21
	preparation for and participation in exams	23h+2h	25
	consultations		13
		RAZEM: ¹⁾	175
quantitative indicators	Student workload - activities that require direct teacher participation 30h+15h+15h+13h+2h=75h	75	ECTS ^{4,5)} 2,5
	Student workload - practical skills activities 15h+15h+21h+14h+21h+21h+3h=110h	90	3
basic references:	1. Wilde P: <i>Wizmur M., Mechanika teoretyczna</i> , PWN, Warszawa 1984, 2. Misiak J: <i>Mechanika ogólna, tom 1</i> , WNT, Warszawa 1993, 3. Misiak J: <i>Zadania z mechaniki ogólnej, cz.1</i> , WNT, Warszawa 1993, 4. Misiak J: <i>Mechanika ogólna, tom 2</i> , WNT, Warszawa 1997, 5. Dyląg Z., Jakubowicz A., Orłoś Z.: <i>Wytrzymałość materiałów, t.1</i> , 6. Grabowski J., Iwanczewska A.: <i>Zbiór zadań z wytrzymałości materiałów</i>		
supplementary references:	1. Leyko J: <i>Mechanika ogólna, tom 1</i> , PWN, Warszawa 1996. 2. I. Mieszczerski - <i>Zbiór zadań z mechaniki</i> , 3. Romicki R: <i>Rozwiązania zadań z mechaniki zbioru I.N. Mieszczerskiego</i> , PWN, Warszawa 1971, 4. T.C.Bradbury: <i>Theoretical mechanics</i> ,		
number of learning effect:	the method of learning effect verification	learning form	
EK1	written exam (lecture), test (exercise, laboratory), lab. reports	L,Ex, Lab	
EK2	written exam (lecture), test (exercise)	L,Ex	
EK3	written exam (lecture), test (exercise)	L,Ex	
EK4	test (laboratory), lab. reports	Lab	
EK5	test (laboratory), lab. Reports	Lab	
EK6	test (laboratory), lab. reports	Lab	