

MODULE SPECIFICATION

Module code	
Module title in Polish	Mechanika teoretyczna
Module title in English	Theoretical Mechanics
Module running from the academic year	2016/2017

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	Civil Engineering
Level of qualification	First cycle <i>(first cycle, second cycle)</i>
Studies profile	Academic <i>(academic/practical)</i>
Mode of study	Full-time <i>(full-time / part-time)</i>
Specialism	
Organisational unit responsible for module delivery	The Department of Mechanics, Metal Structures and Computer Methods
Module co-ordinator	Agnieszka Dudzik, PhD, Eng.
Approved by	Marek Iwański, Professor

B. MODULE OVERVIEW

Module type	Core module <i>(core/programme-specific/elective HES*)</i>
Module status	Compulsory module <i>(compulsory / non-compulsory)</i>
Language of module delivery	English
Semester in the programme of study in which the module is taught	Semester 2
Semester in the academic year in which the module is taught	Sumer semester <i>(winter / summer)</i>
Pre-requisites	None <i>(module code/module title, where appropriate)</i>
Examination required	Yes <i>(yes / no)</i>
ECTS credits	6

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per semester	15	30		15	

* elective HES – elective modules in the Humanities and Economic and Social Sciences

C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to acquaint students with the abilities of utilising equilibrium equations to determine interactions and acquiring the skills of determining internal forces in basic plane statically determinate rod structures.
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student has knowledge as regards a vector calculus.	l/c/p	B_W01	T1A_W01 T1A_W02
W_02	A student knows the principles of preparing rod structures schemas as well as static analysis.	l/c/p	B_W06 B_W07	T1A_W02 T1A_W03 T1A_W04 T1A_W06 T1A_W07
U_01	A student can make a reduction of forces to a point.	l/c/p	B_U01	T1A_U08 T1A_U09
U_02	A student can define calculation models.	l/c	B_U02 B_U03	T1A_U08 T1A_U11 T1A_U13
U_03	A student can build equilibrium equations and determine the interaction of shields, solids, and statically determinate rod structures.	l/c/p	B_U09	T1A_U03 T1A_U05 T1A_U07 T1A_U09 T1A_U13 T1A_U14
U_04	A student is able to determine internal forces in statically determinate rod structures.	l/c/p	B_U09	T1A_U03 T1A_U05 T1A_U07 T1A_U09 T1A_U13 T1A_U14
K_01	A student can work individually.	c/p	B_K01	T1A_K01 T1A_K03 T1A_K04
K_02	A student is responsible for the reliability of the obtained results.	c/p	B_K02	T1A_K02 T1A_K05 T1A_K07
K_03	A student formulates conclusions and describes the results of his/her own works.	p	B_K04	T1A_K01 T1A_K07

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	The elements of the vector calculus. Static moments of forces about point and axial. Varignon's theorem. A resultant of a plane system of forces. A static moment of pair of forces.	W_01
2	Reducing a system forces to a point. The cases of forces systems. The equilibrium of forces system. Dependent and independent equilibrium equations. The equilibrium of shields and solids.	W_01 U_01 U_03
3	The classification of building structures. The classification of loads. The classification of support conditions. The methods of rods joining. Static	W_02 U_02

	diagrams. Basic assumptions of statics. Static determinability and geometrical invariability of building structures.	U_03
4	Determining the reactions of simple beams, continuous articulated beams, frames, and trusses.	W_01 W_02 U_03 U_04
5	Solving plane trusses. The method of joints and the Ritter method.	W_02 U_03
6	Internal forces. The definition of internal forces as well as differential dependencies. Examining the function of internal forces as well as preparing diagrams.	W_02 U_04
7	The kinematics of a shield as well as shield systems. The principles of prepared works as well as kinematic determining the reaction of shields and beams.	W_01 W_02 U_03

2. Topics to be covered in the classes

No.	Topics	Module outcome code
1-4	The elements of the vector calculus. Static moments of forces about a point and axial. A resultant of a plane system of forces. A static moment of a pair of forces. The reduction of a system of forces in a plane and spatial system.	W_01 U_01 K_01 K_02
5-6	The cases of forces systems. The equilibrium of forces systems. The equilibrium of a shields and solids.	W_01 W_02 U_03 K_01 K_02
7-8	Determining the reactions of simple beams, articulated continuous beams, frames and trusses.	W_01 W_02 U_02 U_03 U_04 K_01 K_02
9-10	Solving plane trusses. The method of joints and the Ritter method.	W_01 U_03 K_01 K_02
11-14	Internal forces. The definition of internal forces as well as differential dependencies. Examining the function of internal forces as well as preparing diagrams for beams and frames.	U_04 K_01 K_02
15	The kinematics of a shield as well as shield systems. The principles of prepared works as well as kinematic determining the reactions of shields and beams.	W_01 W_02 U_03

3. Topics to be covered in the projects

Project number	Topics	Module outcome code
1	Determining a main vector, a main moment as well as the support reactions for a given plane system of forces. Determining a main vector, a main moment as well as the support reactions for a given spatial system of forces.	W_01 W_02 U_01 U_03

		K_01 K_02
2	Calculating axial forces in truss rods with the method of joints and the Ritter method. Preparing the diagrams of internal forces for a given an articulated beam and a frame.	W_01 W_02 U_03 U_04 K_01 K_02

Assessment methods

Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	An examination, a test, and a project
W_02	An examination, a test, and a project
U_01	An examination, a test, and a project
U_02	An examination
U_03	An examination, a test, and a project
U_04	An examination, a test, and a project
K_01	An examination, a test, and a project
K_02	An examination, a test, and a project
K_03	An examination, a test, and a project

C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	15
2	Contact hours: participation in classes	30
3	Contact hours: participation in laboratories	
4	Contact hours: attendance at office hours (2-3 appointments per semester)	1
5	Contact hours: participation in project-based classes	15
6	Contact hours: meetings with a project module leader	2
7	Contact hours: attendance at an examination	2
8		
9	Number of contact hours	65 <i>(total)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit =25-30 hours of study time)</i>	2.6
11	Private study hours: background reading for lectures	10
12	Private study hours: preparation for classes	10
13	Private study hours: preparation for tests	20
14	Private study hours: preparation for laboratories	
15	Private study hours: writing reports	
16	Private study hours: preparation for a final test in laboratories	
17	Private study hours: preparation of a project/a design specification	35
18	Private study hours: preparation for an examination	10
19		

20	Number of private study hours	85 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit =25-30 hours of study time)</i>	3.4
22	Total study time	150
23	Total ECTS credits for the module <i>(1 ECTS credit =25-30 hours of study time)</i>	6
24	Number of practice-based hours <i>Total practice-based hours</i>	53
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit =25-30 hours of study time)</i>	2.1