



Subject card

Subject name and code	Modelling in machine design, PG_00057372						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Łubiński					
	Teachers	dr hab. inż. Jacek Łubiński mgr inż. Bartosz Bastian dr inż. Leszek Dąbrowski dr hab. inż. Michał Wodtke					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	30.0	0.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study	SUM	
	Number of study hours	60	10.0		30.0	100	
Subject objectives	Improvement and integration of the knowledge and skills gained on earlier stages of engineering training. Opportunity to gain a wide scope of understanding of the use of methods used for the development of engineering models of phenomena and processes in real - life cases of engineering tasks. Obtainment of connections between the skills in use of modern tools for engineering analysis and the reality of practical activity on the basis of numerous examples of tasks realised in co - operation with industrial organisations.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U03] is able to prepare construction, technological and operational documentation in compliance with appropriate standards, including technical drawings in CAD 2D and 3D systems	The capacity to solve technical problems with the use current engineering tools on the basis of the engineering modeling and numerical analyses environment - ANSYS.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W05] possesses profound knowledge on the operation of complex systems and mechanical devices, including process equipment	Skills in analytical approach to engineering tasks and correct selection of input data, formation of load and support model and appropriate conditioning of the task with regard to the requirements of the simulation environment.			[SW1] Assessment of factual knowledge		
	[K7_U06] when solving engineering problems on design, technology and operation of machines is able to assess and classify typical methods and tools, define systemic and ex-technical aspects using modern calculating methods and design tools or modifying the current ones	Further development of the capacity to analyse technical information delivered in various forms, especially by technical drawings and CAD models.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Mechanical devices' and machine failure analysis in real-life industrial environment. Evaluation of the models of machine components' support and load in real - life conditions of use on the basis of scattered sources of information. Fatigue of materials - ammendment and broadening of the basic scope. Numerical analysis of selected technical tasks with the use of the ANSYS environment.</p>		
Prerequisites and co-requisites	<p>Completed courses in fundamentals of machine design,engineering mechanics, materials science, manufacturing technologies (machining, welding, plastic forming), engineering graphics or engineering drawing. Understanding of the physical foudations of the functioning of machines and basics of machine construction.</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	practical training completion	60.0%	100.0%
Recommended reading	Basic literature	<p>Fundamentals of Machine Design Engineering Graphics for Mechanical Engineers Metal cutting handbook Plastic forming of metals handbook Welding engineers handbook Mechanical Engineer's handbook Machine Design by Robert L. Norton</p>	
	Supplementary literature	<p>Fizyka, Resnick & Haliday The Fabric of Reality, D.Deutsch</p>	
	eResources addresses	<p>Adresy na platformie eNauczanie: Modelowanie w budowie maszyn 2023/24 - Moodle ID: 37116 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=37116</p>	
Example issues/ example questions/ tasks being completed	<p>Analytical evaluation of the causes of a machine failure in an industrial facility. Investigation into the load and support model and detailed reconstruction of the functional determinants pertaining to the machine. Numerical analysis of exemplary tasks in machine elements' engineering.</p>		
Work placement	<p>Not applicable</p>		