



Subject card

Subject name and code	Element modelling techniques, PG_00024947						
Field of study	Medical and Mechanical Engineering, Mechanical and Medical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2022/2023	
Education level	first-cycle studies	Subject group				Optional subject group 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	3	Language of instruction				Polish	
Semester of study	6	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Zakład Materiałoznawstwa I Technologii Materiałowych -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Dionizy Czekaj				
	Teachers		dr hab. inż. Dariusz Fydrych dr inż. Aleksandra Świerczyńska dr inż. Michał Landowski prof. dr hab. inż. Dionizy Czekaj				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Introducing students to modern methods of designing elements and computer-aided design issues.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_W10		The student knows basic techniques of element manufacturing by additive methods. The student understands methods of obtaining design data from real objects and ways of processing it.			[SW1] Assessment of factual knowledge	
	K6_U05		The student is able to prepare CAD documentation based on measurement data realized on free surfaces.			[SU1] Assessment of task fulfilment	
	K6_U07		Students will be able to design simple components for mechanical and medical engineering using CAD software.			[SU4] Assessment of ability to use methods and tools	
	K6_W07		The student is able to verify the CAD design for its correctness and simulate its operation.			[SW2] Assessment of knowledge contained in presentation	
Subject contents	The role of computers in designing and manufacturing. Computer-aided CAD/CADD design. Models used in design. CAD programs. AutoCAD. SolidWorks. FreeCAD. Methods of designing elements in the CAD system. Tools and directions of CAD development. CAE computer-aided engineering analysis. Computer-aided CAM manufacturing. Capabilities of CAD/CAM systems. Computer-aided CAP planning, CAPP process planning and CAPP production planning and control. CAD/CAM/CAE (CAX) systems. Computer aided integrated CIM manufacturing process. Selection of materials. Modeling of the crystal structure of engineering materials. The use of electrical circuits to model the properties of piezoelectric materials. Basics of technical drawing. Modeling mechanical properties of engineering materials. Application of the finite element method in the mechanics of materials and structures.						

Prerequisites and co-requisites	Basic of manufacturing techniques		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquium	51.0%	50.0%
	Laboratory classes	100.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. P. Borkowski, G.Krzysiński, P. Marek, T. Zagrajek, Metoda elementów skończonych w mechanice materiałów i konstrukcji. Rozwiązywanie wybranych zagadnień za pomocą systemu ANSYS, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2022 2. T. Zagrajek, G.Krzysiński, P. Marek, Metoda elementów skończonych w mechanice konstrukcji. Ćwiczenia z zastosowaniem systemu ANSYS, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2006 3. B. Noga, Z. Kosma, J. Parczewski, Inventor. Pierwsze kroki, Wydawnictwo HELION, 2016 4. B. Noga, Inventor. Podstawy projektowania, Wydawnictwo HELION, 2011 5. P. Płuciennik, Projektowanie elementów maszyn z wykorzystaniem programu Autodesk Inventor, Wydawnictwo Naukowe PWN, Warszawa, 2013 6. E. Chlebus, Innowacyjne technologie Rapie Prototyping/ Rapie Tooling w rozwoju produktu, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2003 7. E. Chlebus, Techniki komputerowe CAx w inżynierii produkcji, Warszawa WNT 2000 8. W. Kubiński, Inżynieria i technologie produkcji, Wydawnictwo AGH, Kraków, 2017 	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie: Techniki modelowania elementów, W, KE, sem.06, letni 22/23 - Moodle ID: 29717 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29717 Techniki modelowania elementów, W, KE, sem.06, letni 22/23 - Moodle ID: 29717 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29717	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. The role of computers in designing and manufacturing. 2. Models used in design. 3. Methods of designing elements in the CAD system. 		
Work placement	Not applicable		