



## Subject card

Subject name and code	Numerical modeling of plastic shaping processes, PG_00059495						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
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	dr inż. Michał Landowski					
	Teachers	dr inż. Michał Landowski dr hab. inż. Jacek Tomków					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	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		7.0		33.0	100
Subject objectives	The aim of the course is to familiarize students with the basic issues related to forming processing of construction materials						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U04] is able to plan and carry out experiments, including measurements and computer simulations, interpret the obtained results and extract conclusions; can use analytical, simulation and experimental methods to formulate and solve engineering tasks	The student is able to conduct experiments to validate numerical data.	[SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K7_W03] has an orderly, theoretically founded knowledge related to selected areas of production engineering.	The student has systematic knowledge about the processes of producing elements by forming processing	[SW3] Assessment of knowledge contained in written work and projects
	[K7_K04] is aware of the social role of the university graduate, and especially understands the need to formulate and communicate to society - incl. through the mass media - information and opinions on technological achievements and other aspects of an engineer's activity; makes efforts to provide such information and opinions in a generally comprehensible manner, justifying different points of view	The student is able to explain in a generally understandable way the processes of shaping materials through forming processing.	[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness
	[K7_K05] is able to integrate the possessed knowledge from various scientific disciplines, and in the innovative implementation of engineering tasks also take into account system and non-technical aspects, including ethical ones	the student is able to combine knowledge from various disciplines when selecting materials and designing forming processing processes.	[SK2] Assessment of progress of work
Subject contents	The lecture covers the processes of producing elements by forming processing, selecting materials and semi-finished products. Selection of processes and process parameters. The laboratory includes numerical modeling of plastic forming processes and verification of calculations during real processes. Modeling of processes, selection of parameters and analysis of errors during processes. The project includes the design of a forming tool and FEM analysis of the process.		
Prerequisites and co-requisites	Knowledge of the basics of materials science and manufacturing processes (forming processing)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	50.0%	40.0%
	Laboratory	100.0%	30.0%
	Project	100.0%	30.0%
Recommended reading	Basic literature	1. Golański T.: Mechanizacja i automatyzacja w tłocznictwie. WNT, Warszawa 1978.  2. Skarbiński M.: Technologiczność konstrukcji maszyn. WNT, Warszawa 1977.  3. Golański T.: Aspekty ekonomiczne konstrukcji tłoczników. Prace ITB, 1980.	
	Supplementary literature	1. Erbel S., Kuczyński K., Marciniak Z.: Obróbka plastyczna. Warszawa. PWN 1986  2. Romanowski W.P.: Poradnik obróbki plastycznej na zimno. Warszawa: WNT 1976	
	eResources addresses	Adresy na platformie eNauzanie: Modelowanie numeryczne procesów obróbki plastycznej, PG_00059495,W/L/P,ZiIP, II stopień, sem. 02, zimowy 23/24 - Moodle ID: 33966 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=33966">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=33966</a>	

Example issues/ example questions/ tasks being completed	Design a tool for the stamping process of a progressive element.  Analyze the flow of the material during the extrusion process.
Work placement	Not applicable