GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modelling of heat and plastic treatment processes of materials, PG_00059373		
Field of study	Mechanical 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	Part-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 inż. Grzegorz Gajowiec	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	9.0	9.0	0.0	36
	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	36	11.0	53.0	100

Subject objectives	The aim of the course is to familiarize students with the basic issues related to heat treatment and processingplasticity of construction materials

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] possesses specialized knowledge on design, construction, properties and testing methods of construction materials	student has specialist knowledge in the design of forming processing processes	[SW3] Assessment of knowledge contained in written work and projects
[K7_U07] is able to perform a preliminary economic analysis of the undertaken engineering actions within the range of design, production and operation of machines and technical devices	student is able to make a preliminary analysis of element production techniques	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W10] possesses knowledge on the methods of technical and economic analysis of industrial systems and optimization of manufacturing systems; is familiar with the general principles of initiating and developing forms of individual entrepreneurship, particularly for innovative projects using the knowledge	student has knowledge about the processes of forming and heat treatment of elements and knows the principles of selecting the parameters of these processes	[SW3] Assessment of knowledge contained in written work and projects

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. Basic processes of heat treatment of elements. Selection of the correct parameters of heat treatment.The laboratory includes numerical modeling of plastic forming processes and verification of calculations during real processes. Modeling of heat treatment processes, selection of parameters and analysis of errors during processes.The project includes the design of a plastic 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. Burakowski T., Roliński E., Wierzchoń T.: Inżynieria powierzchni metali. WPW, Warszawa 1992. 2. Jarzębski M.Z.: Dyfuzja w metalach. Śląsk. Katowice 1976. 3. Praca zbiorowa.: Metaloznawstwo. Skrypt Politechniki Gdańskiej, Gdańsk 1991. 4. Poradnik inżyniera. Obróbka cieplna stopów żelaza. WNT, Warszawa 1977. 5.Golatowski T.: Mechanizacja i automatyzacja w tłocznictwie. WNT, Warszawa 1978. 6. Skarbiński M.: Technologiczność konstrukcji maszyn. WNT, Warszawa 1977. 7. Golatowski 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 eNauczanie: Modelowanie procesów obróbki cieplnej i plastycznej materiałów, PG_00059373,W/L/P,MiBM NST, II stopień, sem. 02, zimowy 23/24 - Moodle ID: 33965 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33965

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