

# SYLLABUS

## Course description

Course description				
Course code		Course	TECHNOLOGIE SPECJALNE	
MB/O/I/NST/C2A.1			SPECIAL TECHNOLOGIES	
Language of instruction		English		
Academic year		2023/2024		
<b>field of study:</b>		Mechanical engineering		
		Designing and manufacturing of machines		
<b>field of specialisation:</b>				
Educational level		first-cycle studies		
Education profile		General academic		
Mode of study		Part-time study		
Semester(s)		5		
Affiliation with a group of classes		Specialization module		
Course status		Obligatory		
Types of classes, instruction hours, ECTS credits		Types of classes	Number of instruction hours	Number of ECTS credits
		Lecture	16 [h]	4 ECTS
		Classes	0 [h]	
		Project	16 [h]	
Linkage of the course	with the education profile	Associated with the conducted scientific activity in the discipline to which the field of study is assigned		4 ECTS
	with qualifications	It serves the student's acquisition of engineering competencies		4 ECTS
	with science discipline	Mechanical engineering		4 ECTS
Form of teaching		Traditional – classes organized at the University /classes conducted using online learning methods and techniques		
Prerequisites				
Department		Faculty of Mechanical Engineering		
Coordinator		dr inż. Wojciech Kucharczyk		
The website of the basic organizational unit		<a href="http://www.wm.uniwersytetradom.pl/">http://www.wm.uniwersytetradom.pl/</a>		
E-mail address, phone number of the coordinator		wojciech.kucharczyk@uthrad.pl, tel. 48 361 7680		

## LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	The aim is to acquire the ability to use and select the appropriate manufacturing technology, in accordance with the design requirements of the element, and the ability to design the technological process for manufacturing products from materials with high mechanical properties and limited deformability; the ability to use appropriate computer programs supporting the design of technological processes.
Curriculum Content:	<p>The content of the classes is related to the conducted scientific research.</p> <p><b>Lecture.</b> The direction of development of special methods of shaping materials. Die casting, mold casting, full mold casting (gasified models). Technological character of the construction of products made by various methods. General characteristics of technologies ensuring obtaining products with high accuracy and using special materials, e.g.: high-alloy hard-to-machine, bimetallic, composite materials. Joining difficult-to-machine materials. Unconventional methods of preparing materials for shaping. Blast machining, laser machining, anode-mechanical and electro-discharge cutting. Fine punching, smoothing. High-energy methods of shaping materials. Characteristics of high-energy sources. Changes taking place in the material under the influence of high energy. Shaping products with flexible tools, hydraulic methods. Ironing in liquid state. Phenomena occurring during pressing in the liquid state, process parameters and their impact on product quality. Methods of ironing in the liquid state. Shaping of products from sintered powders. Forming methods. Isostatic pressing. Connection of sinters with solid materials. Solid metal bonding. Linkage factors. Processes used in joining metals. Joining of the same and dissimilar metals, joining of powders.</p> <p><b>Project (NB).</b> During the semester, the student performs one or two projects of the machining process of a given part. The topics of the projects include elements that require the use of machining operations covered by the lectures. Project scope: construction drawing of selected parts; drawing of the semi-finished product (casting, forging, extrusion, etc.); drawings of shaping tools; technological card, instruction cards of set machining operations and technical control points; calculation and selection of parameters of given operations.</p>
Didactic (educational) methods:	<p><b>Lecture</b> - giving method (informative lecture).</p> <p><b>Project</b> - practical method (project method).</p>
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	<p>The condition for passing the course is to achieve all the required learning outcomes specified for the subject.</p> <p><b>1. Lecture.</b> Written exam - average grade from partial questions.</p> <p><b>2. Project.</b> Completion of an individually made technological process design for the indicated part of the machines in the field of: removal, heat and surface treatment as well as quality control.</p> <p>The final grade for the project is the sum of the grades: 60% project, 30% presentation, 10% activity in class.</p>

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course ( W ) knows and understands / ( U ) can / ( K ) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Identifies physical phenomena occurring in the process of shaping materials under the influence of high energies, laser energy, erosion methods.	K_WG02	Lecture	Written exam	Arithmetic mean of sub-question scores
W2	Analyzes the relationships between the structure, chemical composition of engineering materials and their properties and is able to link them with the possibilities of their production by appropriate technology. Has knowledge in the field of engineering materials, their research and modern shaping technologies.	K_WG13	Lecture	Written exam	Arithmetic mean of sub-question scores
W3	He designs technological processes for the production of machine elements using modern methods using knowledge in the field of engineering graphics and computer-aided design.	K_WG04 K_WG11 K_WG14	Lecture	Written exam	Arithmetic mean of sub-question scores
U1	He is able to select the appropriate manufacturing technology for the properties of the material used and the quality requirements of the manufactured product.	K_UW01 K_UW04	Project	Passing individually made project	Evaluation of the degree and quality of project execution
U2	Describes the phenomena occurring during the implementation of the technological process and is able to design the necessary technological equipment.	K_UW10 K_UK15	Project	Passing individually made project	Evaluation of the degree and quality of project execution
K1	Justifies the choice of product manufacturing technology, completing the necessary construction and technological documentation; can work in a discussion team.	K_KK02 K_KO05	Project	Passing individually made project	Evaluation of the degree and quality of project execution

Literature and teaching aids	
[1] Mazurkiewicz A.: Konstruowanie powierzchni i addytywne kształtowanie wyrobów obróbką laserową. Wyd. UTH Radom, Radom 2018. [2] Mazurkiewicz A.: Technologie specjalne kształtowania materiałów. Wyd. II PR, Radom 2009. [3] Mazurkiewicz A., Kocur L.: Obróbka plastyczna. Laboratorium. Wyd. IV PR, Radom 2012. [4] Kuzioła A., Mazurkiewicz A.: Technologia sprzętu mechanicznego. Wyd. PR, Radom 1999. [5] W. Kucharczyk W., Mazurkiewicz A., Żurowski W.: Nowoczesne Materiały Konstrukcyjne. Wybrane zagadnienia. Wyd. III, PR, Radom 2011. [6] Wojtkun F., Sołncew J. P.: Materiały specjalnego przeznaczenia. Wyd. PR, Radom 1999.	

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits			
Attendance, participation	Student workload [h].		
	Other contact hours (IGK)	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in ... lectures	X	X	16 [h]
Participation in .... classes / project	X	X	16 [h]
Meeting with teachers during their duty hours	4 [h]	X	X
Preparation for lectures / project Preparation for exam	X	20 [h] / 20 [h] 24 [h]	X
Total student workload	4 [h] / 0,2 ECTS	64 [h] / 2,5 ECTS	32 [h] / 1,3 ECTS
ECTS credits for the course	100 [h] / 4 ECTS		

Additional information, comments
<p>In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate.</p> <p>Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).</p>