

# SYLLABUS

## Course description

Course description				
Course code		Course	Nauka o materiałach	
ME/O/I/NST/B5			Material science	
Language of instruction		English		
Academic year		2025/2026		
field of study:		Mechanical Engineering		
field of specialisation:		All		
Educational level		first-cycle studies		
Education profile		General academic		
Mode of study		Part-time studies		
Semester(s)		1		
Affiliation with a group of classes		B . Group of obligatory course core subject		
Course status		Obligatory		
Types of classes, instruction hours, ECTS credits		Types of classes	Number of instruction hours	Number of ECTS credits
		Lecture	10 [h]	3 ECTS
		Classes	[h]	
		Lab	15 [h]	
Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned		3 ECTS
	with qualifications	It is used to acquire engineering competences by the student		3 ECTS
	with science discipline	Mechanical engineering		3 ECTS
Form of teaching		Traditional – classes organized at the University /classes conducted using distance learning methods and techniques		
Prerequisites		knowledge of mechanics (statics) and mathematics		
Department		Faculty of Mechanical Engineering		
Coordinator		Piotr Sadowski, BEng, PhD		
The website of the basic organizational unit		http://wm.uniwersytetradom.pl		
E-mail address, phone number of the coordinator		<a href="mailto:p.sadowski@uthrad.pl">p.sadowski@uthrad.pl</a> 48 361 76 27		

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

Learning Objective:	Gaining knowledge in the field of construction and properties of materials depending on the chemical composition, phase and microstructure, as well as acquiring skills and competence in the selection of materials for technical applications.
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Curriculum Content:	<p><b>Lecture content:</b> Matter and its components (2h). Natural and engineering technical materials - comparison of their structure, properties and applications (2h). Elements of crystallography and the basics of solidification (2h). Phase changes (2h). Strengthening of materials, shaping the structure and properties of engineering materials (2h). Steels and cast iron alloys (4h). Heat and thermo-chemical treatment of iron alloys (2h). Non-ferrous metals and their alloys (4h). Sintered and ceramic materials (2h). Glass and glass ceramics (2h). Polymer and composite materials (2h). Material testing methods (2h). Working conditions and mechanisms of wear and decohesion of engineering materials (2h).</p> <p><b>Content of laboratory exercises:</b> Introductory information and OHS training (2h), Construction, operation and operation of a metallographic microscope (2h). Crystal structure analysis (2h). Macroscopic examinations (2h). Testing the hardness of materials (2h). Analysis of the structure of alloys using phase equilibrium systems (2h). Analysis of the structure and properties of carbon steel and cast steel (2h). Analysis of the structure and properties of cast iron (2h). Analysis of the structure and properties of non-ferrous metals and their alloys (6h). Analysis of the structure and properties of steel and alloys after heat treatment (2h). Steel hardenability test (2h). Identification of plastics(2h). Corrosion and protection against corrosion (2h) Qualitative and quantitative assessment of the structure (2h), Analysis of sintered materials (2h), supplementing, correcting and passing</p>
Didactic (educational) methods:	feeding methods (informative lecture), - activating methods (didactic discussion), - exposing methods (exhibition, show), - practical methods (demonstration, laboratory exercises)
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	The condition for passing the course is to achieve all the required learning out comes specified for the course....

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	Has knowledge of engineering materials, their research and shaping technologies;	K_WG13	Lecture Laboratory exercises	Exam Passing individual practical exercises	Arithmetic mean of the grades of partial questions, Arithmetic mean of grades from practical exercises
U1	Is able to select appropriate engineering materials to ensure proper operation of machinery and equipment;	K_UW11	Lecture Laboratory exercises	Exam Passing individual practical exercises	Arithmetic mean of the grades of partial questions, Arithmetic mean of grades from practical exercises
K1	is ready to complete and critically evaluate specialized knowledge and is able to select sources of knowledge and methods of learning appropriate for himself/herself and others;	K-KK01,	Lecture Laboratory exercises	Exam Passing individual practical exercises	Arithmetic mean of the grades of partial questions, Arithmetic mean of grades from practical exercises
K2	is willing to comprehensively analyze and effectively carry out assigned tasks, and in the event of difficulties in solving them, use expert opinion;	K-KK02	Lecture Laboratory exercises	Exam Passing individual practical exercises	Arithmetic mean of the grades of partial questions, Arithmetic mean of grades from practical exercises

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Literature and teaching aids
<p>Primary literature:</p> <ol style="list-style-type: none"> <li>1. Wojtkun F., Sołncew J. P.: Materiałoznawstwo. T. I i II. Wyd. Politechniki Radomskiej. Radom 1999.</li> <li>2. Lisica A., Ostrowski B., Ziewiec W.: Laboratorium materiałoznawstwa. Wyd. Politechniki Radomskiej, Radom 2006.</li> <li>3. Lisica A.: Inżynieria materiałowa w wybranych pytaniach i odpowiedziach. Wyd. Politechniki Radomskiej. Radom 2005.</li> <li>4. Przybyłowicz K., Metaloznawstwo. WNT 2003.</li> <li>5. Dobrzański L. A.: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego. WNT, Warszawa 2006.</li> </ol> <p>Additional literature:</p> <p>Study aids:</p>

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits		
Attendance, participation	Student workload [h].	
	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in lectures/classes/lab	X	25[h]
Preparation for lectures/classes/lab , Preparation for ... credit / exam	50..[h]	X
Total student workloadPreparation for ... credit / exam	50 [h]/ 2ECTS	25 [h]/ 1ECTS
ECTS points per subject	3 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>

