SYLLABUS

Course description

<table>
<tr><td colspan="2">Course code</td><td rowspan="2">Course</td><td colspan="4">Inżynieria wytwarzania</td></tr>
<tr><td colspan="2">ME/O/I/NST/B09</td><td colspan="4">Manufacturing Engineering</td></tr>
<tr><td colspan="3">Language of instruction</td><td colspan="4">English</td></tr>
<tr><td colspan="3">Academic year</td><td colspan="4">2025/2026</td></tr>
<tr><td colspan="3">field of study:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td colspan="3">field of specialisation:</td><td colspan="4">All</td></tr>
<tr><td colspan="3">Educational level</td><td colspan="4">first-cycle studies</td></tr>
<tr><td colspan="3">Education profile</td><td colspan="4">General academic</td></tr>
<tr><td colspan="3">Mode of study</td><td colspan="4">Part-time studies</td></tr>
<tr><td colspan="3">Semester(s)</td><td colspan="4">2, 3, 4</td></tr>
<tr><td colspan="3">Affiliation with a group of classes</td><td colspan="4">B . Group of obligatory course core subject</td></tr>
<tr><td colspan="3">Course status</td><td colspan="4">Obligatory</td></tr>
<tr><td colspan="3" rowspan="4">Types of classes, instruction hours, ECTS credits</td><td>Types of classes</td><td>Number of instruction hours</td><td colspan="2">Number of ECTS credits</td></tr>
<tr><td>Lecture</td><td>24 [h]</td><td colspan="2" rowspan="3">9 ECTS</td></tr>
<tr><td>Classes</td><td>- [h]</td></tr>
<tr><td>Lab</td><td>48 [h]</td></tr>
<tr><td rowspan="3">Linkage of the course</td><td>with the education profile</td><td colspan="3">Related to the conducted scientific activity in the discipline to which the field of study is assigned</td><td>9 ECTS</td></tr>
<tr><td>with qualifications</td><td colspan="3">It is used to acquire engineering competences by the student</td><td>9 ECTS</td></tr>
<tr><td>with science discipline</td><td colspan="3">Mechanical engineering</td><td>9 ECTS</td></tr>
<tr><td colspan="3">Form of teaching</td><td colspan="4">Traditional – classes organized at the University /classes conducted using distance learning methods and techniques</td></tr>
<tr><td colspan="3">Prerequisites</td><td colspan="4">knowledge of mechanics (statics) and mathematics</td></tr>
<tr><td colspan="3">Department</td><td colspan="4">Faculty of Mechanical Engineering</td></tr>
<tr><td colspan="3">Coordinator</td><td colspan="4">Jarosław Kotliński PhD Eng</td></tr>
<tr><td colspan="3">The website of the basic organizational unit</td><td colspan="4">http://wm.uniwersytetradom.pl</td></tr>
<tr><td colspan="3">E-mail address, phone number of the coordinator</td><td colspan="4">jaroslaw.kotlinski@uthrad.pl</td></tr>
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LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	Knowledge of the technological processes of metallurgy, foundry, plastic forming, welding, machining and 3D printing.
Curriculum Content:	Lecture content: Basic definitions and terms in the field of mechanical engineering, production, classification of production processes. Production of pig iron, blast furnace process, steel production. Foundry. Familiarization with the production process in a foundry, production of sand molds, casting methods, types of molds, requirements, possibilities, products. Documentation of raw casting. Plastic processing, types of forging, cutting and punching, stamping, extrusion processes. Welding. Types of processes, classic welding methods. Gas, electric, MAG, TIG welding, laser welding, thermal cutting, electric resistance welding. Machining methods, types of machine tools, basic operations. 3D printing. The essence of 3D printing. 3D printing methods, materials used in 3D printing. Types of 3D printers. Content of exercises: Safety during manufacturing processes. Manufacturing process in a foundry. Manual forming process, special casting methods. Forging methods. Cutting and punching, basic stamping operations, testing the suitability of sheets for stamping processes. MMA, TIG, MIG, MAG electric arc welding, thermal cutting methods. Basic machining operations, turning, milling, grinding, drilling. 3D printing. Construction of 3D printers working in the SL, FDM and L-PBF methods. Preparing 3D printers for work. Selection of parameters in 3D printing. 3D print processing processes.
Didactic (educational) methods:	informational lecture and laboratory and computational exercises
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	Lecture: The basis of the credit is to receive (50% +1 point) the maximum number of points from the grades for the colloquium, as well as for the activity and independence of work. Laboratory exercises: The average value of the grades received by the student on the test and report, as well as for activity and independence of work.

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 forming technologies;	K_WG13	Lecture	Graded credit	Control Test
W2	knows and understands the basic methods, techniques and tools required for solving simple engineering tasks in the area of construction, manufacturing technology and operation of machinery;	K_WG16	Lecture	Graded credit	Control Test
U1	is able to assess the suitability of routine methods and tools for solving a simple engineering task of a practical nature in the design, manufacture and operation of machinery and equipment, and select and apply the appropriate method and tools;	K_UW09	Lab	Graded credit	Control project
U2	is able to, according to the given specification, design and implement a simple device, object, system or process, typical of the process of designing, manufacturing and operating machinery and equipment, using appropriate methods, techniques and tools;	K_UW10	Lab	Graded credit	Control project
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 Lab	Verbal	Conversation
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 Lab	Verbal	Conversation

Literature and teaching aids
Primary literature: 1.Praca zbiorowa: Spawalnictwo. Laboratorium. PR. Radom 2002. 2.Mazurkiewicz A., Kocur L.: Obróbka plastyczna. Laboratorium. Radom, PR 2006. 3.Kuzioła A.: Metalurgia i odlewnictwo. PR. Radom. 2011 4.Kotliński J. Drukowanie części maszyn. Monografia. Wydawnictwo UT-H Radom 2018. Additional literature: Feld M.: Technologia budowy maszyn. PWN, W-wa,2000. Study aids: Operating instructions.

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	72 [h]
Preparation for lectures/classes/lab , Preparation for ... credit / exam	150 [h]	X
Total student workload Preparation for ... credit / exam	150 [h]/ 6 ECTS	72 [h]/ 3 ECTS
ECTS points per subject	9 ECTS	

Additional information, comments
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. 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 Radomskiego), 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).