



## COURSE SPECIFICATION

Course code	full-time programme:	<b>M#2-S2-ME-PT-209</b>
	part-time programme:	
Course title in Polish	<b>Technologie spajania materiałów</b>	
Course title in English	<b>Joining Processes</b>	
Valid from (academic year)	<b>2024/2025</b>	

## GENERAL INFORMATION

Programme of study	<b>MECHANICAL ENGINEERING</b>
Level of qualification	<b>second-cycle</b>
Type of education	<b>academic</b>
Mode of study	<b>full-time programme</b>
Specialism	<b>Design and Manufacturing</b>
Department responsible	<b>Department of Metal Science and Manufacturing Processes</b>
Course leader	<b>dr inż. Bartłomiej Szwed</b>
Approved by	<b>dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering</b>

## COURSE OVERVIEW

Course type	<b>specialism-related</b>	
Course status	<b>compulsory</b>	
Language of instruction	<b>English</b>	
Semester of delivery	full-time programme	<b>Semester II</b>
	part-time programme	<b>Semester II</b>
Pre-requisites		
Examination required (YES/NO)	<b>YES</b>	
ECTS value	<b>2</b>	

Mode of instruction		lecture	class	laboratory	project	seminar
No. of hours per semester	full-time programme	<b>15</b>		<b>15</b>		
	part-time programme					

## LEARNING OUTCOMES





Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	Has a detailed and in-depth knowledge of material bonding methods. Has a detailed and in-depth knowledge of the construction of various types of machinery and equipment for processing and shaping materials. Has in-depth and advanced knowledge of how to design a material bonding process.	MiBM2_W05
Skills	U01	Can apply knowledge to solve complex engineering tasks in the area of welding materials at the stage of design, material selection, testing. Is able to evaluate, analyse welded joints.	MiBM2_U01
	U02	Be able to design the technological process of material welding and select appropriate machines and equipment for this purpose. Design the heat treatment process of welded joints.	MiBM2_U07
Competence	K01	Is aware of the need to independently supplement and extend knowledge in the field of materials bonding technology. Is ready to critically evaluate his/her knowledge, the importance of knowledge in solving cognitive and practical problems and the need to acquire new information both from the literature and from experts in the field.	MiBM2_K01
	K02	Is ready to responsibly perform professional roles related to the field of study of mechanics and mechanical engineering, adhere to ethical principles and act to adhere to these principles taking into account the changing needs of society, cares about the achievements, ethos and traditions of the profession.	MiBM2_K05

**COURSE CONTENT**

Mode of instruction	Topics covered
lecture	Diversity of metallurgical welding processes Physical and chemical phenomena accompanying the arc welding process Phenomena occurring in the formation of the weld metal Phenomena accompanying the welding process, occurring in the heat affected zone Structural analysis of single-strand and multi-strand welded joints Weldability of steel Thermal treatments before and during welding. Heat treatment of welded joints.
laboratory	Methods of preparing parts for welding and the performance of various types of welded joints by arc methods Technology of arc welding of rebars Technology of soldering by arc methods Microstructure of welded joints of structural steel made by arc methods Microstructure of welded joints of high-alloyed steel by arc methods Calculation and measurement of temperature before, during and after welding. Conducting heat treatment of arc-welded joints

**ASSESSMENT METHODS**

Outcome	Methods of assessment





code	Oral examination	Written examination	Test	Project	Report	Other
W01		X				
U01			X		X	
U02			X		X	
K01						X
K02						X

**ASSESSMENT TYPE AND CRITERIA**

Mode of instruction	Assessment type	Assessment criteria
lecture	examination assessment	Scoring at least 50% on the exam
laboratory	non-examination assessment	Obtaining at least 50% of the points from the colloquia of individual exercises. Approval of reports on individual laboratory exercises.

**OVERALL STUDENT WORKLOAD**

ECTS weighting													
No.	Activity type	Student workload										Unit	
		full-time programme					part-time programme						
		L	C	Lb	P	S	L	C	Lb	P	S		
1.	Scheduled contact hours	15		15									h
2.	Other contact hours (office hours, examination)	4		2									h
3.	<b>Total number of contact hours</b>	<b>36</b>										h	
4.	<b>Number of ECTS credits for contact hours</b>	<b>1,4</b>										ECTS	
5.	<b>Number of independent study hours</b>	<b>14</b>										h	
6.	<b>Number of ECTS credits for independent study hours</b>	<b>0,6</b>										ECTS	
7.	<b>Number of practical hours</b>	<b>25</b>										h	
8.	<b>Number of ECTS credits for practical hours</b>	<b>1,0</b>										ECTS	
9.	<b>Total study time</b>	<b>50</b>										h	
10.	<b>ECTS credits for the course</b> <i>1 ECTS credit = 25-30 hours of study time</i>						<b>2</b>					ECTS	

**READING LIST**

1. Tasak E.: Metalurgia spawania. Wydawnictwo „JAK” Andrzej Choczewski, Kraków 2008
2. Klimpel A.: Spawanie, zgrzewanie i cięcie metali. Technologie. PWN Warszawa 1999r.
3. Butnicki St.: Spawalność i kruchość stali. WNT Warszawa 1979r.
4. Brozda J., Pilarczyk J., Zeman M.: Spawalnicze wykresy przemian austenitu CTPc-S. Wydawnictwo „ŚLĄSK” Katowice 1983
5. Przybyłowicz K.: Nowoczesne Metaloznawstwo. Wydawnictwo Naukowe AKAPIT, Kraków, 2012;





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6. Praca zbiorowa. Poradnik inżyniera – spawalnictwo. T1 i T2. WNT, Warszawa 2017
7. Instrukcje do ćwiczeń laboratoryjnych.
8. Ferenc K., Ferenc J.: Konstrukcje spawane. Połączenia. WNT, Warszawa 2019
9. Pilarczyk J., Pilarczyk J.: Spawanie i napawanie elektryczne metali. Śląsk, Katowice 1996
10. Nowacki J. i inni: Lutowanie w budowie maszyn. WNT, Warszawa 2007
11. Ferenc K. (redaktor prowadzący): Technika spawalnicza w praktyce. Poradnik inżyniera, konstruktora i technologa. Wydawnictwo Verlag Dashofer



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**WMiBM**

Wydział Mechatroniki  
i Budowy Maszyn