



Dofinansowane przez Unię Europejską



COURSE SPECIFICATION

Course code	full-time programme:	M#2-S1-ME-310
	part-time programme:	
Course title in Polish	Techniki Laserowe	
Course title in English	Laser Technologies	
Valid from (academic year)	2024/2025	

GENERAL INFORMATION

Programme of study	MECHANICAL ENGINEERING
Level of qualification	first-cycle
Type of education	academic
Mode of study	full-time programme
Specialism	all
Department responsible	Department of Maintenance, Laser and Nanoscale Technologies
Course leader	dr inż. Piotr Sęk , dr inż. Hubert Danielewski
Approved by	dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering

COURSE OVERVIEW

Course type		programme-specific
Course status		compulsory
Language of instruction		English
Semester of	full-time programme	Semester III
delivery	part-time programme	
Pre-requisites		
Examination required (YES/NO)		NO
ECTS value		2

Mode of instruction		lecture	class	laborator y	project	seminar
No. of hours	full-time programme	15		15		
per semester	part-time programme					

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code		
Knowledge	W01	Has advanced knowledge of laser devices, especially those used in material processing.	MiBM1_W02		







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	W02	Has advanced knowledge of available laser processing methods	MiBM1_W07 MiBM1_W17		
	U01	Is able to select the parameters of a simple laser processing process ditch.	MiBM1_U04		
Skills	U02	Can design a simple technological process in the area of mechanics and machine construction and select appropriate machines and devices for this purpose	MiBM1_U08		
	K01	Is aware of the risks associated with the use of laser techniques.	MiBM1_K01		
Competence	K02	Is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the safety of other people and the impact on the environment and the responsibilities related to these issues.	MiBM1_K02		

COURSE CONTENT

Type of instruction lecture	Topics covered								
lecture	Historical notes. Physical basis of laser radiation generation, construction of resonator. Properties of laser radiation. Applications of lasers in technology and in everyday life. Laser radiation sources. Laser systems for processing. Laser cavity technologies – cutting and drilling. Laser welding. Laser surface treatment Laser additive technologies								
laboratory	Getting to know the laboratory. Health and safety rules. Laser cutting. Laser welding Laser hardening. Laser cladding. Laser marking.								

ASSESSMENT METHODS

Outcome	Methods of assessment (Mark with an X where applicable)								
code	Oral Written examination Test Project Report								
W01			х						
W02			х						
U01					х				
U02			х		х				
K01						х			
K02					х	х			

ASSESSMENT TYPE AND CRITERIA

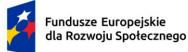
Mode of instruction	Assessment type	Assessment criteria
lecture	non-examination assessment	Obtaining at least 50% of points in the test.
laboratory	non-examination assessment	Obtaining at least 50% of points in the test. Positive completion of course reports.

OVERALL STUDENT WORKLOAD



Projekt "Dostosowanie kształcenia w Politechnice Świętokrzyskiej do potrzeb współczesnej gospodarki" nr FERS.01.05-IP.08-0234/23







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	ECTS weighting											
				Student workload								
No.	Activity type		full-time					part-time				
			-	gram		-		<u> </u>	gran			
1.	Scheduled contact hours	L	С	Lb	Р	S	L	С	Lb	Р	S	h
		15		15								
2.	Other contact hours (office hours, examination)	2	2 2								h	
3.	Total number of contact hours	34								h		
4.	Number of ECTS credits for contact hours		1,4								ECTS	
5.	Number of independent study hours	16								h		
6.	Number of ECTS credits for independent study hours		0,6							ECTS		
7.	Number of practical hours		25						h			
8.	Number of ECTS credits for practical hours	1				ECTS						
9.	Total study time	50									h	
10.	ECTS credits for the course 1 ECTS credit = 25-30 hours of study time					2	2					ECTS

READING LIST

- 1. Wiliam Steen, Laser Material Processing, 2003
- 2. Jan Kusiński, Lasery I ich zastosowania w inżynierii materiałowej, Wydawnictwo Naukowe "Akapit" Kraków 2000
- 3. Adam Kujawski, Paweł Szczepański, Lasery podstawy fizyczne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999.
- 4. J. M. Dowden, The Mathematical of Thermal Modeling An Introducion to the Theory of Laser Material Processing, Chapman and Hall/CRC, London, 2001.
- Zhu X., Naumov A.Y., Villeneuve D.M., Corkum P.B., Influence of laserparameters and material properties on micro drilling with femtosecond laser pulses, "Applied Physics A" 1999, 69: 367
- 6. Jacek Zimn, y Laserowa obróbka stali. Wydaw. Politechniki Częstochowskiej, 1999.
- 7. Jacek Zimny, Piotr Myjak, Mikrospawanie laserowe w mechatronice. Kraków : Polska Geotermalna Asocjacja [etc.], 2012.



