Kielce University of Technology

FACULTY OF MECHATRONICS AND MECHANICAL ENGINEERING

Annex9
to the Rector's Ordinance No. 35/19
of 12 June 2019

COURSE SPECIFICATION

Course code	**M#1-S1-ME-309**
Course title in Polish	**Techniki Laserowe**
Course title in English	**Laser Technology**
Valid from (academic year)	**2019/2020**

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**first-cycle**
Type of education	**academic**
Mode of study	**full-time**
Specialism	**all**
Department responsible	**Department of Terotechnology and Industrial Laser Systems**
Course leader	**Dr hab. inż. Włodzimierz Zowczak**
Approved by	

COURSE OVERVIEW

Course type	**basic**
Course status	**compulsory**
Language of instruction	English
Semester of delivery	**semester 3**
Pre-requisites	**Technical Physics**
Examination required (YES/NO)	NO
ECTS value	**2**

Mode of instruction	**lecture**	**class**	**laboratory**	**project**	**seminar**
No. of hours per semester	**15**		**15**		

LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	On completion of the course, students will have a basic theoretical knowledge of laser devices, especially those used in material processing	MiBM_W08
	W02	On completion of the course, students will have a basic knowledge of the available laser processing methods	MiBM_W10
Skills	U01	On completion of the course, students will have the skills to choose the parameters of a simple laser processing process	MiBM1_U08
Competence	K01	On completion of the course, students will be aware of the of the risks associated with the use of laser tech-niques	MiBM1_K02
	K02	On completion of the course, students will be aware and understand the possibilities of energy-saving production created by laser technologies	MiBM1_K02

COURSE CONTENT

Type of instruction*	Topics covered
lecture	1. Historical remarks. Physical basics of laser radiation generation, construction of a resonator. 2. Properties of laser radiation. Applications of lasers in technology and in everyday life 3. Laser radiation sources used in material processing. Laser systems for processing. 4. Laser waste technologies - cutting and drilling. 5. Laser welding. Laser surface treatment. 6. Laser additive technologies - 3D printing 7. Risks related to laser technology, safety rules.
laboratory	1. Getting acquainted with the laboratory. Health and safety rules 2. Laser beam examination 3. Laser cutting 4. Laser drilling of holes 5. Laser welding 6. Laser hardening 7. Laser marking

*) Please delete rows in the table above that are not applicable.

ASSESSMENT METHODS

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

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessmentcriteria
lecture	**non-examination assessment**	A pass mark for the test covering the content of lectures.
laboratory	non-examination assessment	A pass mark for each pre-lab in-class test and each post-lab report

*) Please delete rows in the table above that are not applicable.

OVERALL STUDENT WORKLOAD

ECTSweighting							
	Activity type	**Student workload**					**Unit**
1.	Scheduled contact hours	L	C	Lab	P	S	h
		15		15			
2.	Other contact hours (office hours, examination)	2		2			h
3.	**Total number of contact hours**	**32**					h
4.	**Number of ECTS credits for contact hours**	**1,3**					ECTS
5.	**Number of independent study hours**	**18**					h
6.	**Number of ECTS credits for independent study hours**	**0,7**					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**					ECTS

READING LIST

1. T. Burakowski, T. Wierzchoń, Inżynieria powierzchni metali, WNT, Warszawa 1995 ̇2.
2. H. Klejman, Lasery, PWN, Warszawa 19793.
3. Klimpel, Technologia spawania i cięcia metali, Wyd. Polit. Śląskiej 19974.
4. J. Kusiński, Lasery i ichzastosowanie w inżynierii materiałowej, Wyd. Nauk. Akapit, 20005.
5. W. Steen, J. Mazumder, Laser Material Processing, Springer 20106.
6. W. Zowczak, Laser Material Processing, skrypt dostępny na portalu PŚk