COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S1-ME-KWW-507**
	part-time programme:	
Course title in Polish	**Programowanie obrabiarek sterownych numerycznie I**	
Course title in English	**CNC Programming I**	
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	**Computer-Aided Manufacturing**
Department responsible	**Department of Machine Design and Machining**
Course leader	**dr inż. Piotr Maj**
Approved by	**dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering**

COURSE OVERVIEW

Course type		**specialism-related**
Course status		**compulsory**
Language of instruction		**English**
Semester of delivery	full-time programme	**Semester V**
	part-time programme	
Pre-requisites		
Examination required (YES/NO)		**YES**
ECTS value		**5**

Mode of instruction		lecture	class	laboratory	project	seminar
No. of hours per semester	full-time programme	**15**		**15**	**30**	
	part-time programme					

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	The student has knowledge of CNC machine programming, machine construction and design.	MiBM1_W03

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	W02	The student is able to design a technological process and create technical documentation. He has knowledge about the construction of numerically controlled machine tools.	MiBM1_W07 MiBM1_W09 MiBM1_W11
Skills	U01	The student is able to design a technological process and program a numerically controlled machine tool using computer software.	MiBM1_U02 MiBM1_U08
	U02	Able to use CAD/CAM software.	MiBM1_U19
Competence	K01	Is aware of the need to supplement knowledge and is ready to critically evaluate the knowledge he or she possesses.	MiBM1_K01 MiBM1_K03

COURSE CONTENT

Type of instruction lecture	Topics covered
lecture	Construction of numerically controlled machine tools, kinematic systems, technological capabilities of machine tools. Fundamentals of programming numerically controlled milling machines, including: program structure, defining a semi-finished product, types and applications of machining tools, tool library, machining cycles, programming simple tool paths.
laboratory	Discussion and preparation of a numerically controlled milling machine for operation, selection of a semi-finished product, selection and measurement of tools, selection of machining parameters, determination of the program zero point, creation of a simple program, simulation and launch of the machining process.
project	Operation of a control simulator for numerically controlled machine tools, development of a technological process for a numerically controlled milling machine. Development of a model and technical drawing of a selected item using a CAD program, selection of a machine tool, holder and tools, selection of technological parameters and development of a program controlling the operation of a numerically controlled machine tool.

ASSESSMENT METHODS

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

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ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	examination assessment	Successful completion of the final exam. Obtaining at least 50% of the points.
laboratory	non-examination assessment	Positive assessment of course reports. Obtaining at least 50% of points from the written colloquium. The final grade is an arithmetic mean.
project	non-examination assessment	Final assessment based on obtaining at least 50% of points from the developed project. Obtaining at least 50% of points from the written colloquium.

OVERALL STUDENT WORKLOAD

No.	Activity type	ECTS weighting										Unit
		Student workload										**Unit**
		full-time programme					**part-time programme**					
1.	Scheduled contact hours	L	C	Lb	P	S	L	C	Lb	P	S	h
		15		15	30							
2.	Other contact hours (office hours, examination)	4		2	2							h
3.	**Total number of contact hours**	**68**										h
4.	**Number of ECTS credits for contact hours**	**2,7**										ECTS
5.	**Number of independent study hours**	**57**										h
6.	**Number of ECTS credits for independent study hours**	**2,3**										ECTS
7.	**Number of practical hours**	**94**										h
8.	**Number of ECTS credits for practical hours**	**3,8**										ECTS
9.	**Total study time**	**125**										h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**5**										ECTS

READING LIST

1. Honczerenko J. Obrabiarki sterowane numerycznie. PWN, 2019
2. Kaczmarek J. Podstawy obróbki wiórowej, ściernej i erozyjnej. Warszawa: Wydawnictwo Naukowo Techniczne, 1971
3. Habrat W, Wdowik R. Ustawianie maszyny sterowanej numerycznie, 2012
4. Paderewski K. Zarys kinematyki obrabiarek. Warszawa: Wydawnictwa Naukowo-Techniczne, 1976
5. Witold Habrat: Obsługa i programowanie obrabiarek CNC Podręcznik operatora, Kabe 2015
6. Wit Grzesik, Piotr Kiszka, Piotr Niesłony: Programowanie obrabiarek CNC, Wydawnictwo Naukowe, PWN 2019
7. Cichosz P.: Narzędzia skrawające, WNT 2009

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