COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S1-ME-405A**
	part-time programme:	
Course title in Polish	**Programowanie w praktyce inżynierskiej**	
Course title in English	**Application of programming in engineering**	
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 Machine Design and Machining**
Course leader	**dr hab. inż. Jarosław Gałkiewicz, prof. PŚk**
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		**elective**
Language of instruction		**English**
Semester of delivery	full-time programme	**Semester IV**
	part-time programme	
Pre-requisites		
Examination required (YES/NO)		**NO**
ECTS value		**3**

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

LEARNING OUTCOMES

Politechnika Świętokrzyska
Kielce University of Technology

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

Wydział Mechatroniki
i Budowy Maszyn

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	Knows and understands advanced numerical methods used in engineering practice.	MiBM1_W01
	W02	Knows and understands the structure of the Python language and how it can be used to solve mechanical engineering problems.	MiBM1_W03
Skills	U01	Is able to apply knowledge of programming to solve typical engineering tasks.	MiBM1_U01
	U02	Can use the capabilities of the Python language and high-level programming language to present the results of his/her work with particular emphasis on creating data visualizations (creating graphs).	MiBM1_U02 MiBM1_U05
	U03	Is able to write extensive scripts using conditional, selection, and repetition instructions, using, among others, operations performed on matrices and vectors.	MiBM1_U02 MiBM1_U05
Competence	K01	Is ready to independently complete the knowledge of using the Python language for engineering analysis.	MiBM1_K03

COURSE CONTENT

Type of instruction lecture	Topics covered
lecture	A brief history of the Python language. Structure of the language, constants, variables, and basic instructions. Data flow control. Functions, lists, and other complex data structures. Debugging. Use of external modules. Modules useful in engineering practice. Popular algorithms and their implementation in Python.
laboratory	Creating programs related to the content presented in the lecture: input/output instructions, conditional instructions, loops, operations on data structures, debugging codes, working with modules: file operations, working with PDF files, MsExcel, MsWord, processing image files, creating graphs, mouse and keyboard control. Exercises using high-level programming language on matrices and vectors, flow controls, defining functions, creating 2D graphs, and solving equations.

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
U01			X	X		
U02			X	X		
U03			X	X		
K01			X	X		

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	non-examination assessment	The pass mark is a minimum of 50% for the final test
laboratory	non-examination assessment	A pass marks for all control tasks (project and tests). The final grade is the arithmetic average.

OVERALL STUDENT WORKLOAD

ECTS weighting												
No.	**Activity type**											**Unit**
		full-time programme					part-time programme					
1.	Scheduled contact hours	L	C	Lb	P	S	L	C	Lb	P	S	h
		15		30								
2.	Other contact hours (office hours, examination)	2		2								h
3.	**Total number of contact hours**	**49**										h
4.	**Number of ECTS credits for contact hours**	**2,0**										ECTS
5.	**Number of independent study hours**	**26**										h
6.	**Number of ECTS credits for independent study hours**	**1,0**										ECTS
7.	**Number of practical hours**	**50**										h
8.	**Number of ECTS credits for practical hours**	**2,0**										ECTS
9.	**Total study time**	**75**										h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**3**										ECTS

READING LIST

1. https://www.python.org/doc/
2. Automatyzacja nudnych zadań z Pythonem. Nauka programowania. Wydanie II, Al Sweigart, Helion, 2021.
3. Złam ten kod z Pythonem. Jak tworzyć, testować i łamać szyfry. Al Sweigart, Helion, 2021.
4. Programowanie w Pythonie dla średnio zaawansowanych. Najlepsze praktyki tworzenia czystego kodu. Al Sweigart, Helion, 2021.
5. Math adventures with Python, Peter Farrell, No Starch Press, Inc.2019.
6. Modeling and simulation in python. An Introduction for Scientists and Engineers Allen B. Downey. No Starch Press, Inc.2019.
7. Dive into algorithms. Bradford Tuckfield, No Starch Press, Inc.2021.
8. MATLAB i Simulink. Mrozek B., Mrozek Z. Poradnik użytkownika. Wydawnictwo Helion, 2017.
9. Technika obliczeń inżynierskich w MATLABIE. Wciślik M., Wydawnictwo Politechniki Świętokrzyskiej, 2021.
10. https://www.mathworks.com/