



Dofinansowane przez Unię Europejską



COURSE SPECIFICATION

Course code	full-time programme:	M#2-S1-ME-201				
	part-time programme:					
Course title in Polish	Matematyka w zastosow	Matematyka w zastosowaniach inżynierskich				
Course title in English	Engineering Mathematic	S				
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 Mathematics and Physics
Course leader	dr hab. Beata Maciejewska, 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		compulsory
Language of instruction		English
Semester of	full-time programme	Semester II
delivery	part-time programme	
Pre-requisites		Calculus
Examination required (YES/NO)		YES
ECTS value		4

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

LEARNING OUTCOMES

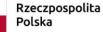
Category of Outcor outcome code	ne Course learning outcomes	Corresponding programme outcome code
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Knowledge	W01	Students understand the basic concepts of integral calculus for functions of two variables and the appropriate mathematical notation. They know the principles of constructing and solving simple mathematical models described by differential equations.	MiBM1_W01
Knowledge	W02	They know standard computational procedures for integral calculus problems. They know the applications of selected mathematical topics in engineering.	MiBM1_W01
	W03	MiBM1_W01	
Skills	U01	They are proficient in solving complex calculus problems (such as computing double integrals and line integrals, and solving differential equations).	MiBM1_U01 MiBM1_U12
SKIIIS	U02 They are skilled in using mathemation U02 and accurately recording mathemation		MiBM1_U01
Competence	K01	Is ready to critically evaluate his/her knowledge and seek expert opinions in case of difficulties in solving a problem on his/her own.	MiBM1_K01
	K02	Students understand the need for lifelong learning.	MiBM1_K03

COURSE CONTENT

Type of instruction lecture	Topics covered
lecture	Definition and properties of a double integral. Double integral in the normal range. Change of the order of integration in a double integral. Change of variables in double integrals. Line integrals. Line integral of a vector field. Line integral of a scalar field. Green's Theorem. Applications of the double integral and the line integrals in mechanics. Basic concepts of ordinary differential equations. Separable Equations. Linear Equations. The method of variation of a parameter and the method of undetermined coefficients.
class	Determining the limits of integration in a double integral. Calculating the double integral over a normal region. Change of variables in a double integral. Calculating the line integral of a vector field and the line integral of a scalar field. Applying Green's theorem to calculate the vector line integral. Calculating physical quantities using a double integral and lines integrals. Differential equations with separable variables. Homogeneous and non-homogeneous first-order linear differential equations. The method of variation of a parameter. Higher-order linear differential equations with constant coefficients.

ASSESSMENT METHODS

Outcome	Methods of assessment								
code	Oral examination	Written examination	Test	Project	Report	Other			
W01		Х	Х						
W02		Х	Х						
W03		Х	Х						
U01		Х	Х						



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



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U02	Х	Х		
K01				Х
K02				Х

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
lecture	examination assessment	Achieving at least 50% of the points on the written exam.
class	non-examination assessment	Achieving a total of at least 50% of the points on the written tests.

OVERALL STUDENT WORKLOAD

	ECTS weighting											
		Student workload								Unit		
No.	o. Activity type			II-tin	-			•	art-ti			
			Ľ	gram	ime			pro	grai	mme		
1.	. Scheduled contact hours	L	С	Lb	Ρ	S	L	С	b	Р	S	h
		15	30									
2.	Other contact hours (office hours, examination)	4	4 2								h	
3.	Total number of contact hours		51								h	
4.	Number of ECTS credits for contact hours	2,0								ECTS		
5.	Number of independent study hours		49							h		
6.	Number of ECTS credits for independent study hours		2,0							ECTS		
7.	Number of practical hours			67							h	
8.	Number of ECTS credits for practical hours		2,7							ECTS		
9.	Total study time	100				h						
10.	ECTS credits for the course 1 ECTS credit = 25-30 hours of study time		4					ECTS				

READING LIST

- 1. Hożejowska S., Hożejowski L., Maciąg A., Matematyka w zadaniach dla studiów ekonomiczno-technicznych, Wydawnictwo Politechniki Świętokrzyskiej, Kielce 2005.
- 2. Krysicki W., Włodarski L., Analiza matematyczna w zadaniach. Cz. 2, PWN, Warszawa 2002.
- 3. Stewart J., Calculus : early transcendentals, Brooks/Cole Publishing Company, Pacific Grove 1991.
- 4. Żakowski W., Kołodziej W., Matematyka. Cz. II, WNT, Warszawa 1997.
- 5. Żakowski W., Leksiński W., Matematyka. Cz. IV, WNT, Warszawa 1995.



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