



Mathematical analysis II
Educational subject description sheet

Basic information

Field of study Civil engineering		Education cycle 2021/22	
Speciality -		Subject code WIKSiGIBUN.I2AO.1207.21	
Organizational unit The Faculty of Environmental Engineering and Geodesy		Lecture languages english	
Study level First-cycle (engineer) programme		Mandatory optional	
Study form Part-time		Block general subjects (conducted) in foreign languages	
Education profile General academic		Disciplines Maths	
		Subject related to scientific research Yes	
		Subject shaping practical skills Nie	
Teacher responsible for the subject	Mariusz Grządziel		
Other teachers conducting classes	Mariusz Grządziel		
Period Semester 2	Examination exam	Number of ECTS points 6.0	
	Activities and hours lecture: 18 practical classes: 18		

Goals

C1	Presenting to the students advanced methods of mathematical analysis of functions of one variable such as improper integrals or power series, and the basic methods of mathematical analysis of functions of several variables.
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Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	calculus of several variables.	BU_P6S_WG01	written exam, active participation
Skills - Student can:			
U1	use methods of mathematical analysis (of one or several variables) for computing such quantities as the mass, center of gravity or moment of inertia of a flat figure or of a solid	BU_P6S_UK18	written exam, active participation
U2	solve simple differential equations	BU_P6S_UK18	written exam, active participation
U3	use methods of mathematical analysis of functions of several variables for solving optimization problems	BU_P6S_UK18	written exam, active participation
Social competences - Student is ready to:			
K1	critically evaluate the results of the computations obtained from computer algebra systems	BU_P6S_KK01	active participation

Balance of ECTS points

Activity form	Activity hours*	
lecture	18	
practical classes	18	
lesson preparation	60	
class preparation	40	
literature study	40	
exam / credit preparation	4	
Student workload	Hours 180	ECTS 6.0
Workload involving teacher	Hours 36	ECTS 1.3
Practical workload	Hours 18	ECTS 0.7

* hour means 45 minutes

Study content

No.	Course content	Activities

1.	<p>The Riemann Integral: definition, methods of computing, applications</p> <p>Improper integral and its applications</p> <p>Power series</p> <p>Differential equations of first and second order</p> <p>Differential calculus of functions of several variables</p> <p>Multiple integrals and their applications</p> <p>Scalar line integral</p>	lecture
2.	<p>The Riemann Integral: definition, methods of computing, applications - computational exercises</p> <p>Improper integral and its applications - computational exercises</p> <p>Power series - computational exercises</p> <p>Differential equations of first and second order -problems</p> <p>Differential calculus of functions of several variables - problems</p> <p>Multiple integrals and their applications - computational exercises</p> <p>Scalar line integral- computational exercises</p>	practical classes

Course advanced

Teaching methods:

discussion, lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	written exam	50%
practical classes	written exam, active participation	50%

Literature

Obligatory

1. Strang, G, Herman, E., Calculus, Vol 1-3, Rice University, 2020.
2. Stewart J., Calculus, International Metric Edition, 8-th Edition, Cengage Learning, 2016.
3. Lebl J., Notes on Diffy Qs: Differential Equations for Engineers, Createspace Independent Publishing Platform, 2016.

Optional

1. Hartman G. (lead author), Heinold B., Siemers T., Chalishajar D., Calculus, CreateSpace Independent Publishing Platform; 4 edition, 2018.
2. Trench W., Elementary differential equations, Brooks/Cole Thomson Learning, 2001.

Kierunkowe efekty uczenia się

Kod	Treść
BU_P6S_KK01	Absolwent jest gotów do krytycznej oceny posiadanej wiedzy i odbieranych treści;
BU_P6S_UK18	Absolwent potrafi brać udział w debacie - przedstawiać i oceniać różne opinie i stanowiska oraz dyskutować o nich;
BU_P6S_WG01	Absolwent zna i rozumie w zaawansowanym stopniu zagadnienia z wybranych z działów matematyki i fizyki, stanowiących podstawę do rozwiązywania zadań z zakresu teorii konstrukcji oraz technologii materiałów budowlanych;