

Subject code	Credits
MATN1001	6

Title

MATEMATIKA

Title in English

MATHEMATICS

Subject goal and annotation

The main objectives of the course . to present some fundamentals of mathematical analysis. Teaching methods are lectures and practical works. The content of the course: Matrixes and determinants; solving systems of linear equations; limit of function; continuity of function; derivative of function; differential; applications of derivatives; Taylor formula of function; indefinite integrals; definite integrals; Newton-Leibniz formula; application of definite integrals.

Prerequisites

High school mathematics knowledge.

Relationship between the learning outcomes of the Programme and learning outcomes of the subject

Learning outcomes of the Programme	Learning outcomes of the subject	Criteria for measuring the achievement of learning outcomes
1. Knowledge and understanding of basic <i>mathematics, physics</i> and <i>nature</i> , and its applicability in engineering.	To know main concepts on limits theory and calculate limits of functions	Student demonstrates the ability to calculate limits of different functions.
	To find derivatives of functions	Student demonstrates the ability to find first and higher order derivatives of different functions
	To calculate indefinite integrals	Student is able to recognize and calculate different indefinite integrals
	To calculate and apply definite integrals	Student is able to calculate and apply different definite integrals
7. Formalization and specification of real-world problems, and ability to describe them at an abstract level	Use mathematical language to describe real world problems	Student is able to describe different problems and solutions formally

Subject content

	Lecture topics and contents	Hours
1.	Main classes of functions. Limit of function.	8
2.	Continuous functions.	2
3.	Derivatives and differential of a function.	8
4.	Higher-order derivatives.	2
5.	L'Hôpital's rule.	1
6.	Extrema of a function. Function graphing.	4
7.	Indefinite integral. Main integration methods.	10
8.	Definite integral, Newton - Leibniz formula.	7
9.	Application of definite integral.	3
	Total	45

Practical work contents

Three groups of practical problems:
1. Calculation of tasks in limits theory.

2. Calculation of problems with first and higher order derivatives, applications of them.
3. Calculation of indefinite and definite integrals.

Evaluation of study results

Final written exam (50%), mid-term written exam (25%), and assessments of practical work (25%).

Distribution of subject study hours

Lectures	45
Practical work	30
Individual studies (including studies in groups, preparation for the mid-term and final exams)	87
Total	162

Recommended literature

No	Authors of publication and title	Number of copies available		
		<i>in the Library of VMU</i>	<i>in specialized publication collections at VMU</i>	<i>in other libraries</i>
Basic materials				
1.	Pekarskas V. Diferencialinis ir integralinis skai iavimas I ir II dalys. (Differential and Integral Calculus, I, II), 2008	I-25, II-22	I-6, II-6	
2.	Pekarskas V. Trumpas matematikos kursas. (Short Course of Mathematics), 2005	20	1	
3.	Kavaliauskas A. Aukztosios matematikos u0davinytas. (Tasks of Calculus), 2005	2	1	
Supplementary materials				
1.	N.Januzauskait , R.Markauskas, A.Pekarskien , V.Sabatauskien . Tiesin algebra ir diferencialinis skai iavimas. (Linear Algebra and Differential Calculus), 2006			
2.	Z.Furmonavi ien , S.Januzauskait , A.Mar iukaitien , D.Prizmantien , N.Ratkien . Tiesin algebra ir matematin analiz (u0davini sprendimas). (Linear Algebra and Mathematical Analysis (Solutions of problems)), 2001			

Subject prepared and coordinated by

Doc. dr. Sigita Pe iulyt , Faculty of Informatics, Department of Mathematics and Statistics