RĪGAS TEHNISKĀ
UNIVERSITĀTE

RTU Course "Mathematics"

12501 null

General data

Code	DIM108
Course title	Mathematics
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Inta Volodko
Academic staff	Ilze Karpinska Ilmārs Iltiņš Gaida Petere
Volume of the course: parts and credits points	2 parts, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV
Annotation	Matrices and determinants. Systems of linear equations. Scalar and vector product. Plane analytic geometry. Functions. Limits. Derivative and its applications. The indefinite and definite integrals. First-order differential equations. Functions of several variables, partial derivatives.
Goals and objectives of the course in terms of competences and skills	To develop students' understanding of basic mathematical concepts that are necessary to be able to comprehend processes and algorithms in professional study courses. To develop students' logical thinking and skills necessary to analyse solutions of problems when performing more complicated tasks within the framework of study courses of professional specialization.
Structure and tasks of independent studies	Six homework assignments are given during the study course. The topics of these assignments are as follows: linear algebra, differentiation of a function of one argument, analysis of functions, indefinite integral, applications of a definite integral, differential equations. Homework assignments are submitted before the deadline indicated by an instructor. Student has an opportunity to re-submit the homework assignment once after it has been corrected by the instructor. The grades for homework assignments are taken into account for the calculation of the final grade for the study course.
Recommended literature	1. Inta Volodko. Augstākā matemātika. Īss teorijas izklāsts. Uzdevumu risinājumu paraugi. I daļa, Rīga, Zvaigzne ABC, 2007, 294. lpp., 2. daļa, Rīga, Zvaigzne ABC, 2009, 396 lpp. 2. Andrejs Koliškins, Inta Volodko, Maksimilians Antimirovs. Matemātika I tehnisko augstskolu studentiem. RTU, 2004, 337 lpp., Matemātika II tehnisko augstskolu studentiem. RTU, 2005, 244 lpp. 3. Kārlis Šteiners, Biruta Siliņa. Augstākā matemātika. Lekciju konspekts inženierzinātņu un dabaszinātņu studentiem. 1. daļa, Zvaigzne, 1997, 96 lpp., 2.daļa, Zvaigzne ABC, 1998, 115 lpp. 4. Kārlis Šteiners. Augstākā matemātika. Lekciju konspekts inženierzinātņu un dabaszinātņu studentiem. 3. daļa, Zvaigzne ABC, 1998, 192 lpp., 4. daļa, Zvaigzne ABC, 1999, 168 lpp., 6. daļa, 2001, 208 lpp. 5. Kronbergs E., Rivža P., Bože Dz. Augstākā matemātika. 1. un 2. daļa, Rīga, Zvaigzne, 1988, 534 lpp., 527 lpp., 2. daļa, Rīga, Zvaigzne, 1988, 527 lpp. 6. Biruta Siliņa, Kārlis Šteiners. Rokasgrāmata matemātikā. Zvaigzne ABC, 2006, 367 lpp. 7. Dz. Bože, L.Biezā, B.Siliņa, A.Strence. Uzdevumu krājums augstākajā matemātikā. Zvaigzne ABC, 1996, 328 lpp. 8. Inta Volodko. Tipveida uzdevumu krājums matemātikā I. RTU, 2001, 2003, 2005, 206 lpp. 9. I. Volodko, A. Āboltiņš, L. Biezā. Tipveida uzdevumu krājums matemātikā II. RTU, 2002, 2005, 288 lpp.
Course prerequisites	The study course is based on the knowledge of mathematics acquired at the secondary school.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Elements of linear algebra: Determinants. Matrices, operations on them. Solution of systems of linear equations.	8	12	0	0
Introduction to calculus: Elementary functions. A limit of a function.	4	8	0	0
One-variable differential calculus: Derivative of functions. Applications of derivatives in the analysis of functions.	18	28	0	0
Integral calculus: Indefinite integral. Definite integral and its applications.	18	26	0	0
Ordinary differential equations: First-order and second-order differential equations, methods of their solution.	12	22	0	0
Review.	4	0	0	0
Total:	64	96	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
After successful completion of the study course a student is able to solve systems of linear equations and to perform operations on matrices.	Evaluation of students' knowledge and skills is based on the results of homework assignments, tests and final examination.

Able to plot graphs of elementary functions, to find the interval of definition for elementary functions, to determine whether the given function is even or odd, to determine the points of intersection with axis.	Students' knowledge and abilities are assessed based on homework assignments, tests and final examination.
Able to find derivatives of functions, to analyse the behavior of a function using derivatives and to plot the graph of a function.	Two tests, two homework assignments and several assignments at the final examination are used to assess students' knowledge on these topics.
Able to integrate simple functions; to find the area of a plane figure, length of a curve and volume of a body of revolution using a definite integral.	Evaluation of students' knowledge and skills is based on the results of homework assignments, tests and final examination.
Able to solve simple first- and second-order ordinary differential equations.	Students' knowledge and abilities are assessed based on homework assignments, tests and final examination.

Evaluation criteria of study results

Criterion	%
Homework	10
Tests	40
Exam	50
Total:	100

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	1.0	1.0	0.0		*	
2.	2.0	1.0	1.0	0.0		*	