



COURSE UNIT DESCRIPTION

Course unit title	Code
HIGHER MATHEMATICS II	

Annotation

Lecturer(s)	Department, Faculty
Coordinating: Asist. Dr. Vytautas Stepas	Faculty of Mathematics and Informatics, Naugarduko g. 24, LT-03225, Vilnius.
Other:	

Study cycle	Type of the course unit
First	Compulsory

Mode of delivery	Semester or period when it is delivered	Language of instruction
Auditorium	2 (Spring) semester	Lithuanian/English

Requisites
Prerequisites: Must have completed the first part of the course Co-requisites (if relevant): None

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
10	264	128	136

Purpose of the course unit: programme competences to be developed		
Knows Indefinite integral and properties, their calculation methods. Are acquainted with the series, can to use them by solving different problems; Understand the concepts of multiple, line, surface integrals, know their properties, and are able to apply them by solving practical and theoretical problems. Know the complex variable function theory methods to calculate the integral. Know to apply them when solving practical problems; Be able to perform the description of the physical processes by differential equations, know the methods of how to solve them. Understand the processes and events for the probabilistic description and can use statistical methods of data management.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Know and understand the mathematics course material provided (1.1)	Lectures (theoretical material, application examples). Used and the board, and audiovisual and computer tools.	Exam
To be able to solve the task and problems (see the books in the reference list) (1.1)	Exercises (briefly repeat the theoretical material and solved tasks). Homework.	Control works
To find out more difficult places in the course (2.4)	Consultation (questions of the more difficult to understand the theoretical material dealt with tasks).	Correctly formulated questions and answers

Course content: breakdown of the topics	Contact hours	Individual work: time and assignments

	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship/work placement	Contact hours, total	Individual work	Assignments
1. Indefinite integrals. Antiderivative of function. The most important properties of indefinite integral. Table of principal indefinite integrals. Integration thechnics: by change of variable, by parts, rational fractions, trigonometric expressions, linear-fractional irrationalities, binomial, quadratic irrationalities. Integrals inexpressible by elementary functions.	12	6		6			24	26	The set of tasks in the book specified in the reference list.
2. Definite integrals and their properties. Formulas of mean values. Relation with antiderivative of function. The Newton-Leibniz formula. Change of variables and integration by parts in the improper integral. Gamma-function, beta-function, the Euler-Poisson integral, the Dirichlet integral, the Laplace integrals. Area of plane figure. Area of curvilinear trapezium. Area of curvilinear sector.	12	6		6			24	26	The set of tasks in the book specified in the reference list.
3. Series. Number series. Their convergence. Taylor's series. Harmonic series. Their convergence. Absolutely and relative convergent series. The D'Alembert convergence test. The Cauchy convergence test. The Leibniz convergence test. The Dirichlet-Abel convergence test. The Riemann theorem. Product of series, infinite products and their convergence.	12	6		6			24	26	The set of tasks in the book specified in the reference list.
4. Double, triple, n-multiple integrals. Line integrals. Surface integrals. Volume of solids. Volume of the solid of rotation. Formula of the volume of solid, when the area of cross-section is given. Length of curve arch. Area of side-surface of the solid of rotation.	8	4		4			16	16	The set of tasks in the book specified in the reference list.
5. Linear differential equations, boundary conditions. The first order and higher order differential equations, methods of their solution. Systems of differential equations. The first order equation in partial derivatives.	10	5		5			20	20	The set of tasks in the book specified in the reference list.
6. Probability theory. Random events and function of probability distribution.	10	5		5			20	22	The set of tasks in the book specified in the reference list.
Total	64	32		32			128	136	

Assessment strategy	Weight %	Deadline	Assessment criteria
Control work	30	Throughout entire semester	Written 3 control works. Evaluation is cumulative. The final grade is composed of three control work (one semester) assessment and evaluation of the exam.
Exam	70	Session time	To be allowed to take the exam, you need to attend at least 75% of the exercise. The exam takes place in writing. The exam will consist of theoretical and practical challenges. Part of the exam consists of tasks requiring a detailed answer or solution, the other part is an ongoing tasks.

Author	Publishing	Title	Issue of a periodical or	Publishing house or
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	year		volume of a publication; pages	internet site
Required reading				
Malik S.C., Arora Savita	1992	Mathematical analysis (second edition)		New Delhi, India
Adams R.A.	1995	Calculus (a complete course)		Canada
Riley, Hobson, Bence.	2006	Mathematical methods for physics and engineering	3th Edition	
Logan J. D.	2006	A First Course in Differential Equations		Springer, USA
Bertsekas P. B., Tsitsiklis J. N.	2008	Introduction to Probability	2nd Edition	Athena Scientific, MA, USA
Stepanauskas G.	2007	Neapibrėžtinis ir apibrėžtinis integralai		Paskaitų konspektas
Stepanauskas G.	2012	Eilutės		Paskaitų konspektas
Recommended reading				
Pekarskas V.	2003	Diferencialinis ir integralinis skaičiavimas, II		Kaunas: Technologija
Misevičius G., Pincevičius A., Rakauskas R.J., Eidukevičius R.	1999	Aukštoji matematika (vadovėlis ir pratybos su kompiuteriu)		Vilnius: TEV
Demidovič B.P.	1997	Matematinės analizės uždavinių ir pratimų rinkinys		Maskva: Maskvos universiteto leidykla