Subject code	ECTS credits
MAT1003	6

Course title in Lithuanian

GEOMETRIJA

Course title in English

GEOMETRY

Short course annotation in Lithuanian (up to 500 characters)

Įgyjamos esminės vektorinės algebros ir analizinės geometrijos žinios, susipažįstama vektoriaus sąvoka, tiesiniai veiksmais su vektoriais, tiesinė vektorių priklausomybe plokštumoje ir erdvėje, baze plokštumoje ir erdvėje, stačiakampe baze, skaliarine sandauga, vektorine sandauga, trijų vektorių sandauga; plokštumos lygtimi; tiesės lygtimi erdvėje, tiese plokštumoje, antros eilės kreivėmis (apskritimu, elipse, hiperbole, parabole), kūginiais, cilindriniais ir sukimosi paviršiais.

Short course annotation in English (up to 500 characters)

Acquired fundamental knowledge of basic concepts of vector algebra and analytical geometry: vectors; operations with vectors; linear dependence of vectors in plane and space; basis in plane and space; scalar product; vector product; parallelepipedal product; equation of a plane; equation of a line in space; equation of a line in plane; circle; ellipse; hyperbola; parabola; cone; cylinder; tangent plane and normal of the curve.

Prerequisites for entering the course

High school mathematics knowledge.

Course aim

Course aim is to provide knowledge of basic concepts of geometry.

Links between course outcomes, criteria of learning achievement evaluation, study methods and methods of learning achievement assessment

No	Course outcomes	Criteria of learning achievement evaluation	Study methods	Methods of learning achievement assessment
1	Provide knowledge on vectors, operation with vectors.	Student demonstrates the ability to solve a given task with vectors.	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
2	Knowledge and understanding of planes.	Student demonstrates the ability to solve a given task with plane(s).	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
3	Knowledge and understanding of lines in R^2 and R^3.	Student demonstrates the ability to solve a given task with line(s).	Lectures, practical works, individual work, consulting	Mid-term exam, assessment of practical work
4	Provide knowledge on the second degree curves and surfaces in R^2 and R^3 (its properties, separate cases and application in practical tasks).	Student knows definitions and equations of second degree curves and surfaces and is able to solve given task.	Lectures, practical works, individual work, consulting	Final exam, assessment of practical work
5	Knowledge and understanding of transformations of coordinates.	Student demonstrates knowledge on basic theory of transformations of coordinates, and is able to simplify a given	Lectures, practical works, individual	Final exam, assessment of practical work

No	Course outcomes	Criteria of learning achievement evaluation	Study methods	Methods of learning achievement assessment
		equation of particular second degree curves in R^2.	work, consulting	

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome				
	1	**2**	**3**	**4**	**5**
Know and comprehend concepts and propositions of fundamental mathematical subjects, recognize and apply them solving practical/theoretical tasks	+	+	+	+	+
Identify the problem, collect and analyze real/theoretical data using various mathematical methods, tools and IT technologies	+	+	+	+	+
Operating with formal mathematical symbols and terms, determine mathematical connections between various mathematical quantities; conceive mathematical propositions and logical proofs, construct and prove new statements	+	+	+	+	+
Think logically and analytically, evaluate alternative ways of task solving and implement optimal solutions	+	+	+		

Content

No	Content (topics)
1.	Vectors, linear operations with vectors.
2.	Linear dependence of vectors in plane and space. Basis in plane and space. Orthogonal basis.
3.	Coordinates of vectors. Magnitude of a vector.
4.	Products: scalar product, vector (cross) product and parallelepipedal product.
5.	Planes (general form of the plane equation; plane equation from three points). Angle between two planes. Distance of the nearest point on a plane to a point. Intersection of planes. Sheaf of planes.
6.	Lines in R^3 (general form of the line equation; plane equation from two points). Angle between two lines. Angle between line and a plane. Distance of the nearest point on a line to a point. Intersection of line and plane. Sheaf of lines.
7.	Lines in R^2.
8.	Second degree curves (circle, ellipse, hyperbola and parabola).
9.	Normal line and tangent line of the second degree curves.
10.	Transformations of coordinates.
11.	Surfaces: cone, cylinder, surface of revolution, ellipsoid, hyperboloid, paraboloid, etc.
12.	Coordinate systems: Cartesian coordinates in R^2, Cartesian coordinates in R^3, polar coordinates, cylindrical coordinates, spherical coordinates.

Distribution of workload for students (contact and independent work hours)

Lectures	**45 hours**
Practical work	**30 hours**
Individual students work	**85 hours**
Total:	**160 hours**

Structure of cumulative score and value of its constituent parts

Final written exam (50%), mid-term written exam (25%), assessment of two practical works (25%).

Recommended reference materials

No	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	*Self study rooms*	*Other libraries*

Basic materials						
1	2004	Baškienė A. Analizinė geometrija. (Analytical Geometry)	Šiauliai: ŠU leidykla	1	1	
2	2004	Pekarskas V. Tiesinės algebros ir analizinės geometrijos elementai. (Linear Algebra and Analytical Geometry Elements)	Kaunas: Technologija	10	2	
Supplementary materials						
1	2000	Vaškas P. Analizinė geometrija. (Analytical Geometry)	Vilnius, VU			
2	2003	Baškienė A. Analizinės geometrijos uždaviniai. (Tasks of analytical Geometry)	Šiauliai: ŠU			

Course programme designed by

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