

(Table 5.2) Course unit description

Study program : Mathematics			
Type and level of studies: Undergraduate academic studies			
Course unit: Non-Euclidean geometries			
Teacher in charge : dr Emilija Nešović			
Language of instruction: English			
ECTS: 6			
Prerequisites: None			
Semester: Summer			
Course unit objective: Introducing students with non-Euclidean geometries, such as elliptical, hyperbolic and semi-Euclidean geometry.			
Learning outcomes of Course unit By overcoming this program, the student is trained to apply the necessary knowledge and to explore the non-Euclidean spaces.			
Course unit contents <i>Theoretical classes</i> Discovery of the first non-Euclidean geometry. The Euclid's 5-th postulate. Hyperbolic parallel axiom (axiom of Bolyai-Lobachevsky). Parallel straight lines in hyperbolic plane. The angle of parallelism. Function of Lobachevsky. Hyper-parallel straight lines and their properties. Congruence of triangles. Saccheri and Lambert quadrilateral. Congruence of quadrilaterals. Triangles with infinity edges. Epicycles and epispheres. Poincare models of hyperbolic geometry. Klein-Beltrami model. Elliptic geometry. Semi-Euclidean geometry. Minkowski space. <i>Practical classes</i> Solving problems and proving consequences of the hyperbolic parallel axiom.			
Literature 1. H. S. Coxeter, Non-Euclidean geometry, Toronto University, 1968. 2. H. Meschowski, Non-Euclidean geometry, Academi press, New York, 1964. 3. W. Fenchel, Elementary geometry in hyperbolic space, Walter de Gruyter, Berlin, 1989. 4. B. O'Neill, Semi-Riemannian geometry with applications to relativity, Academic Press, New York, 1983.			
Number of active teaching hours			Other classes
Lectures: 2	Practice: 2	Mentor system: 2	
Independent work: 0			
Teaching methods Lectures, auditory exercises, consultations, colloquiums and a final exam.			
Examination methods (maximum 100 points)			
Exam prerequisites	No. of points:	Final exam	No. of points:
Student's activity during lectures		oral examination	50
practical classes/tests		written examination	
Seminars/homework			
Project			
Colloquium	50		
Grading system			
Grade	No. of points	Description	
10	91-100	Excellent	
9	81-90	Exceptionally good	
8	71-80	Very good	
7	61-70	Good	
6	51-60	Passing	
5	Less than 50	Failing	