

M101	<b>Elementary Geometry</b>	L	S	E	ECTS 6
		2	0	2	

**Course objective.** Students will systemize and expand their knowledge of the geometry of the plane and space. Classical geometrical contents will be processed and presented by means of the softwares of dynamic geometry.

**Course prerequisites.** Secondary school knowledge.

**Course content.**

1. The basic concepts of the geometry of the plane. Axioms of the Euclidean geometry of the plane.
2. Congruence of triangles and the application of theorems of triangle congruency. Characteristic points of a triangle.
3. The perimeter and area of polygons.
4. Similarity of triangles and applications of theorems of triangle similarity. Ceva's and Menelay's theorem.
5. Circle. Power of a point with respect to the circle. Euler's theorem. Euler's circle and Feuerbach's theorem.
6. Ellipse. Hyperbola. Parabola.
7. Mappings of the plane. Isometries of a plane. Similarities of the plane. Inversion.
8. The basic objects in the geometry of the space. Axioms of the Euclidean geometry. The determination of the plane and line in three-dimensional space. Angles between lines and planes. Distance in space.
9. Isometries and some mappings of three-dimensional space.
10. Polyhedra. Euler's formula for polyhedra. Regular polyhedra. Volume and surface area of polyhedra.
11. Cylinder. Cone. Sphere. Volume and surface area of cylinder, cone and sphere.

**LEARNING OUTCOMES**

No	LEARNING OUTCOMES
1.	Demonstrate the understanding of the fundamental concepts of planimetry and stereometry
2.	Derive the formulas of planimetry and stereometry
3.	Demonstrate the knowledge of the proof and application of the basic theorems of planimetry and stereometry
4.	Using the adopted mathematical claims and formulas in solving problem
5.	Using appropriate software packages while performing geometric constructions
6.	Developing spatial abilities
7.	Implementation the mathematical proofs of the foundation of the procedures and formulas encountered in this course

**COUPLING OF THE LEARNING OUTCOMES, TEACHING PROCESS ORGANIZATION  
AND THE EVALUATION OF THE TEACHING OUTCOMES**

TEACHING PROCESS ORGANIZATION	ECTS	EXPECTED LEARNING OUTCOMES **	STUDENT ACTIVITY *	EVALUATION METHOD	SCORE	
					min	max
Lecture attendance	1	1-7	Lecture attendance, discussion, team work and independent work on given tasks	Attendance sheets, tracking activities	0	4
Written exam (preliminary exm)	2	1-7	Preparing for written exam	Evaluation	25	48
Final exam.	3	1-7	Repetition of the subject matter	Oral exam	25	48
TOTAL	6				50	100

**Teaching methods and student assessment.** Lectures and exercises are obligatory. The final exam follows after the completion of lectures and exercises and it consists of two parts: written and oral exam. During the semester students have two colloquiums which cover the whole material. Satisfactorily done colloquiums substitute the written part of exam.

**Can the course be taught in English:** Yes

**Basic literature:**

1. D. Palman, *Planimetrija*, Element, Zagreb, 1999.
2. B. Pavković, D. Veljan, *Elementarna matematika 2*, Školska knjiga, Zagreb, 1995.

**Recommended literature:**

1. A. S. Posamantier, *Advanced Euclidean Geometry*, Key College Publishing, 2002.
2. D. Palman, *Trokut i kružnica*, Element, Zagreb, 1994.
3. H.S.M. Coxeter, S.L. Greitzer, *Geometry Revisited*, The Mathematical Association of America, Washington, 1967.
4. A. Marić, *Planimetrija - zbirka riješenih zadataka*, Element, Zagreb, 1998.