Course: Differential geometry	
Teacher(s): Mića Stanković, Sanja Konjik	
Course status: elective	
ECTS: 12	
Prerequisites: None	
Goal: Mastering the basic concepts of differential geometry	
Outcomes: The student is able to independently follow the achievements in the field of differential geometry of curves and surfaces.	

Contents
Theoretical lectures
Curves: parametric and implicit form. Reparameterization. Arc length, normal and tangent vector field. Osculatory plane. Torsion. Orthonormal reference system. Curvature and torsion in terms of arbitrary parameterization. Frenet's formulas. Fundamental theorem for space curves.

Surfaces: Parametric and implicit form, regularity, surface parameterization, surface curves, first basic form, matrix representation of first basic form. Isometry of parameterized surfaces, tangent plane, normal line and Gaussian mapping. Line surfaces, development surfaces. Normal and geodesic curves on surfaces. The second basic form. Asymptotic directions and asymptotic lines. Shape operator. Mean curvature, Gaussian curvature, main curvatures and their relations. Rodriguez equation. Elliptical, parabolic and hyperbolic points of the surface. Euler's theorem, main curvatures as extreme values of normal curves at a point. Tensor notation. Covariant derivative and Levi-Civita connection. Christoffel symbols. Codazzi equations. Gauss's theorem.

Recommended bibliography
1. С. Минчић, Љ. Велимировић: Диференцијална геометрија кривих и површи, ПМФ Ниш, 2007, ИСБН 978-86-83481-34-7
2. Do Carmo, Manfredo P., DIFFERENTIAL GEOMETRY OF CURVES AND SURFACES , Prentice Hall, 1976.
3. 2 (1948) 47-158
4. Alfred Gray: Modern Differential Geometry of Curves and Surfaces with Mathematica, Second Edition, 1997. SCI., NEW YORK 74 NO$3 (1995) 997-1043

Number of classes per week	Theoretical: 5	Practical:

Methods of teaching:
Theoretical lectures and independent work of students during practical hours.

Knowledge estimation: **(max 100 points)**
50 points on pre-exam and 50 points on oral exam