

Course Unit Descriptor

Study Programme: MSc in Applied Mathematics			
Course Unit Title: Theory of Curves and Surfaces			
Course Unit Code: MA06			
Name of Lecturer(s): Sanja Konjik			
Type and Level of Studies: Master Academic Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Winter			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 5			
Prerequisites: None			
Course Aims: The acquisition of knowledge and skills in the selected topics of differential geometry of curves and surfaces.			
Learning Outcomes: Student capable of applying the acquired knowledge and skills to specific problems.			
Syllabus: <i>Theory</i> Regular curves in \mathbb{R}^n , arc length, Frenet curves in \mathbb{R}^n , plane and space curves, tangent vector, normal and binormal vectors, curvature, torsion, the Frenet equations and the Fundamental theorem of the local theory of curves, spherical curves, global theory of curves, surfaces in \mathbb{R}^3 , the first fundamental form, the Gauss and Weingarten maps, the second fundamental form, curvatures (normal, geodesic, principal, Gauss, mean), intrinsic geometry of surfaces, covariant derivative, the Lie derivative, parallel displacement, geodesics, the Gauss and Weingarten equations, the Gauss Theorema Egregium, the Fundamental theorem of the local theory of surfaces. <i>Practice</i> The application of knowledge gained in the theoretical classes in solving practical problems (exercises).			
Required Reading: - Kühnel, W., Differential Geometry, Curves-Surfaces-Manifolds, 2nd edition, AMS, USA, 2006. - Banchoff, T., Lovett, S., Differential Geometry of Curves and Surfaces, A K Peters, Ltd., Natick, 2010. - O'Neill, B., Elementary Differential Geometry, Revised 2nd edition, Elsevier Inc., USA, 2006. - Blažić, N., Bokan, N., Uvod u diferencijalnu geometriju, Vesta, Matematički fakultet, Beograd, 1996. - Dragović, V., Milinković, D., Analiza na mnogostrukostima, Matematički fakultet, Beograd, 2003.			
Weekly Contact Hours: 4	Lectures: 3	Practical work: 1	
Teaching Methods: Lecture by teacher, discussion, practical work (exercise assignment and problem solving), seminar work.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	points
Preliminary exam(s)	30	oral exam	70
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			