

Study programmes: Bachelor studies – Mathematics				
Course name: M1.14 – Teaching Methodology in Mathematics and Computer Science				
Lecturers: Aleksandar Lipkovski				
Status: Compulsory				
ECTS: 5				
Attendance prerequisites: Fulfilled conditions for enrollment in the fourth year of undergraduate studies.				
Course aims: Enables the students to be independent in preparation and realization of lessons, as well provides the basic knowledge of teaching methodology in mathematics and computer science.				
Course outcome: Upon completion of this course, the students will acquire knowledge and competences necessary for independent preparation for classes and teaching of mathematics and computer science.				
Course content: Introduction: Particularities of the mathematics as a scientific subject and as a school subject. Basic objectives of teaching mathematics (educational and pedagogical). General methods in Learning and Teaching Mathematics: Observation and experiment. Comparison. Analysis and synthesis. Generalization and abstraction. Forms of thinking in Learning and Teaching Mathematics: Development of mathematical concepts. Abstraction, Classification. Language and symbols. Hierarchy of notions and their generality level. Propositions. Axioms, theorems, proofs. Independence and consistency. Models. Induction and deduction. Identification of thinking forms through the content: the hierarchy of the main number systems, generalization that leads to algebraic structures, axioms of geometry and different geometries. Mathematical logic, sets, functions etc. Identification of teaching phrases by abstraction level and deductive reasoning. Developing Mathematical Thinking: New content acquisition, motivation, understanding, memorization, reproduction. Types of problems and their role. Role of cognitive schemas. Creative learning. General research ideas (generalization, analogy and ideas transfer). Teaching Mathematics: Principles, Methods and Forms. Basic didactic principles. Heuristic method, Active learning. Traditional methods. Programmed instructions. Individualized Instruction vs. Differentiated Instruction. Computer in teaching and learning. Organization of Teaching Mathematics: Lecture as a basic teaching form. Types of lectures. Evaluation. Criteria of content acquisition. Stimulating effect of school grades. Minimum passing grade. Problems, schoolwork, homework, written examination. Types and roles of textbooks.				
Literature: H. Freudenthal, <i>Mathematics as an Educational Task</i> , Kluwer Academic Publishers, Dordrecht, 1973; G.Polya: <i>Kako ću riješiti matematički zadatak</i> , Školska knjiga, Zagreb, 1956; P. Radojević, V. Radojević, <i>Metodika nastave matematike</i> , Zavod za udžbenike i nastavna sredstva, Beograd, 1984; F. Zech, <i>Metodika matematike, Osnovni kurs, Teorijska i praktična uputstva za poučavanje i učenje</i> (translated from German, Zagreb), Bazel 1999.				
Number of hours: 2	Lectures: 2	Tutorials: 2	Laboratory: -	Research: -
Teaching and learning methods: Lectures / Tutorials				
Assessment (maximal 100 points)				
Course assignments	points	Final exam	points	
Lectures	10	Written exam	-	
Exercises / Tutorials	-	Oral exam	50	
Colloquia	20	Written-oral exam	-	
Essay / Project	20			

