

M029	Obligatory - Year 4	Didactics of Mathematics I	L+P+S (2+1+1) + (2+1+1)	ECTS 6+6
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Course objectives. The aim of the course is to inform the students about basic notions and concepts of teaching mathematics on the primary and secondary school level and to prepare students for efficient and successful planning, organization, realization and evaluation of the teaching process of mathematics and the application of modern as well as traditional didactic teaching methods and strategies in the process of teaching mathematics in elementary and secondary school. The possibility of applying certain strategies and teaching methods depending on the mathematical content to be adopted, on the age and abilities of students, and on the goals of some secondary schools, will be studied by means of a combination of lectures, students' own projects and practical work.

Course prerequisites. The subject matter of the previous years of study.

Syllabus.

1. The aim and the task of teaching mathematics. Mathematics in the Croatian national curriculum. Mathematical literacy. Student achievements / learning outcomes.
2. The teaching plan and programme. A lesson in mathematics. Teaching methods and forms (frontal and individual types of work, forms of teaching methods: project, problem solving, heuristic, programmed and experimental teaching methods, working with texts and other media, demonstrations, etc.). Macro- and micro-planning. The structure of the teaching lesson. Evaluation of the work of students and teachers (recording the initial situation, techniques for monitoring and evaluation, test and implementation of written ways of testing, teacher self-assessment).
3. Types of mathematical thinking and reasoning. Mathematical language (construction, use and symbols). Mathematical concept (concept, scope and content of the concept). Construction of examples and counterexamples. Interpretation and application of the definition of mathematical concepts. Theorem and proof. Formulation, proving and application of the theorem in teaching mathematics.
4. Scientific methods of reasoning in mathematics.
5. The principles of teaching mathematics.
6. Fundamental principles of teaching mathematics. Creating posters, presentations and other materials for visualization and popularization of mathematics.
7. Application of computers in teaching mathematics. Effective use of technology in teaching mathematics. Implementation of curriculum and technology.
8. Work on topics from elementary and secondary schools with the illustration of the use of various methods and approaches depending on the age of students and the educational goals, analysis of the effects of the application of particular methods and approaches.

Learning outcomes

After completing the course, students are expected to:

- understand the principles of teaching mathematics and its application;
- demonstrate knowledge of the different ways of defining mathematical concepts;
- understand and use the method of thinking and reasoning in teaching mathematics (analogy, analysis and synthesis, induction and deduction, generalization and specialization, abstraction and concretization);
- express the aims and tasks for each unit and topics of lessons in mathematics;
- prepare for the lesson in mathematics;
- perform the teaching lesson methodically correctly;
- use different teaching methods;
- develop conceptual understanding;
- use modern concepts of teaching mathematics;
- use mathematical methods and mathematical terminology correctly.

Teaching methods and student assessment. Lectures and exercises are obligatory. Exercises are performed in cooperation with primary and secondary schools. Students have the obligation to attend

and to analyze specially designed (experimental) lessons under the guidance of the methodologist, together with the primary or secondary school tutor. Knowledge of students is assessed throughout the year by means of mid-term exams and project tasks. Mid-term exams cover the subject matter of primary and secondary school. After the lectures and exercises students take an exam, which consists only of the oral part.

Can the course be taught in English: Yes.

Basic literature:

1. M.Pavleković, Metodika nastave matematike s informatikom I, Element, Zagreb, 2001.

Recommended literature:

1. M. Pavleković, Metodika nastave matematike s informatikom II, Element, Zagreb, 1999.
2. Z. Kurnik, Znanstveni okviri nastave matematike, Element, Zagreb, 2009.
3. Journals: Matka, Matematičko-fizički list, Matematika i škola, Osječki matematički list, Poučak, Mathematics Teacher
4. Textbooks, exercise books and other learning materials for primary and secondary school.