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| Study programmes: Bachelor studies – Mathematics | | | | |
| Course name: Foundations of Mathematics | | | | |
| Lecturers: Milan Božić, Žarko Mijajlović, Aleksandar Jovanović, Zoran Petrović | | | | |
| Status: Optional | | | | |
| ECTS: 6 | | | | |
| Attendance prerequisites: Introduction to Mathematical Logic, Algebra 1 | | | | |
| Course aims: Introduction to the examples of foundations of mathematical concepts, as well as the history and the main directions in the foundations of mathematics. | | | | |
| Course outcome: Acquiring general knowledge on the foundations of mathematics that mathematician, non-specialist for the field, is expected to have. | | | | |
| Course content: | | | | |
| Examples of foundations. Natural numbers: the Peano axioms and formal arithmetics, non-standard models of formal arithmetics and Gödel's results. Integers and rational numbers. Real numbers. Foundations of real functions. Complex numbers. | | | | |
| Set theory. Naive set theory, Cantor's theorem, Cantor–Bernstein theorem, cardinal and ordinal numbers, paradoxes, on axiomatization of set theory. The axiom of choice and the continuum hypothesis. | | | | |
| The history and the main directions in the foundations of mathematics. The appearance of the axiomatic method in Ancient Greece and its first implementation in Euclid's “Elements”. The connections between the philosophy and mathematics in Ancient Greece. The appearance of the mathematical analysis in the 17 th century and the problems of its foundations (until the 19 th century). Foundational crisis at end of the 19 th and the beginning of the 20 th century. Discovery of paradoxes in mathematics. The appearance of three main directions in the foundations of mathematics: formalism, intuitionism and logicism. The foundations of mathematics today. | | | | |
| Literature: | | | | |
| Ž. Mijajlović, <i>Algebra</i> , Milgor, Beograd, 1998; Božić, Ivić et al., <i>Brojevi</i> , Školska knjiga, Zagreb, 1985; S. Prešić, <i>Realni brojevi</i> , Zavod za udžbenike i nastavna sredstva, Beograd, 1985; Alonzo Church, <i>Introduction to Mathematical Logic</i> , Princeton University Press, 1996; M. and S. Prešić, <i>Uvod u matematičku logiku</i> , Matematički institut, Beograd, 1984; M. Božić, <i>Pregled istorije i filozofije matematike</i> , Zavod za udžbenike i nastavna sredstva, Beograd, 2002. | | | | |
| Number of hours: 5 | Lectures: 3 | Tutorials: 2 | Laboratory: - | Research: - |
| Teaching and learning methods: Lectures/ Tutorials | | | | |
| Assessment (maximal 100 points) | | | | |
| Course assignments | points | Final exam | points | |
| Lectures | - | Written exam | - | |
| Exercises / Tutorials | - | Oral exam | 40 | |
| Colloquia | 20 | Written-oral exam | - | |
| Essay / Project | 40 | | | |