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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | Mathematics |
| Study Module (if applicable) |  |
| Course title | Mathematical Logic and Set Theory |
| Level of study | [x] Bachelor [ ]  Master’s [ ]  Doctoral |
| Type of course | [x]  Obligatory [ ]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | first |
| Number of ECTS allocated | 7.00 |
| Name of lecturer/lecturers | Jelena Ignjatović |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| The main purpose is to give the introduction to basic concepts of propositional logic and predicate logic, basic techniques of proving mathematical statements and to introduce basic discrete mathematical structures - sets, relations, functions, graphs, sequences, matrices, etc. Students would learn how to use the correct form of logical reasoning, how to avoid common errors in reasoning, how to use basic techniques of proving and how to use symbolic expressions as concrete objects, how to work with sets, relations, functions and other concepts of the set theory, as well as how to practically apply the basic concepts and results of the mathematical logic and the set theory. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| * **Introduction to mathematical logic** – history and importance;
* **Propositional logic** - mathematical logic, logical form, predications, logical conjunctions of propositional formulas, logical equivalence, tautology and contradiction, implication, contraposition, conversion and inversion, equivalence, logical argumentation, rules of reasoning, errors in reasoning;
* **Predicate logic** - predicates and quantifiers, bound and free variables, negation of quantifiers, nested quantifiers, logical argumentation with quantifiers, instantiation and generalization, correctness of argumentation with quantifiers, errors in reasoning;
* **Techniques of proving** - methods of proving, errors in proving, strategies of proving, types of proofs;
* **Sets** - set operations, partitive set, ordered pairs and ordered n-tuple, Cartesian product;
* **Relations** – definition, representation of relations, operations between relations, equivalence relations, power sets, ordered relations, ordered sets;
* **Functions** – correspondence and functions, injective, surjective, bijective functions, inverse functions, arrays;
* **Cardinals** – finite and infinite sets, countable and uncountable sets, equipotent sets, operations with cardinal numbers;
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| **LANGUAGE OF INSTRUCTION** |
| [x] Serbian (complete course) [ ]  English (complete course) [ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)[ ] Serbian with English mentoring [ ] Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **ASSESSMENT METHODS AND CRITERIA** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| **Activity during lectures** | **5** | **Written examination** | **25** |
| **Practical teaching** | **10** | **Oral examination** | **40** |
| **Teaching colloquia** | **20 (2x10)** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |