|  |
| --- |
|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | **Computer Science** |
| Study Module (if applicable) |  |
| Course title | **Discrete Structures 1** |
| 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 | **Miroslav Ćirić** |
| 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 the basic concepts of propositional logic and predicate logic, basic techniques of proving mathematical statements and introduction to 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** - logical form, propositions and propositional formulas, logical connectives, 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, restricted quantifiers, logical argumentation with quantifiers, instantiation and generalization, correctness of argumentation with quantifiers, errors in reasoning;
* **Techniques of proving** - methods of proving, direct and indirect proofs, errors in proving, strategies of proving, forward and backward reasoning, mathematical induction, recursive definitions, structural induction;
* **Sets** - set operations, powerset, ordered pairs and ordered n-tuples, Cartesian product;
* **Relations** – definition, representation of relations, operations on relations, equivalence relations, partitions, orderings and ordered sets;
* **Functions** – correspondences and functions, injective, surjective, bijective functions, inverse function, operations on a set, arrays and matrices;
* **Cardinals** – cardinality of a set, finite and infinite sets, countable and uncountable sets, equipotent sets, operations with cardinal numbers;
 |
| **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** | **10** | **Written examination** | **25** |
| **Practical teaching** | **–** | **Oral examination** | **40** |
| **Teaching colloquia** | **25** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |