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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 | Ordered Set and Lattices |
| Level of study | [ ] Bachelor [ ]  Master’s [x]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [ ]  Autumn [ ] Spring |
| Year of study  |  |
| Number of ECTS allocated | 12.00 |
| 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 of the subject is to inform students with basic concepts of the theory of ordered sets, networks and ordered algebraic structures, as well as to introduce their applications, especially in mathematical logic and theoretical computer science. At the end of the course the student would master basic ideas, concepts and results of the theory of ordered sets, lattices and ordered algebraic structures, and would be able to apply them in individual scientific researches within some other scientific fields. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| **Ordered sets** - quasi-orders, orders and ordered sets, presentation of ordered sets; **Elements of ordered sets** - ideals and filters of ordered sets; **Mappings between ordered sets** - isotone and antitone mappings, homomorphism and isomorphism on ordered sets, closure operators and Galoa connections; **Lattices** - lattices as ordered sets, lattices as algebraic structures, sub-lattices, homomorphism and congruence on lattices, fixed-point theorems, [Knaster–Tarski fixed-point theorem](https://en.wikipedia.org/wiki/Knaster%E2%80%93Tarski_theorem), Kleene’s theorem; **Ideals and filters of lattices**;**Lattice properties** - bounded lattices, complete lattices; **Important types of lattices** - algebraic lattices, lattices of relations, lattices of subalgebras and congruence, lattices of ideals and filters, modular and distributive lattices, infinite-distributive and complete-distribution lattices, Boolean algebras, orthomodular lattices, Brouwerian lattices;**Ordered algebraic structures** – ordered semigroups and monoids, quantales, residuated lattices, Heyting algebras, BL-algebras, MV-algebras; **Application of networks in mathematical logic** |
| **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** | **--** |
| **Practical teaching** | **--** | **Oral examination** | **70** |
| **Teaching colloquia** | **20** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |