<table>
<tr><td>NAZIV PREDMETA</td><td colspan="7">Introduction to Mathematical Logic and Set Theory</td></tr>
<tr><td>Code</td><td>PMM700</td><td>Year of study</td><td colspan="4">2.</td></tr>
<tr><td>Course teacher</td><td>Milica Klaričić Bakula</td><td>Credits (ECTS)</td><td colspan="4">5,0</td></tr>
<tr><td rowspan="2">Teaching assoc.</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of application of e-learning</td><td colspan="4">20</td></tr>
<tr><td colspan="7">OPIS PREDMETA</td></tr>
<tr><td>Course objectives</td><td colspan="6">The main goal of this course is to give students a deeper insight into the foundations of mathematics in which Mathematical Logic, and especially one of its areas, axiomatic Set Theory, plays the most important role.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">Entry competences: elementary Set Theory.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Upon successful completion of this course students will be able to:
- evaluate the development of Mathematical Logic in terms of its relation to the foundations of Mathematics, explain and evaluate historical role of Cantor’s naive approach to Set Theory
- define axiomatically Propositional Logic and First Order logic (Propositional Calculus PC and Deductive Calculus DC, Predicate Calculus PC)
- define axiomatically Set Theory using the Zermelo-Frankel system of axioms
- using resolution or tableau test satisfiability, validity and logical consequence, for a given formula find its prenex normal form, disjunctive normal form and conjunctive normal form
- give a formal proof of a formula within a calculus (PC or PD)
- compute cardinality of sets given in various ways
- apply cardinal and ordinal numbers arithmetic and order between cardinals and ordinals
- characterize order types of the sets N, Z, Q and R
- apply transfinite induction</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">- Introduction: Historical overview (1)
- Propositional Logic: syntax and semantics (2)
- Normal forms (1)
- Propositional Calculus (2)
- Deductive Calculus (2)
- First order theories. syntax and semantics (2)
- Prenex normal form (1)
- Predicate Calculus (1)
- Cantor’s “naive” approach to Set Theory. Paradoxes (1)
- The Zermelo-Frankel system of axioms (2)
- Relations and functions (1)
- Inductive and transitive sets (1)
- The Axiom of choice. The function of choice. A family of sets. The product of set family (1)
- Finite and infinite sets (1)
- Equipotent sets. Cardinal numbers. The Cantor-Bernstein theorem (1)
- Countable sets (1)
- Uncountable sets. Continuum. The continuum hypothesis (2)
- Partial orders. Total orders. Isomorphisms of ordered sets. Order types (2)
- Characterizations of the ordered sets N, Z, Q and R (2)
- Well-ordered sets. Ordinal numbers. Transfinite induction. The Buralli-Forti paradox (2)</td></tr>
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Format of instruction	Lectures and exercises.
Student responsibilities	Attending classes.
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Attending classes: 2 ECTS. Partial exams: 1 ECTS Final exam: 2 ECTS.
Grading and evaluating student work in class and at the final exam	Two partial written exams / one final written exam and final oral exam.
Required literature (available in the library and via other media)	1. M. Vuković, Matematička logika 1, PMF, Zagreb, 2007. 2. V. Matijević, Uvod u teoriju skupova, skripta, PMF, Split, 2014. 3. P. Papić, Uvod u teoriju skupova, HMD, Zagreb, 2000.
Optional literature (at the time of submission of the study programme proposal)	1. D. van Dalen, Logic and Structures, Springer-Verlag, 1997. 2. E. Mendelson, Introduction to Mathematical Logic, D. Van Nostrand Company, Inc. Princeton, 1997. 3. H.B. Enderton, Elements of Set Theory, Academic Press, New York, 1977P 4. K. Kuratowski, A. Mostowski, Set Theory, PWN, Warszawa, 1968.
Quality assurance methods that ensure the acquisition of the exit competences	Summary feedback for the whole class after the exam. Anonymous student survey.
Other (as the proposer wishes to add)	