<table>
<tr><td>COURSE NAME</td><td colspan="7">Mathematical Logic</td></tr>
<tr><td>Code</td><td>PMM110</td><td>Year of study</td><td colspan="5">2.</td></tr>
<tr><td>Course teacher</td><td>Milica Klaričić Bakula</td><td>Credits (ECTS)</td><td colspan="5">5,0</td></tr>
<tr><td rowspan="2">Associate teachers</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="5">10</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Students will:
- learn basic concepts and results in Mathematical Logic
- gain a deeper insight in foundations of mathematics
- learn to write complete, coherent, concise proofs demonstrating mathematical rigor using various techniques: directly, indirectly and by induction
- learn how to define a first order theory axiomatically which will give them a good preparation for Set Theory and Geometry.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">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="7">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
- define syntax and semantics of Propositional Logic
- define axiomatically Propositional Logic (Propositional Calculus PC and Deductive Calculus DC)
- state the following metatheorems, give their proofs and explain their meaning for PC and DC: The Soundness Theorem, The Completeness Theorem, The Compactness Theorem, The Deduction Theorem
- define first order theories and explain the position of First Order Logic among them
- define axiomatically First Order Logic (Predicate Calculus PC)
- state the following metatheorems, give their proofs and explain their meaning for first order theories : The Soundness Theorem, The Completeness Theorem, The Compactness Theorem, The Deduction Theorem
- using resolution or tableau test satisfiability, validity and logical consequence
- for a 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)
- give some well-known examples of first order theories (theory with equality, Peano Arithmetic, Set Theory)</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="7">- Introduction: historical overview (1)
- Propositional Logic: syntax and semantics (2)
- Normal forms (2)
- Validity tests (1)
- Propositional Calculus (2)
- Metatheorems for PC (2)
- The Completeness Theorem and consequences (2)
- Deductive Calculus (3)
- Alternative axiomatizations and some non-classical propositional logics (1)
- First order theories. syntax and semantics (3)
- Prenex normal form (1)
- Tableau (2)
- Predicate Calculus (1)
- Metatheorems for first order theories (2)
- The Completeness Theorem and consequences (1)</td></tr>
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	- First order theories: examples (4)
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.
Optional literature (at the time of submission of study programme proposal)	1. D. van Dalen, Logic and Structures, Springer-Verlag, 1997. 2. H. D. Ebinghaus, J. Flum, W. Thomas, Mathematical Logic, Springer-Verlag, 1984. 3. A. G. Hamilton, Logic for Mathematicians, Cambridge University Press, 1988. 4. E. Mendelson, Introduction to Mathematical Logic, D. Van Nostrand Company, Inc. Princeton, 1997. 5. J. R. Shoenfield, Mathematical Logic, Addison-Wesley, Massachusetts, 1973.
Quality assurance methods that ensure the acquisition of exit competences	Summary feedback for the whole class after the exam. Anonymous student survey.
Other (as the proposer wishes to add)	