Pedagogic case and specific course in which designed tasks and units are used

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| Pedagogic case: | * Inquiry-based introduction for 1st module “Elements of Mathematical Logic” within the framework of general course in Mathematics for first year students of pedagogical institute
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| Description (including temporal scheme for design, development and implementation) | * 1st year students of pedagogical institute learn basic mathematics, and in particular elements of Mathematical Logic
* ICT tools will be used to let student understand deeply and clearly how to explore different mathematical tasks
* Rough planning: design November-December 2018, development January-March 2019,

implementation February-April 2019. |
| Aim of pedagogic case | * To include inquiry-based activity into learning and teaching selected topics in Mathematical Logic.
* To explore results of this activity with the current group of students, collect data in some forms, and make suggestions to improve this activity in the future.
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| Mathematical concepts  | * Statements
* Logical operations
* Predicates
* Quantifiers
* Theorems, considerations
* Deduction, induction
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| Addressed practice | * 1st year bachelor's program for students of specialization primary education; an introduction to mathematics in the program building on expectations of what students have learned in their pre-university courses.
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| Place in specific courseCourse namePlace of teaching units | * A one-semester module in a modular program.
* Title is: Mathematics and methods of teaching
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| Learners profileorientation, year, age, prior knowledge, other such as math anxiety, special needs, .. | * Primary education students
* First year students
* High school mathematics background
* Mathematical content is new to all students
* Mathematics is not an attractive subject for a large number of students and many want to see applications
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| Organisation of specific course study credits/hours, location, group size | * 8 credit course: 3 EC for mathematics part, 5 EC for methods of teaching part
* Course runs on weekly basis from February 2019 up to and including December 2019 as obligatory course: mathematics part takes 10 course weeks in total
* Number of students: 48
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| Expected learning outcomes | The student should be able to:* use basic concepts and operations in mathematical logic
* determine type of statements and predicates
* apply logical operations to statements and predicates
* construct deductive and inductive thinking
* formulate and prove of theorems.
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| Envisioned use of digital technology | * Systems for classroom survey (Menti, Kahoot)
* GeoGebra, Go-Lab.
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| Planning of tasks | * Analysis of available materials on Mathematical logic
* Discussion with colleagues who are mathematicians and mathematics educators
* Creation of the course team
* Design of activities for inquiry-based teaching
* Including new forms of activity into existing teaching program
* Monitoring the process
* Keeping a record of new tasks/approaches for the current group of students – to include specific details of tasks and approaches, and teacher reflections on the teaching and learning that takes place
* Getting feedback from students (polls, interviews).
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| Names of persons involved  | * Yuriy Mazhuga
* Lyudmila Romanenko
* Student assistant in the mathematics part of the course
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| Course: | Mathematics and methods of teaching, 1st module “Elements of mathematical logic” |
| Learning objectives | Within framework of this module, students should be able to:* solve mathematical problems in the areas listed in the contents;
* work independently;
* organize the material of the module to support own learning;
* construct clear, logical arguments.
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| Learning contents | * Introduction to Mathematical Logic
* Mathematical concepts and mathematical sentences
* Statements and predicates
* Logical operation
* Quantifiers
* Structure and types of theorems
* Deductive thinking, induction
* Proof of the truth of statements.
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| teaching /learning activities | * Lectures, seminars, practical work, independent work with materials of the course, obligatory and non-obligatory assignments.
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| Media | * Personal computers
* Mobile phones for classroom engagement during the lectures and practical work
* Appropriate software for computing and lecturer-class interaction (Kahoot, Menti, Padlet, GeoGebra, GoLab, SOWISO).
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| Evaluation | * Continuous assessment of the student throughout the course: practical tasks, passing tests, homework assignment
* Written or oral exam.
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| **Instructor role** | * Developing the module content (inquiry-based tasks/problems)
* Encouraging students’ activity and discussion
* Monitoring learning process/progress and providing support and feedback
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| **Student roles**  | * Active participation in learning during the lectures, seminars and independent studies
* Engaging in inquiry-based mathematics tasks
* Reasoning methods of solution and discussing ideas with peers/tutors
* Reflecting on their learning.
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