

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

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Pedagogic case:	<ul style="list-style-type: none"> • Inquiry-based introduction for different modules of general course in Mathematics for first year students of pedagogical institute
Description (including temporal scheme for design, development and implementation)	<ul style="list-style-type: none"> • 1st year students of pedagogical institute learn basic mathematics, and in particular theoretical foundation of Algebra and Geometry • ICT tools will be used to let student understand deeply and clearly how to explore different mathematical tasks • Rough planning: design February-March 2019, development February-April 2019, implementation February-May 2019.
Aim of pedagogic case	<ul style="list-style-type: none"> • To include inquiry-based activity into learning and teaching selected topics in Algebra and Geometry. • 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.
Mathematical concepts	<ul style="list-style-type: none"> • Numeric expressions • Equation with one variable • System of two equations with two variables • Inequality with one variable • Functions • Graphs of functions • Geometric shapes
Addressed practice	<ul style="list-style-type: none"> • 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.
Place in specific course Course name Place of teaching units	<ul style="list-style-type: none"> • A one-semester modules in a modular program. • Title is: Mathematics and methods of teaching

<p>Learners profile orientation, year, age, prior knowledge, other such as math anxiety, special needs, ..</p>	<ul style="list-style-type: none"> • Primary education students • First year students • High school mathematics background • Mathematics is not an attractive subject for a large number of students and many want to see applications
<p>Organisation of specific course study credits/hours, location, group size</p>	<ul style="list-style-type: none"> • 8 credit course: 3 EC for mathematics part, 5 EC for methods of teaching part (which is also meant to be inquiry-oriented according to the co-teacher) • 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
<p>Expected learning outcomes</p>	<p>The student should be able to:</p> <ul style="list-style-type: none"> • use basic concepts and operations in Algebra and Geometry • solve equations and inequalities with one variable • solve systems of two equations with two variables • determine type of functions • build the graphs of functions • determine the geometric shapes • find the length, area, volume and other values • effective use of available software tools for visual imagination.
<p>Envisioned use of digital technology</p>	<ul style="list-style-type: none"> • Systems for classroom survey (Mentimeter, Kahoot) • GeoGebra, Go-Lab
<p>Planning of tasks</p>	<ul style="list-style-type: none"> • Analysis of available materials on Algebra and Geometry • 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)
<p>Names of persons involved</p>	<ul style="list-style-type: none"> • Yuriy Mazhuga • Lyudmila Romanenko • Student assistant in the mathematics part of the course
<p>Course:</p>	<p>Mathematics and methods of teaching, 2nd module</p>

	“Theoretical foundation for the study of algebraic material” and 3 rd module “Elements of geometry”
Learning objectives	<p>Within framework of these modules, students should be able to:</p> <ul style="list-style-type: none"> • 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.
Learning contents	<ul style="list-style-type: none"> • Introduction to Algebra and Geometry • Basic concepts and operations in Algebra and Geometry • Equations and inequalities • Systems of equations • Functions • Graphs of functions • Geometric shapes • Length, area, volume and other values.
teaching /learning activities	<ul style="list-style-type: none"> • Lectures, seminars, practical work, independent work with materials of the course, obligatory and non-obligatory assignments.
Media	<ul style="list-style-type: none"> • 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).
Evaluation	<ul style="list-style-type: none"> • Continuous assessment of the student throughout the course: practical tasks, passing tests, homework assignment • Written or oral exam.
Instructor role	<ul style="list-style-type: none"> • Developing the modules content (inquiry-based tasks/problems) • Encouraging students’ activity and discussion • Monitoring learning process/progress and providing support and feedback.
Student roles	<ul style="list-style-type: none"> • 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.