



SYLLABUS - Mathematics 1 for Primary School

Basic data of the subject	
Academic Unit:	Faculty of Education
Course title:	<u>Mathematics 1</u> for primary school
Program:	Primary school
Level:	Bachelor
Course status:	Mandatory
Study year:	1st year – 1st semester
Number of hours per week:	3+2 (5 hours)
Credit value – ECTS:	7 ECTS
Time / location:	Faculty of Education
Lecturer:	Dr.sc. Ismet Temaj
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Course description:	In this course, students will receive information from mathematical logic, the theory of sets and binary relations, which represent an important chapter of contemporary mathematics. Relationships dynamize work with communities and create space for the development of students' "critical" thinking. On the other hand, the set of natural numbers N is based on Peano's axiomatic system and the demand for its expansion is justified, in integers Z, rational Q and real R e Complex. Solving many problems from everyday life is based on solving equations and inequations, percentages which are also the study topics of this course.
Course objectives:	The primary objective of the course is to acquire knowledge of fundamental mathematical concepts, structures, and operations that are essential for a teacher of the lower cycle of primary education. The secondary objective is to develop students' abilities and skills in problem solving and interpretation. At the same time, the course aims to enhance students' capacity to plan and implement effective teaching of these concepts in the lower grades of primary education, including the selection of appropriate methods, tools, and learning activities.
Learning outcomes:	Knowledge At the end of the course, the student will be able to: • describe the fundamental concepts of mathematical logic, sets, and relations; • define natural, integer, rational, real, and complex numbers and their properties; • recognize the main structures and concepts of functions, groups, and equations; • explain the characteristics of proportion, percentage, and their applications in real-life problems;

	- identify the connections between mathematical concepts and the content of primary education. Skills At the end of the course, the student will be able to: - apply the concepts and rules of logic and arithmetic in solving mathematical problems; - analyze the relationships between quantities through the use of functions and graphs; - process numerical data using operations with fractions, percentages, and proportions; - construct concrete, visual, and contextual examples to explain mathematical concepts in primary school; - design didactic activities and worksheets that link mathematical content with practical teaching. Competences At the end of the course, the student will be able to: - integrate mathematical knowledge and teaching methodology in concrete educational situations; - develop lesson plans that reflect the adaptation of mathematical concepts according to pupils' age; - evaluate the most suitable teaching strategies for explaining mathematical notions at the primary level; - demonstrate critical and creative approaches in selecting methods, tools, and techniques for teaching mathematics; - collaborate effectively with colleagues to develop and reflect on best practices in teaching mathematical concepts.		
Contribution on student load (must correspond with learning outcomes)			
Activity	Hours	Days/week	Total
Lectures	3	15	45
Exercise theoretical/laboratory	2	15	30
Practice work	-	-	-
Contact with lecturer/consultations	1	12	12
Field exercises	2	15	30
Mid-terms, seminars	3	2	6
Homework	1	15	15
Individual time spent studying (at the library or home)	2	15	30
Final preparation for the exam	2	15	30
Time spent in evaluation (tests, quiz, final exam)			
Projects, presentations, etc.	3	3	9
Total			177 hours



Teaching methods :	For teaching subject's implementation will be used this teaching methodology: advanced lectures; discussions; discussions; quizzes; employment; group work; presentations.
Evaluation methods:	The evaluation is based on the following activities: Midterm I 15 % Midterm II 25 % Final exam 60 % Final grade: Points (%) grade 94 -100 10 84 - 93 9 73 - 83 8 61 - 72 7 50 - 60 6
Literature	
Basic Literature:	[1]. Ismet Temaj 'Matematika elementare I'' (dispense) Prizren 2020 [2]. Allen R. Angel , Christine D. Abbot , Dennis C. Runde " A survey of mathematics with applications " [3]. S.Tahiri, S. Rudi, N. Hyseni (1986) "Matematika për studentët e grupit klasor" Prishtinë; [4] Beckmann, S. (2024). Elementary Mathematics for Teachers. Wiley. ISBN: 978-1119822663 [5] Rosen, K. H. (2023). Discrete Mathematics (9th Ed.). McGraw-Hill. ISBN: 978-1260837015 [web:23] [6] Hyseni, S. (2023). Elementare Matematikë për Mësuesit e Arsimit Fillor. Prishtinë: Universiteti i Prishtinës. ISBN: 978-9951-etc.
Additional Literature:	<i>Text books (1-9)based on mathematics and materials from internet .</i>

Designed study plan:		
Week	Lectures	Exercises
First week:	Introductory concepts; objects, constants and variables; relations and operations; expressions and formulas; mathematical logic; understanding judgments and operations with judgments.	Presentation of the syllabus; general exercises; discussion on teaching approaches for explaining logical judgments and basic logic concepts suitable for grades 1–5 (such as true/false statements using concrete objects, drawings, and everyday examples).

Second week:	Set of natural numbers N ; extension to integers Z .	Mathematical logic, understanding judgments and operations with judgments; discussion on how natural and integer numbers are introduced in primary education using concrete objects, number lines, diagrams, and real-life situations.
Third week:	Set of rational numbers; representation of rational numbers; algebraic properties of rational numbers Q .	Natural numbers and operations with natural numbers; representation on number line; planning concrete activities for presenting fractions (dividing objects, dividing shapes into equal parts) and comparing them in classroom settings.
Fourth week:	Algebraic properties of rational numbers Q ; field of real numbers; representation of real numbers; algebraic properties of real numbers.	Integers and operations with integers; representation on number line; rational numbers and understanding fractions; discussion of didactic strategies for transitioning from natural to integer and rational numbers in primary textbooks.
Fifth week:	Understanding sets and elements; operations with sets and their properties.	Properties of rational numbers and types of fractions, operations with fractions; designing tasks and visual examples for explaining equivalent, different, and mixed fractions according to primary education curricula.
Sixth week:	Cartesian product; binary relations and operations with relations; equivalence relation.	Sets and operations with sets; discussion on simplifying set and relation concepts for primary age through object classification, Venn diagrams, and classification games.
Seventh week:	Colloquium I.	Equivalence relation; reflection on typical student errors in classification and equality, and methods to address them in teaching practice.
Eighth week:	Definition of mapping (function); function and its properties; some special functions.	Understanding functions, properties of functions, inverse function and composition; discussion on presenting simple dependencies (e.g., price-quantity, time-distance) in class using tables, diagrams, and sketches.

Ninth week:	Algebraic structures; understanding groups; applications in sets of numbers.	Inverse function and composition; identifying situations from school mathematics where group-like structures appear implicitly (e.g., operations with numbers) and discussing how to explain rule coherence to students.
Tenth week:	Linear equations and inequalities with one unknown; application of solving first-order linear equations and inequalities in word problems.	Solving equations and inequalities; creating word problems from everyday life (shopping, measurements, age, motion) suitable for primary cycle and discussing step-by-step presentation methods in class.
Eleventh week:	Linear equations with two unknowns; coordinate plane; graph of linear equations with two unknowns (linear function).	Linear equations and inequalities with one unknown and their applications; discussion on introducing coordinate plane and linear function graph in upper primary grades using coordinate grids, points from concrete situations, and simple digital tools.
Twelfth week:	Set of complex numbers; algebraic roots and imaginary numbers; geometric representation of complex numbers; operations with complex numbers.	Coordinate plane; linear function; reflection on which parts of complex number theory have formative value for primary teachers (e.g., number concept extension) and how to translate into simpler language when discussing "numbers beyond the line" with students.
Thirteenth week:	Direct and inverse proportion.	Direct and inverse proportion; creating concrete situations (recipes, map scales, speed, work) and table tasks for classroom use during proportion explanation.
Fourteenth week:	Calculation of percentages, promille, and interest.	Percentage, promille, and interest calculation; creating practical tasks (price discounts, grades, simple statistics, interest) and discussing visual methods (pie charts, bar graphs) for explaining these concepts to students.
Fifteenth week:	Midterm 2	Mixed exercises; recapitulation of main topics through microteaching; students prepare and present mini-lesson plans for selected topics (e.g., fractions, equations, percentages)



		demonstrating how they would teach primary students.
Academic policies and rules of conduct:		
• In general, lecture presentations will be delivered through MS PowerPoint, the use of the whiteboard, teaching materials, computer programs, and numerical exercises. • In addition, the lecturer will provide supplementary materials such as scientific papers, publications, national bulletins, as well as recent discoveries and research findings. • In cases where practical work cannot be conducted on a weekly basis, and in cooperation with the university management, this activity will be organized on specific days in relevant organizations, companies, or production-processing units. • Each session will include a participatory and interactive approach that encourages dialogue and active engagement with students. • Students are required to attend lectures and exercises regularly. • Student contribution and participation during lectures and exercises will be positively evaluated. • Punctual attendance in lectures and exercises is mandatory.		