Appendix No. 1.5 to the Resolution No. 61/2025
of the Rector of the University of Rzeszów

SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2026 TO 2029
ACADEMIC YEAR 2026/2027

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	Elementary Mathematics Review
Course/Module code *	
Faculty (name of the unit offering the field of study)	Faculty of Exact and Technical Sciences
Name of the unit running the course	Faculty of Exact and Technical Sciences Institute of Mathematics
Field of study	Mathematics
Qualification level	First-cycle studies
Profile	General academic
Study mode	Full-time studies
Year and semester of studies	Year 1, Semester 1
Course type	Major subject
Language of instruction	English
Coordinator	Anna Szpila, PhD
Course instructor	Anna Szpila, PhD

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Laboratories	Seminars	Practical classes	Internships	others	**ECTS credits**
1	—	30	—	—	—	—	—	2

1.2. Course delivery methods
☒ conducted in a traditional way
- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

pass with a grade **(GC** - Graded Credit)

2. PREREQUISITES

Achievement of the learning outcomes defined for the basic level of the high school exit exam in mathematics.

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	Systematizing knowledge of elementary mathematics.
O2	Increasing proficiency in using elementary mathematical methods, particularly algebraic expressions, trigonometry, analytical geometry, equations/inequalities, and elementary functions.
O3	Identifying links between higher mathematics and school-level concepts.

3.2. COURSE/MODULE LEARNING OUTCOMES (TO BE COMPLETED BY THE COORDINATOR)

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	The student possesses knowledge regarding algebraic expressions, number sets, elementary functions, and basic concepts of geometry, in particular vectors, lines, and circles on a plane.	K_W01
LO_02	The student performs operations on algebraic expressions, uses short multiplication formulas, and interprets/explains relationships presented in the form of formulas; conducts inductive proofs; operates on number sets, particularly on intervals	K_U01
LO_03	The student describes the properties of elementary functions, draws graphs of these functions, interprets functional dependencies, and utilizes elementary functions in practical problems.	K_U04
LO_04	The student solves equations and inequalities: linear, quadratic, rational, containing absolute value, exponential, logarithmic, trigonometric, and cyclometric.	K_U01, K_U04
LO_05	The student performs operations on vectors and applies vector calculus in solving problems of elementary geometry.	K_U04

LO_06	The student describes lines on a plane and their mutual positions in various ways.	K_U01
LO_07	The student describes circles and their mutual positions.	K_U01
LO_08	The student is able to use the language appropriate for mathematics, describes formulas verbally, and vice versa—records mathematical formulas based on a verbal description.	K_U01
LO_09	The student is ready for critical assessment of received content, in particular for determining its logicality.	K_K02

3.3. Course content (to be completed by the coordinator)

A. Classes, laboratories, seminars, practical classes

Content outline
Number Sets and Algebra: the set of natural numbers, the set of real numbers, special product formulas, transformations of algebraic expressions, numerical intervals and operations on intervals, absolute value of a real number, equations and inequalities with absolute value.
Quadratic Function: quadratic function formulas in general, canonical, and factored forms, Viète's formulas, sketching graphs of quadratic functions, reading properties of a quadratic function from its graph, investigation of quadratic functions – optimization, quadratic equations and inequalities, quadratic equations and inequalities involving absolute value, quadratic equations and inequalities where the unknown is under a square root.
Polynomial and Rational Functions: equality of polynomials, roots of a polynomial, multiple roots, factoring polynomials, polynomial equations and inequalities, definition of a rational function, rational equations and inequalities.
Exponential and Logarithmic Functions: powers with real exponents and their properties, the exponential function and its properties, exponential equations and inequalities, logarithm – definition and basic properties, the logarithmic function and its properties, logarithmic equations and inequalities.
Trigonometric Functions: definition of trigonometric functions of a real variable, periodicity of trigonometric functions, graphs of trigonometric functions, reduction formulas, sine and cosine of the sum and difference of angles, sums and differences of sines and cosines, trigonometric identities, trigonometric equations and inequalities.
Cyclometric Functions and Hyperbolic Functions: definition of cyclometric functions, graphs and properties of cyclometric functions, identities for cyclometric functions, cyclometric equations and inequalities, definition of hyperbolic functions, graphs and properties of hyperbolic functions, hyperbolic identities, comparison of hyperbolic function properties with trigonometric function properties.
Vectors on a Plane: vector coordinates, vector length, vector addition and multiplication of a vector by a scalar, parallel vectors, the scalar product of vectors, perpendicular vectors, the angle between vectors, the vector product, the area of a parallelogram.
Lines on a Plane: the slope-intercept form of a line, the slope of a line, the general form of a line equation, parallel and perpendicular lines.

Circles: the equation of a circle, mutual position of a line and a circle, the tangent line to a circle, mutual position of circles.

3.4. Methods of Instruction

problem solving, discussion

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO_01	Test, observation during classes.	Classes
LO_02	Test, observation during classes.	Classes
LO_03	Test, observation during classes.	Classes
LO_04	Test, observation during classes.	Classes
LO_05	Test, observation during classes.	Classes
LO_06	Test, observation during classes.	Classes
LO_07	Test, observation during classes.	Classes
LO_08	Observation during classes.	Classes
LO_09	Observation during classes.	Classes

4.2 Course assessment criteria

Passing the classes is based on midterm tests and activity during classes.
Two midterm tests are planned.
The condition for passing is obtaining at least 50% of the points from each test.
Grading scale:

- below 50% – Unsatisfactory (2,0)
- 50% - 60% – Satisfactory (3,0)
- 61% - 70% – Satisfactory plus (3,5)
- 71% - 80% – Good (4,0)
- 81% - 90% – Good plus (4,5)
- 91% - 100% – Very good (5,0)

Activity during classes can increase the grade by a maximum of half a grade.

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Course hours	45

Other contact hours involving the teacher (consultation hours, examinations)	5
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	50
Total number of hours	100
Total number of ECTS credits	2

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	—
Internship regulations and procedures	—

7. Instructional materials

Compulsory literature:

1. S. Axler, Algebra and Trigonometry, John Wiley & Sons Inc, 2011
2. R. Larson, Precalculus, BROOKS COLE PUB CO, 2016
3. L. Redlin, S. Watson, Precalculus: Mathematics for Calculus, Cengage Learning, 2016
4. P. Schmidt, Schaums Outline of College Mathematics, McGraw-Hill, 2010

Complementary literature:

Approved by the Head of the Department or an authorised person