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

SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2026/2027 TO 20299/2030
ACADEMIC YEAR 2026/2027

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	**Mathematics**
Course/Module code *	
Faculty (name of the unit offering the field of study)	Faculty of Technology and Natural Sciences
Name of the unit running the course	Faculty of Science and Technology Institute of Mathematics
Field of study	Agriculture
Qualification level	first-cycle studies
Profile	general academic
Study mode	stationary
Year and semester of studies	1 year, 1 semester
Course type	Basic
Language of instruction	English
Coordinator	dr Renata Tłuczek-Pięciak
Course instructor	dr Renata Tłuczek-Pięciak

* - 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	15	20						3

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)

LECTURE – CREDIT, CLASSES – GRADED CREDIT

2. PREREQUISITES

Knowledge and skills in mathematics at the basic Matura exam level.

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

3.1. Course/Module objectives

O1	To familiarize students with fundamental concepts of mathematical analysis and linear algebra.
O2	Mastery of the fundamental concepts, methods, and techniques used in mathematical analysis and linear algebra.
O3	Acquiring the ability to use mathematical methods to describe phenomena in the natural and technical sciences.

3.2. COURSE/MODULE LEARNING OUTCOMES

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	The student knows and understands mathematical concepts from the theory of real-valued functions of a single variable and linear algebra to an extent necessary for their application in agricultural sciences, including, among others: functions and their properties; limits, continuity, and derivatives of functions; indefinite and definite integrals and their applications; matrices, determinants, and systems of linear equations.	K_W04
LO_02	The student finds limits of standard sequences and functions, examines function continuity, determines derivatives and local extrema of single-variable functions, calculates indefinite and definite integrals, performs matrix operations, computes determinants, and solves systems of linear equations.	K_W04 K_U06
LO_03	The student is able to plan and organize individual and team work, including independently finding relevant information in the literature and applying it appropriately in cooperation with the group.	K_U10
LO_04	The student is prepared to seek expert opinion when encountering difficulties in independently solving problems in the natural sciences.they receive.	K_K02

3.3. Course content

A. Lectures

Content outline
Elements of logic. Sets and operations on sets. Functions and their basic properties.
Number sequences and their properties. Limits of sequences.
Limit and continuity of a function.

The derivative of a function of one variable and its properties. Differentiation rules. Some applications of derivatives.
Indefinite integral. Basic methods for calculating indefinite integrals. Definite integral and its relationship to the indefinite integral. Applications of integrals.
Matrices and their properties. Matrix operations. Matrix determinant, inverse matrix. Matrix rank. Systems of linear equations; Cramer's theorem, Kronecker-Capelli theorem.

B. Classes

Content outline
Elements of logic. Sets and operations on sets. Elementary functions and their properties. Domain, range, zeros, monotonicity, injectivity, and function parity (evenness and oddness).
Number sequences and their properties. Limits of sequences.
Limit and continuity of a function.
The derivative of a function of one variable and its properties. Rules for finding derivatives. Extrema of a function.
Indefinite integral. Basic methods for calculating indefinite integrals. Definite integral and its applications. Calculation of areas.
Matrix operations, calculating determinants, finding the inverse matrix. Solving systems of linear equations.

3.4. Methods of Instruction

Lecture: Lecture with a multimedial presentation.
Exercises: Traditional exercises – solving problems at the board, individual and group work, 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, LO-02	COLLOQUIUM, OBSERVATION, AND CLASS DISCUSSION	LEKTURES, CLASSES
LO-03	OBSERVATION, AND CLASS DISCUSSION	CLASSES
LO-04	OBSERVATION, AND CLASS DISCUSSION	CLASSES

4.2 Course assessment criteria

To pass the course, students must successfully complete both the lectures and the classes.

Lecture – Class attendance and a passing grade on a short test.
Classes – A passing grade on the midterm test. Test questions are graded using a point system. The final grade is awarded according to a specific grading scheme.
<50%,65%): 3.0,
<65%,75%): 3.5,
<75%,85%): 4.0,

<85%,95%): 4.5, <95%,100%>: 5.0.

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

Activity	Number of hours
Course hours	35
Other contact hours involving the teacher (consultation hours, examinations)	2
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	38
Total number of hours	75
Total number of ECTS credits	3

* 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. Kossak, R., Mathematical Logic: On Numbers, Sets, Structures, and Symmetry. 2nd ed., Springer, Cham, 2024.
2. . Nathaniel Johnston, Introduction to Linear and Matrix Algebra, Springer, 2021
3. Angus E. Taylor, General Theory of Functions and Integration, Dover Publications, New York,1986

Complementary literature:

1. O'Leary, M. L., A First Course in Mathematical Logic and Set Theory. John Wiley & Sons, Hoboken, NJ, 2016
2. A Collection of Exercises, in Algebra, Linear Algebra and Geometry, Taylor & Francis Ltd, 1996.
3. 3. Raz Kupferman, Lecture notes of Calculus, The Hebrew University, 2013

Approved by the Head of the Department or an authorised person