

GENERAL INFORMATION ABOUT THE FIELD OF STUDY

Effective from the academic year 2026/2027

1.	Field of study	Mathematics
2.	Level of study	First-cycle studies
3.	Study profile	General academic
4.	Form or forms of study	Full-time
5.	Number of semesters	6 semesters
6.	Number of ECTS points necessary to complete the studies at a given level	180 ECTS
7.	Professional title	Bachelor of Science (B.Sc.)
8.	Assignment of the field of study to a field of science and a scientific or artistic discipline (specification of the percentage share in the case of assignment of the field of study to more than one discipline and indication of the leading discipline within which more than half of the learning outcomes will be achieved)	Field of science: Exact and Natural Sciences Leading discipline: Mathematics - 100 %,
9.	Differences in relation to other programmes with similarly defined goals and learning outcomes, conducted at the University and assigned to the same discipline	The study program is based on the learning outcomes established for the mathematics programme taught in Polish at the University of Rzeszów. Currently, the University of Rzeszów does not offer any other programme with similar objectives or learning outcomes. This is the only programme at the University fully assigned to the discipline of mathematics.
10.	Description of the graduate profile including the description of general educational goals as well as employment opportunities and the possibility of continuing studies	Graduates possess comprehensive knowledge of fundamental branches of mathematics and have developed strong analytical and synthetic thinking skills. This enables them to approach practical problems creatively by designing or adapting mathematical models. Equipped with essential IT skills, graduates are well-prepared for the demands of the modern information society. They remain open to scientific advancements and are committed to continuous professional development,

		<p>being fully eligible to pursue second-cycle (Master's) or postgraduate studies. Furthermore, graduates specializing in Data Analysis and Security are qualified to work as consultants in statistical data analysis for banks, consulting firms, research centres, and statistical offices. Those following the Applications of Mathematics in Finance path are prepared for careers in various financial institutions.</p>
11.	Language of instruction	English

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DESCRIPTION OF THE ASSUMED LEARNING OUTCOMES

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Field of study	Mathematics	
Level of study	First-cycle studies	
Study profile	General academic	
<p>The description of the assumed learning outcomes for the field of study, level, and profile of education takes into account the universal first-cycle characteristics for levels 6–7 specified in the Act of 22 December 2015 on the Integrated Qualifications System (consolidated text: Journal of Laws of 2024, item 1606) and the second-cycle characteristics for levels 6–7 specified in the Regulation of the Minister of Science and Higher Education of 14 November 2018 (Journal of Laws of 2018, item 2218) on the second-cycle characteristics of learning outcomes for qualifications at levels 6–8 of the Polish Qualifications Framework.</p>		
Symbol	Learning outcomes	Reference to the second-cycle PQF characteristics
Knowledge: the graduate knows and understands		
K_W01	basic examples illustrating specific mathematical concepts, as well as counterexamples that allow for the refutation of false hypotheses and incorrect reasoning	P6S_WG
K_W02	the role and importance of proof in mathematics and the significance of assumptions in mathematical reasoning	P6S_WG
K_W03	basic concepts and methods for describing problems in various branches of mathematics, in particular in logic and set theory, mathematical analysis, algebra, analytic geometry, topology, discrete mathematics as well as in probability theory and statistics	P6S_WG
K_W04	basic theorems and proof techniques used in various areas of mathematics, in particular in logic and set theory, mathematical analysis, algebra, analytic geometry, topology, discrete mathematics, as well as in probability theory and statistics	P6S_WG
K_W05	basics of computational and programming techniques supporting the work of a mathematician and their limitations	P6S_WG
K_W06	advanced information technologies, in particular mathematical software packages and the possibility of their use in solving application problems	P6S_WG
K_W07	concepts, theorems and methods related to the application of mathematics in other fields of science	P6S_WG

K_Wo8	the dilemmas of contemporary civilization, for whose explanation mathematics is helpful	P6S_WK
K_Wo9	basic economic, legal and ethical determinants of activities related to the use of mathematical knowledge, with particular emphasis on the basic concepts and principles in the field of industrial property protection and copyright	P6S_WK
K_W10	basic principles of creating and developing various forms of individual entrepreneurship	P6S_WK
Skills: the graduate can		
K_Uo1	correctly and comprehensively formulate definitions and theorems and present correct mathematical reasoning	P6S_UK, P6S_UW
K_Uo2	analyse problems and find their solutions based on the learned theorems	P6S_UW
K_Uo3	use the language of mathematical logic and set theory when defining concepts, formulating theorems and developing simple mathematical models	P6S_UK, P6S_UW
K_Uo4	describe the properties of various functions, in particular elementary functions, as well as interpret and explain functional relationships in the form of formulas, tables, graphs, diagrams, and apply them in practical issues	P6S_UK, P6S_UW
K_Uo5	use the differential calculus of functions of one and many variables and apply it in problems from various areas of mathematics and other fields of science, in particular related to solving optimization problems	P6S_UW
K_Uo6	use integral calculus and apply integrals in geometric and physical problems	P6S_UW
K_Uo7	notice the presence of basic algebraic structures in various mathematical issues and use them to solve problems in various areas of mathematics and other fields of science	P6S_UW
K_Uo8	describe algebraic objects of degree up to two in different coordinates and understand the relations between algebraic and geometric descriptions of algebraic transformations and sets	P6S_UW
K_Uo9	identify and define the most important topological properties for Euclidean and metric spaces and use topological properties of sets and functions to solve qualitative problems	P6S_UW
K_U10	apply basic concepts and theorems of discrete mathematics in solving problems from various areas of mathematics	P6S_UW
K_U11	use numerical tools and methods to solve selected problems from various areas of mathematics as well as practical problems	P6S_UW

K_U12	use basic concepts of probability theory, build and analyse mathematical models of a random experiment	P6S_UW
K_U13	use basic concepts of mathematical statistics and make simple statistical inferences also using IT tools	P6S_UW
K_U14	recognize problems that can be solved algorithmically, make a specification of such a problem, design and analyse an algorithm compliant with the specification and implement it in an appropriate programming language, then compile, run and test a self-written computer program	P6S_UW
K_U15	use advanced information technologies, in particular use at least one mathematical package	P6S_UW
K_U16	use appropriate mathematical concepts, tools and methods in solving problems related to the application of mathematics in other fields of science, as appropriate for the chosen path of education	P6S_UW
K_U17	discuss mathematical issues using clear and accessible language	P6S_UK
K_U18	formulate opinions on basic mathematical issues as well as engage in discussions by presenting and evaluating various opinions and positions	P6S_UK
K_U19	use a foreign language at the B2 level defined in the Common European Framework of Reference for Languages	P6S_UK
K_U20	plan and organize individual or team activities aimed at solving a given problem in mathematics or its applications, and subsequently prepare an appropriate study on the subject	P6S_UO
K_U21	work effectively in a team, understanding the meaning and importance of team effort for the success of various endeavours	P6S_UO
K_U22	consciously design their own learning path, independently update and integrate the knowledge acquired during studies with other disciplines, and apply it to pursue their own professional development	P6S_UU
Social competences: the graduate is ready to		
K_K01	make a critical assessment of their strengths and weaknesses, recognize the limitations of their own knowledge and skills, and thus recognize the need to improve their own competences	P6S_KK
K_K02	demonstrate a critical attitude towards the received content, in particular that which is not logically justified	P6S_KK
K_K03	recognize the importance of knowledge in solving cognitive and practical problems typical of workplaces appropriate for graduates of mathematics and to consult experts in the event of difficulties with solving the problem on their own	P6S_KK

K_Ko4	fulfil social obligations arising from the nature of work typical for graduates of mathematics programs	P6S_KO
K_Ko5	take actions in solving problems and performing tasks typical for professions related to the field of study	P6S_KO
K_Ko6	think and act in an entrepreneurial way	P6S_KO
K_Ko7	responsibly fulfil professional roles that require competences appropriate for a mathematics graduate, specifically by adhering to legal and ethical standards and upholding the achievements and traditions of the profession	P6S_KR

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CHARACTERISTICS AND CONDITIONS FOR THE IMPLEMENTATION OF THE STUDY PROGRAMME

Effective from the academic year: 2026/2027

Field of study		Mathematics
Level of study		First-cycle studies
Study profile		General academic
1.	Total number of teaching hours	full-time studies
		1995 hours of coursework +90 hours of professional internship
2.	Number of ECTS points for individual disciplines in the total number of ECTS points required to complete the studies in the field	Mathematics: 180 ECTS
3.	Total number of ECTS points that a student must obtain as part of classes conducted with the direct participation of academic teachers or other persons conducting classes	full-time studies
		91 ECTS
4.	Number of ECTS points that a student must obtain within classes in the field of humanities or social sciences, not less than 5 ECTS points – in the case of fields of study assigned to disciplines within fields other than humanities or social sciences respectively	5 ECTS
5.	Number of ECTS points that a student must obtain within elective classes (not less than 30% of the total number of ECTS points)	78 ECTS
6.	Number of physical education hours (in the case of first-cycle studies and long-cycle Master's studies conducted in the form of full-time studies)	60 hours
7.	Total number of ECTS points assigned to classes shaping practical skills – concerns the practical profile	–
8.	Total number of ECTS points assigned to classes related to scientific activity in the discipline or disciplines to which the field of study is assigned, including the preparation of students for conducting scientific activity	105 ECTS

	or participation in this activity – concerns the general academic profile	
9.	Extent, rules, and forms of professional internships and the number of ECTS points assigned to internships	Number of hours: 90 Duration: 3 weeks ECTS points: 4 ECTS Implementation method and conditions for commencement of internships: Internships at financial institutions or statistical offices, completed during the 6th semester.
10.	Description of methods for verification and assessment of learning outcomes achieved by the student throughout the entire education cycle	Appropriate and diversified verification methods are applied to all learning outcomes defined in the curriculum. Detailed descriptions are provided in individual course syllabi. Common methods include written and oral examinations, mid-term tests (colloquia), presentations, projects, internship logs, and continuous assessment of class participation. Successful completion of a course confirms the achievement of its learning outcomes. Key outcomes are further verified through the diploma thesis and the final diploma examination.
11.	Conditions for graduation	Graduation requirements include: achieving all learning outcomes defined in the study programme, earning 180 ECTS credits, completing the mandatory professional internship, receiving passing grades for the Bachelor's thesis from both the supervisor and the reviewer, and passing the final Bachelor's diploma examination.

Conditions for the implementation of the study programme

No.	Subjects or groups of subjects *	Learning outcomes assigned to subjects/groups of subjects	Number of hours	Assessment form	Number of ECTS points
			full-time studies		
General subject group					
1.	Physical Education	K_U21	60	GC	0
2.	Foreign Language (elective)	K_U19, K_Ko1	120	E	8
3.	Introduction to Computer Lab	K_Wo6, K_U15, K_Ko1	15	GC	1

4.	Social Science Subject (Elective)	K_W10, K_U22, K_K06.	30	GC	2
5.	University-wide Subject (Elective)		30	C	2
6.	Intellectual Property Protection	K_W09, K_K07	15	C	1
Total for general subject group			270		14
Major subject group					
7.	Elementary Mathematics Review	K_W01, K_U01, K_U04, K_K02	30	GC	2
8.	Introduction to Logic and Set Theory	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U03, K_K01, K_K02, K_K03	60	E	6
9.	Calculus 1	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U04, K_U05; K_K01, K_K02, K_K03	120	E	12
10.	Calculus 2	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U06, K_K01, K_K02, K_K03	120	E	12
11.	Calculus 3	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U05, K_K01, K_K02, K_K03	75	E	8
12.	Calculus 4	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U06, K_K01, K_K02, K_K03	60	E	6
13.	Linear Algebra with Geometry 1	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U07, K_K01, K_K02, K_K03	60	E	6
14.	Linear Algebra with Geometry 2	K_W01, K_W02, K_W03, K_W04, K_U01, K_U02, K_U07, K_U08, K_K01, K_K02, K_K03	60	E	6

15.	Algebra with Number Theory	K_Wo1, K_Wo2, K_Wo3, K_Wo4, K_Uo1, K_Uo2, K_Uo7, K_Ko1, K_Ko2, K_Ko3	60	E	6
16.	Introduction to Topology	K_Wo1, K_Wo2, K_Wo3, K_Wo4, K_Uo1, K_Uo2, K_Uo9, K_Ko1, K_Ko2, K_Ko3	60	E	6
17.	Introduction to Probability Theory	K_Wo1, K_Wo2, K_Wo3, K_Wo4, K_Uo1, K_Uo2, K_U12, K_Ko1, K_Ko2, K_Ko3	60	E	6
18.	Basics of Mathematical Statistics	K_Wo1, K_Wo2, K_Wo3, K_Wo4, K_Uo1, K_Uo2, K_U13, K_Ko1, K_Ko2, K_Ko3	45	GC	4
19.	Discrete Mathematics	K_Wo1, K_Wo2, K_Wo3, K_Wo4, K_Wo8, K_Uo1, K_Uo2, K_U10, K_Ko1, K_Ko2, K_Ko3	60	E	6
20.	Basics of Computer Programming	K_Wo5, K_U14, K_Ko1, K_Ko2, K_Ko3	60	GC	5
21.	Object-Oriented Programming	K_Wo5, K_U14, K_Ko1, K_Ko2, K_Ko3	45	GC	4
22.	Introduction to Numerical Methods	K_Wo5, K_Wo8, K_U11, K_Ko1, K_Ko2, K_Ko3	60	GC	5
23.	Diploma Seminar	K_Wo9, K_U17, K_U18, K_U20, K_U22, K_Ko1, K_Ko2, K_Ko7	60	C	10
24.	Monographic Lecture (Elective)	K_Wo1, K_Wo2, K_Uo1, K_Uo2, K_Ko1, K_Ko2	60	E	6
Total for major subject group			1155		116
Total for general subject group and major subject group			1425		130
Educational path in the field of Data Analysis and Security					
25.	Optimization Theory	K_Wo1, K_Wo2, K_Wo7, K_Uo4,	60	GC	5

		K_U16, K_Ko2, K_Ko3			
26.	Database Systems	K_Wo6, K_U15, K_Ko2, K_Ko3	60	E	6
27.	Operating Systems	K_Wo6, K_Wo8, K_U15, K_U22, K_Ko3, K_Ko5	45	GC	3
28.	Graph Theory	K_Wo1, K_Wo2, K_Wo7, K_Uo1, K_Uo2, K_U16, K_Ko3, K_Ko5	30	GC	2
29.	Introduction to the R System	K_Wo5, K_Wo6, K_U15, K_U21, K_Ko4, K_Ko5	45	GC	3
30.	Computer Tools in Mathematical Applications	K_Wo6, K_U15, K_U21, K_Ko4, K_Ko5	30	GC	2
31.	Programming	K_Wo5, K_Wo7, K_U14, K_U22, K_Ko4, K_Ko5, K_Ko7	60	GC	5
32.	Data Analysis in the R System	K_Wo6, K_Wo7, K_U15, K_U22, K_Ko4, K_Ko5, K_Ko7	45	GC	3
33.	Statistical Research Tools and Techniques	K_Wo6, K_Wo7, K_U15, K_U16, K_U22, K_Ko5, K_Ko7.	45	GC	3
34.	Basics of Cryptography	K_Wo7, K_Wo8, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	E	6
35.	Decision-making under Risk	K_Wo7, K_Wo8, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	E	6
36.	Machine Learning	K_Wo7, K_Wo8, K_U14, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	30	GC	2
Total for Data Analysis and Security			570		46
Educational path in the field of Applications of Mathematics in Finance					
37.	Optimization Theory	K_Wo1, K_Wo2, K_Wo7, K_Uo4, K_U16, K_Ko2, K_Ko3	60	GC	5
38.	Database Systems	K_Wo6, K_U15, K_Ko2, K_Ko3	60	E	6

39.	Operating Systems	K_Wo6, K_Wo8, K_U15, K_U22, K_Ko3, K_Ko5	45	GC	3
40.	Graph Theory	K_Wo1, K_Wo2, K_Wo7, K_Uo1, K_Uo2, K_U16, K_Ko3, K_Ko5	30	GC	2
41.	Introduction to the R System	K_Wo5, K_Wo6, K_U15, K_U21, K_Ko4, K_Ko5	45	GC	3
42.	Computer Tools in Mathematical Applications	K_Wo6, K_U15, K_U21, K_Ko4, K_Ko5	30	GC	2
43.	Basics of Economics	K_Wo9, K_W10, K_U22, K_Ko4, K_Ko5, K_Ko7	60	GC	5
44.	Introduction to Mathematical Economics	K_Wo7, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	E	5
45.	Insurance Mathematics	K_Wo7, K_Wo8, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	GC	5
46.	Econometrics	K_Wo7, K_Wo8, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	GC	5
47.	Introduction to Financial Mathematics	K_Wo7, K_Wo8, K_U16, K_U22, K_Ko4, K_Ko5, K_Ko7	60	GC	5
Total for Applications of Mathematics in Finance			570		46
Total for all subjects			1995		176
	Professional internship	K_U21, K_Ko3, K_Ko4, K_Ko5, K_Ko6, K_Ko7	90	GC	4
Total:			1995 (+90 Internship)		180
<p>Assessment codes:</p> <p>E - Examination</p> <p>GC - Graded Credit</p> <p>C - Credit</p> <p>1. Every student is required to complete:</p> <p>1) the general subject group,</p>					

2) the major subject group.

2. The Social Science Subject from the general subjects group is an elective, provided that it includes content in the fields of management and entrepreneurship. The course catalogue is announced annually.
3. The Foreign language course is conducted over four semesters.
4. In the 1st semester, a student is required to pass: Elementary Mathematics Review, Introduction to Logic and Set Theory, Calculus 1, and Linear Algebra with Geometry 1. The subjects Calculus 2 and Linear Algebra with Geometry 2 are taught in the 2nd semester. Calculus 3 and Calculus 4 are taught in the 3rd and 4th semesters, respectively.
5. A student who fails to pass Calculus 1, 2, or 3, or Linear Algebra with Geometry 1 in the appropriate semesters is not eligible for conditional enrolment for the following semester.
6. The student attends the Diploma Seminar in semesters 5 and 6. Failure to pass the Diploma Seminar in the 5th semester results in repeating the semester.
7. The student chooses a Monographic Lecture from a catalogue announced in the semester preceding the one in which the classes are held.
8. At the end of the 2nd semester, the student declares their choice of educational path (specialization). The implementation of these educational paths begins in the 3rd semester.
9. The student chooses one path from:
 - a) Data Analysis and Security
 - b) Applications of Mathematics in Finance.
10. The student acquires the ability to use the TeX system—essential for editing a diploma thesis in mathematics—as part of the course Computer Tools in Mathematical Applications.
11. During the first year, the student is required to complete a health and safety (OSH) training course of at least 4 hours, as well as library training.
12. It is possible to conduct selected classes or forms of instruction using distance learning methods and techniques in synchronous mode, to the extent permitted by current legislation. These classes or forms of instruction are specified in the study plan.

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