ANEXA 1

CURRICULUM
Valid for the study cycle 2025-2028
"Aurel Vlaicu" University of Arad

Faculty of Exact Sciences
Department: **Mathematics and Computer Science**
Name of program: **Mathematics and Computer Science**
Field of studies: **Mathematics**
Length of program / number of ECTS credits: **3 years /180 credits**
Type of education: **Full – Time study**
Graduate title earned: **Bachelor in mathematics**

1. MISSION STATEMENT

The teaching and research mission of the master study programme in question fits the profile and speciality of the Faculty of Exact Sciences. It consists in training high qualified profesionals in the fields of mathematics and computer science competitive in the work market.

2. OBJECTIVES

- Maintaining a high level of scientific training to be transferred to the students in the Mathematics & Computer Science, compatibile with the EU standards and the possibility for them to opt for certain study routes in order to rapidly be integrated into the professional activity;
- Promoting a modern and flexible curriculum, according to european valuesof a socity based on knowledge, favoring the interdisciplinarity and the methodologies of teaching, learning and evaluating, depending on the shape and dynamics of the field;
- Achieving a true quality of the teaching-learning process by making use of some continuously evolving didactical strategies;
- Training professionals with solid theoretical and practical knowledge in accordance to the european standards;
- Stimulating the interest to continue the professional training and scientific research in order to efficiently to the requirements of a knowledge-oriented society.

3. ACADEMIC CAREER DEVELOPMENT

Bachelor's degree graduates "**Mathematics and Computer Science**" according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions	**ESCO Competences**
2120 – cod 212009 – mathematician 2120 – cod 212001 – mathematician consultant 2120 – cod 212014 – statistical analist	C1. Develops problem-solving strategies C2. Performs analytical mathematical calculations C3. Synthesizes information C4. Thinks abstractly C5. Communicates mathematical information C6. Applies scientific methods C7. Uses data processing techniques C8. Uses software for specialized design C9. Manages personal professional development C10. Carries out research activities at an interdisciplinary level C11. Process data C12. Gives proof of disciplinary expertise
2330 – cod 233002 – teacher in secondary education	C13. Teach mathematics C14. Develop digital educational materials C15. Use mathematical and computer tools

2512 – cod 251202 – programmer	C16. Provides technical documentation
2521 – cod 252101 – database administrator	C17. Use databases

Transversal competences

TC1. Shows initiative
TC2. Give advice to others
TC3. Takes responsibility
TC4. Works in teams
TC5. Shows confidence
TC6. Builds team spirit
TC7. Plans

4. EXPECTED LEARNING OUTCOMES OF THE STUDY PROGRAM

No. crt.	LEARNING OUTCOMES			Subjects Contributing to the Achievement of Learning Outcomes
	Knowledge	**Skills**	**Responsibility and Autonomy**	
C1. Develops problem-solving strategies				
	The graduate: a) has knowledge of fundamental concepts in algebra, analysis, logic, discrete structures, algorithms, and graph theory b) understands the structure and properties of algorithmic and mathematical methods used in problem-solving c) is familiar with techniques for mathematical and algorithmic modeling of problem situations from various fields	The graduate: a) proposes and justifies solution strategies for various problems, using logical, analytical, or algorithmic methods b) selects and applies appropriate models, methods, and algorithms to solve problems c) analyzes and compares different possible solutions, explaining the advantages and limitations of each d) uses software tools or programming languages to implement and test solutions	The graduate: a) demonstrates an interest in developing problem-solving strategies b) develops new solution models through the skilled use of specialized software c) is able to work both individually and as part of a team to solve complex problems d) demonstrates rigor, perseverance, and initiative in the problem-solving process	Mathematic Analysis 1,2 Mathematical Logic and Set Theory Algebra 2 (Linear Algebra) Geometry Differential Geometry Algorithmics of graphs Algorithms and Programming Data Structures Object Oriented Programming Operational research Theoretical Mechanics Modeling and simulation Mathematical Software 1,2 Artificial Intelligence 1 Mathematical modeling Elements of Combinatorics
C2. Performs analytical mathematical calculations				
	The graduate: a) knows the fundamental concepts of mathematical analysis, algebra, analytic geometry, differential equations, etc. b) understands theories, formulas, and techniques of analytical calculus: differentiation, integration, limits, series, transformations c) is familiar with analytical methods for solving equations and problems with initial or boundary conditions	The graduate: a) performs complex analytical mathematical calculations accurately, applying rules and theorems rigorously b) uses various computational technologies to perform analytical mathematical calculations and determine solutions to domain-specific problems c) solves logical-mathematical equations and problems	The graduate: a) has the ability to perform complex calculations b) reviews and validates results obtained through critical analysis c) takes responsibility for selecting the correct calculation methods d) applies effective work techniques in multidisciplinary teams	Mathematic Analysis 1,2 Algebra 2 (Linear Algebra) Geometry Differential Geometry Differential Equations 1,2 Basics of Mathematical Statistics Mathematical Statistics Algorithms and Programming Elements of Combinatorics

C3. Synthesizes information				
	The graduate: a) conducts research on a given topic b) knows methods for collecting, classifying, and evaluating information from various sources c) critically summarizes new and complex information related to a given topic	The graduate: a) accurately interprets information collected on a given topic b) integrates various concepts and theorems to construct arguments and solutions c) selects necessary information to solve a specific problem d) uses digital tools to support information synthesis	The graduate: a) uses the information available coherently b) demonstrates professionalism in managing available information c) can work independently or in multidisciplinary teams	Basics of Mathematical Statistics Mathematical Statistics Mathematical modeling Functional Analysis Specialty Practice Methodology for Bachelor's Thesis Writing Bachelor's Thesis Writing
C4. Thinks abstractly				
	a) defines and understands the fundamental concepts underlying abstract thinking: axioms, theorems, proofs, structures, functions, relations, and types of abstract data b) knows the principles of mathematical and formal logic, as well as methods of proof c) formulates observations and distinguishes notions, properties, and assertions in core mathematical disciplines through examples and counterexamples	The graduate: a) provides examples of applying basic theoretical concepts and results to solve exercises and problems related to the curriculum topics b) represents and formulates concepts and problems in abstract, symbolic, or formal terms c) creates abstract representations for information structures: trees, graphs, recursive functions, object classes	The graduate: a) demonstrates intellectual autonomy in exploring and manipulating abstract concepts b) finds solutions to practical, operational, or conceptual problems across a wide range of contexts c) generates argumentative procedures to support solutions	Mathematical Logic and Set Theory Algebra1 (Algebraic Structures) Algorithms and Programming Real Analysis Complex Analysis Differential Geometry Theoretical Mechanics Functional Analysis Algorithmics of graphs Object Oriented Programming Artificial Intelligence 1,2 Formal languages and compilers Elements of Combinatorics
C5. Communicates mathematical information				
	The graduate: a) knows standard mathematical and computer science terminology in Romanian and/or English b) is familiar with notation, symbolism, and formal presentation conventions of mathematical content c) translates various practical problems into mathematical language	The graduate: a) writes rigorous proofs, logical arguments, and detailed explanations using specific terminology b) develops solutions to domain-specific problems using appropriate symbols, language, and mathematical tools c) interprets and explains graphs, tables, mathematical models, and numerical or symbolic results	The graduate: a) communicates and interprets the solution to a problem b) compares alternative solutions using specific mathematical language c) presents ideas and processes using appropriate symbols, language, and mathematical tools d) demonstrates rigor and intellectual discipline in writing and presenting their own mathematical results	Operational research Real Analysis Complex Analysis Functional Analysis Mathematical Software 1,2 Methodology for Bachelor's Thesis Writing Bachelor's Thesis Writing English 1,2,3,4 Scientific and professional writing and communication Ethics and Academic Integrity
C6. Applies scientific methods				
	The graduate: a) constructively approaches scientific texts on a given topic b) selects and organizes	The graduate: a) applies scientific methods and techniques to investigate current practical phenomena or problems	a) The graduate: a) writes, edits, and presents scientific texts b) takes responsibility for the accuracy,	Mathematical Analysis 1, 2 Mathematical Logic and Set Theory Algebra 1 (Algebraic

	the necessary information to conduct research c) compares and distinguishes related notions and their properties in advanced mathematical disciplines d) knows the stages of the scientific methodology: hypothesis formulation, problem modeling, method selection, experimentation, result analysis, and hypothesis validation or rejection	b) corrects and integrates prior knowledge into current studies c) uses digital technology in the studies undertaken d) recognizes and analyzes necessary and/or sufficient conditions in the statements of mathematical assertions and specifies their role in proofs.	coherence, and clarity of the information presented c) analyzes and responsibly interprets the results of conducted scientific research d) adapts techniques and strategies for solving routine problems to address synthesis problems and those with a higher degree of complexity	Structures) Algebra 2 (Linear Algebra) Real Analysis Complex Analysis Mathematical Statistics Probability Theory Differential Equations 1 Differential Equations 2 (Partial Differential Equations) Operations Research Mathematical Software 1,2 Object-Oriented Programming Data Structures Operating Systems Algorithms and Programming Modeling and Simulation Mathematical Modeling Functional Analysis Artificial Intelligence 1,2 Theoretical Mechanics Ethics and Academic Integrity Bachelor's Thesis Writing
C7. Uses data processing techniques				
	The graduate: a) knows methods and techniques for data collection, processing, and analysis b) identifies basic concepts suitable for organizing data in databases c) explains the choice of basic models for data organization and management in databases	The graduate: a) collects, processes, and analyzes relevant data and information b) stores and updates data appropriately c) applies statistical methods for description, estimation, and hypothesis testing d) creates relevant graphical visualizations to support data interpretation	The graduate: a) interprets and responsibly communicates the results of data processing b) shows interest in comparative analysis of results obtained by solving problems with pre-existing data c) can work individually or in teams on projects involving manipulation and analysis of real or simulated data	Mathematical Statistics Probability Theory Databases Object Oriented Programming Modeling and simulation Numerical Analysis Optimization Techniques Formal languages and compilers
C8. Uses software for specialized design				
	The graduate: a) knows mathematical concepts that can be graphically represented or visually modeled b) is familiar with specialized software (GeoGebra, Mathcad, etc.) c) can describe the structural elements of programming languages using specific	The graduate: a) uses software for graphical representations b) uses software for mathematical modeling of phenomena c) creates mathematical visual materials to include in presentations or educational platforms	The graduate: a) creates digital mathematical resources adapted to a target group b) accurately interprets and explains results generated by software c) uses independent information and documentation methods that foster openness to continuous learning	Geometry Differential Geometry Mathematical Software 1,2 Computer Graphics Modeling and simulation WEB Programming Computer Networks

	terminology			
C9. Manages personal professional development				
	The graduate: a) identifies priority areas for professional development based on self-reflection and interaction with peers and stakeholders b) is aware of the need for continuous training; effectively uses resources and learning techniques for personal and professional development	The graduate: a) engages in learning activities to support and update professional competencies b) independently constructs correct proofs of mathematical assertions within the major disciplines of mathematics c) develops scalable software applications and efficiently uses software resources	The graduate: a) demonstrates control and autonomy through continuous self-education skills, researching specialized literature to supplement basic knowledge with new aspects required by complex situations encountered in professional activity b) takes responsibility for lifelong learning and continuous professional development c) can effectively communicate mathematical concepts and reasoning through written reports and oral presentations	Specialty Practice Introduction to entrepreneurship Entrepreneurship – economic and financial aspects Business Management Methodology for Bachelor's Thesis Writing Bachelor's Thesis Writing
C10. Carries out research activities at an interdisciplinary level				
	The graduate: a) identifies and employs appropriate methods of information gathering, documentation, and knowledge acquisition necessary for understanding and conveying domain-specific knowledge b) performs complex searches in digital databases	The graduate: a) builds mathematical models to describe phenomena b) applies effective documentation strategies in specialized literature and critically evaluates scientific literature c) conducts research activities beyond disciplinary and functional boundaries	The graduate: a) takes responsibility for implementing secure and scalable IT solutions, collaborating with specialists from related fields b) proactively engages in professional and research initiatives c) communicates effectively orally and in writing in professional and scientific contexts, adapting the message to the target audience (colleagues, experts, etc.)	Scientific and professional writing and communication Modeling and simulation Artificial Intelligence 1,2 Mathematical modeling Methodology for Bachelor's Thesis Writing Bachelor's Thesis Writing English 1,2,3,4
C11. Process data				
	The graduate: a) knows basic concepts in statistics, probability theory, databases, query languages (SQL), and data mining concepts b) demonstrates knowledge about data types c) has knowledge of data processing (cleaning, transformation, and validation of data)	The graduate: a) inputs information into a data storage and retrieval system through processes such as scanning, manual entry, or electronic data transfer b) processes large volumes of data c) analyzes statistical data to find patterns and trends among data or variables	The graduate: a) interprets data processing results using specific technologies b) shows interest in responsible analysis and communication of results obtained from data processing c) respects ethical and legal standards in data handling	Mathematical Statistics Probability Theory Numerical Analysis Operational research Algorithmics of graphs Data Structures Databases Object Oriented Programming Optimization Techniques Artificial Intelligence 1,2 WEB Programming Computer Networks Operating Systems
C12. Gives proof of disciplinary expertise				
	The graduate: a) demonstrates in-depth	The graduate: a) is capable of	The graduate: a) has an active attitude,	Algebra 1 (Algebraic Structures)

	knowledge and comprehensive understanding of the field of mathematics b) understands the basic concepts within fundamental disciplines, rigorously defines, describes, and illustrates them in relation to related notions, and distinguishes them from other notions through examples and counterexamples c) recognizes interdisciplinary connections between mathematical and computer science concepts and their applicability in solving concrete problems	independently constructing correct proofs of mathematical assertions b) can make connections between concepts in mathematics and concepts in related fields c) identifies practical situations where studied notions and processes are applicable	open to creativity and the use of the latest technologies b) respects ethical principles and scientific integrity in research, including respect for privacy and GDPR requirements c) takes responsibility for their own professional and academic development in the field of Mathematics and Computer Science	Differential Geometry Mathematic Analysis 1,2 Algebra 2 (Linear Algebra) Real Analysis Complex Analysis Mathematical Logic and Set Theory Functional Analysis Data Structures Operating Systems Elements of Combinatorics
C13. Teach mathematics				
	The graduate: a) knows appropriate methods of information gathering and documentation necessary for understanding and transmitting knowledge in the field of mathematics b) knows the basic concepts from the major disciplines of mathematics: algebra, geometry, mathematical analysis, etc.	The graduate: a) identifies the basic concepts from the major disciplines of mathematics involved in a given mathematical assertion as well as in the proofs of these assertions b) identifies and understands the logical sequence of arguments in a mathematical proof c) identifies appropriate techniques for solving problems in the fundamental disciplines of mathematics	The graduate: a) is motivated and enthusiastic about sharing mathematical knowledge b) creates stimulating and responsible learning situations c) demonstrates responsibility in selecting the methods and means of learning used	Algebră1 (Algebraic Structures) Geometry Mathematic Analysis 1 Algebra 2 (Linear Algebra) Mathematical Logic and Set Theory Mathematical Complements Mathematical Software 1 Elements of Combinatorics
C14. Develop digital educational materials				
	The graduate: a) knows digital technologies suitable for transmitting mathematical knowledge b) understands principles of digital design and user interaction (UI/UX) c) has knowledge of languages and technologies for digital development, content editors, etc.	The graduate: a) designs, plans, and develops interactive digital materials (web pages, educational modules, etc.) b) uses digital technologies to transfer information c) utilizes markup and scripting languages (HTML, LaTeX, etc.) to create clear, functional, and aesthetically pleasing content	The graduate: a) works independently or in teams to develop digital content, including in interdisciplinary projects b) can effectively communicate mathematical concepts and reasoning through digital materials c) respects ethical and legal norms regarding copyright, privacy, and accessibility	Scientific and professional writing and communication Computer Graphics WEB Programming Advanced programming methods Ethics and Academic Integrity
C15. Use mathematical and computer tools				
	The graduate: a) is familiar with useful	The graduate: a) skillfully uses	The graduate: a) selects and justifies	Algorithms and Programming

	mathematical and computer science tools: • specialized software for mathematical processing • data structures, algorithms, and programming paradigms as computational support • programming languages used for computational processing and modeling (Java, C++, etc.)	mathematical and computer science tools b) integrates mathematical and computer science tools into a coherent workflow c) uses software tools for numerical calculations, simulations, and visualization of data and mathematical functions	the use of an appropriate mathematical or computer science tool in a professional or academic context b) works independently or in teams to develop solutions based on the use of mathematical and computer science tools	Data Structures Geometry Mathematical Software 1,2 Cryptography and Information Security Databases Optimization Techniques Advanced programming methods
C16. Provides technical documentation				
	The graduate: a) has knowledge about the structure and purpose of technical documentation b) is familiar with the standards for writing documentation in the field c) has knowledge about using digital tools for technical writing (LaTeX, Word, etc.)	The graduate: a) develops technical specifications for algorithms, software modules, applications, or databases. b) uses appropriate formats and tools for generating and managing documentation (e.g., LaTeX for scientific papers, etc.) c) integrates screenshots, diagrams, pseudocode, or code examples into documentation.	The graduate: a) works responsibly within collaborative projects, ensuring transparency and traceability through documentation b) provides complete, accurate, and up-to-date documentation for their own works/projects c) adapts the style and level of detail of the documentation according to the context	Advanced programming methods Operational research Databases WEB Programming Computer Networks Scientific and professional writing and communication Mathematical Software 1,2 Ethics and Academic Integrity English1,2,3,4
C17. Use databases				
	The graduate: a) has knowledge of database models b) has knowledge of using databases in software applications	The graduate: a) uses software tools for data management and organization b) writes SQL queries for extracting, updating, inserting, and deleting data c) creates relationships between tables and uses aggregate functions, subqueries, and views	The graduate: a) can independently develop and manage functional databases, both individually and in team contexts. b) can apply data security and integrity measures in accordance with best practices and legal regulations.	Databases WEB Programming Advanced programming methods Optimization Techniques Ethics and Academic Integrity
TC1. Shows initiative				
	The graduate: a) demonstrates knowledge about the importance of personal initiative in learning, projects, and professional development b) knows ways to identify opportunities for improvement, innovation, or collaboration	The graduate: a) identifies problems or needs in a professional or educational context and proposes solutions b) manages time, effort, and resources efficiently to achieve the set objectives c) actively engages in the learning process, seeking additional sources of information and deeper understanding	a) The graduate: a) is able to act autonomously in planning and carrying out their own projects b) can take initiative in new contexts, demonstrating perseverance and self-confidence c) contributes constructively to team dynamics through ideas, proposals, and proactive interventions	Algorithms and Programming 1 Mathematical Software 1 WEB Programming Databases Computer Networks Computer Graphics Introduction to entrepreneurship Artificial Intelligence 1,2 Modeling and simulation Operational research Advanced programming methods Bachelor's Thesis Writing

TC2. Give advice to others				
	The graduate: a) knows techniques of active listening, constructive feedback, and clear communication b) knows ways to identify the needs and problems of interlocutors	The graduate: a) offers suggestions regarding the best course of action b) makes clear, practical, and context-appropriate recommendations to team members c) encourages collaboration and knowledge sharing within the team or community	The graduate: a) can act as a mentor for other individuals b) maintains confidentiality and respect in collegial relationships c) recognizes the limits of their own expertise and recommends appropriate resources or experts	Mathematic Analysis 1,2 Algebra 1 (Algebraic Structures) Mathematical Logic and Set Theory Differential Equations 1 Object Oriented Programming Basics of Mathematical Statistics Operational research Numerical Analysis Methodology for Bachelor's Thesis Writing Volunteering Mathematical Complements
TC3. Takes responsibility				
	The graduate: a) understands the concept of individual and collective responsibility in professional and academic contexts b) understands the importance of taking responsibility for the quality of work, meeting deadlines, and complying with rules c) knows the relevant ethical and professional standards in the field	The graduate: a) accepts responsibility and accountability for their own professional decisions and actions b) meets deadlines and fulfills assumed commitments c) communicates transparently and promptly about progress, difficulties, or encountered issues	The graduate: a) is prepared to take on responsibilities b) reflects critically on their own actions and their impact on outcomes and the team c) manages complex tasks autonomously, with a high level of responsibility	Data Structures Operating Systems WEB Programming Ethics and Academic Integrity Real Analysis Complex Analysis Elements of Combinatorics Bachelor's Thesis Writing Entrepreneurship – economic and financial aspects Theoretical Mechanics Probability Theory Cryptography and Information Security
TC4. Works in teams				
	The graduate: a) has knowledge of the principles, dynamics, roles, and specific responsibilities within a work team b) knows techniques of interpersonal communication and collaboration c) is able to use digital tools that support teamwork	The graduate: a) collaborates effectively with other team members to achieve common goals b) communicates clearly, listens actively, and provides constructive feedback c) uses digital collaborative tools to organize and coordinate team work d) contributes to the constructive resolution of conflicts and the maintenance of a positive work environment	The graduate: a) participates actively and responsibly in diverse teams, with autonomy and initiative b) understands and respects individual and collective roles and responsibilities c) supports and promotes effective collaboration within the team	Data Structures Algorithms and Programming English 1,2,3,4 Computer Networks Specialty Practice Artificial Intelligence 1,2 Scientific and professional writing and communication Operational research Mathematical Software 1,2 Optimization Techniques Volunteering History of mathematics
TC5. Shows confidence				

	The graduate: a) understands the importance of self-confidence in professional and personal development b) knows techniques and strategies for building and expressing confidence c) understands the impact of confidence on decision-making and risk-taking	The graduate: a) approaches new or challenging situations with a positive attitude and confidence b) demonstrates maturity by fully understanding their own qualities and abilities that can serve as sources of confidence in various situations c) supports their opinions and decisions with reasoned arguments	The graduate: a) acts autonomously and confidently in individual and team projects b) takes responsibility for decisions and actions, expressing their choices firmly c) adopts a proactive attitude toward problems and changes	English 1,2,3,4 Mathematical Logic and Set Theory Methodology for Bachelor's Thesis Writing Bachelor's Thesis Writing Specialty Practice Cryptography and Information Security Business Management
TC6. Builds team spirit				
	a) The graduate: a) understands the concept of team spirit and its importance in collective success b) knows the factors that influence cohesion and motivation within a team c) knows techniques and strategies for creating and maintaining a collaborative and positive work environment, as well as methods for managing conflicts d) understands the role of open communication and mutual respect in developing team spirit	The graduate: a) communicates effectively and encourages the exchange of ideas within a respectful environment b) recognizes and values the contributions of each team member c) manages conflicts constructively d) motivates the team to achieve common goals and maintain a positive climate	The graduate: a) has a positive attitude and offers support to colleagues b) contributes to the development of an organizational culture based on respect, trust, and cooperation c) promotes and supports a collaborative environment in any team	Sports 1,2 Object Oriented Programming History of Computing Systems Artificial Intelligence 1,2 Scientific and professional writing and communication Operational research Mathematical Software 1,2 Algorithms and Programming Data Structures WEB Programming Modeling and simulation Optimization Techniques Voluntariat
TC7. Plans				
	The graduate: a) understands the importance of setting goals, priorities, and deadlines b) knows methods and tools for planning c) understands the stages of the planning and evaluation process for educational or professional activities	The graduate: a) sets clear and realistic objectives for their own activities b) uses resources (time, information, materials) efficiently to achieve objectives a) c) uses digital tools to organize and manage tasks	The graduate: a) demonstrates autonomy in planning and organizing activities b) takes responsibility for meeting deadlines and quality standards c) adapts to unforeseen situations without compromising objectives	Bachelor's Thesis Writing Specialty Practice Artificial Intelligence 1,2 Scientific and professional writing and communication Operational research Mathematical Software 1,2 Entrepreneurship – economic and financial aspects

5. FINAL STIPULATIONS

The Curriculum will be approved, according to the National Education Law 199/2023 by the university Senate and after being signed on each page the President of the Senate.

Aproved Curriculum valid for study cycle 2025-2028.

6. ANALYZIS OF THE CURRICULUM

- **In Curriculum** for **Mathematics and Computer Science** study program the taught disciplines are included with the following weights:

No.crt.	Subject Type	Hours	Study program
1	Fundamentals (DF)	784	35,9%
2	Specialty (DS)	1022	46,8%
3	Complementary (DC)	378	17,3%
TOTAL		2184	100%

- The total number of hours of this program is 2184, divided as follows:
  - Compulsory requirements……**2184 hours**
  - Specialty Practice ……**112 hours**
  - Bachelor's Thesis Preparation……**84 hours**

  Total……..**2184 hours**

- Curriculum structure, according course types (compulsory and elective):

Course	Hours per curriculum	
	Hours	Ratio %
Compulsory courses	1792	82,1 %
Elective courses	392	17,9 % (min 10% - ARACIS regulations)
TOTAL	2184	100%

- The ratio between lectures and practice (seminars, laboratories, projects, internship) is 1:1,4 , complying with the ARACIS regulations min 1:1.
- **The ratio of the facultative disciplines** to the total number of hours 0,8%.
- Study program **Mathematics and Computer Science,** and Mathematical domain fit the national qualifications in HG 412/2025.
- The courses included in the Curriculum and the subjects studied are perfectly aligned with the Bachelor program (BSc) in Mathematics (HG 412/2025).
- The curriculum of the with the Bachelor program (BSc) program "**Mathematics and Computer Science**" complies with the European Credit Transfer and Accumulation System (ECTS) and with the Law 199/2023 on the organizing of university master studies.

7. TIME SKEDULLING OF THE ACADEMIC YEAR (WEEKS)

Year	Didactic activities (weeks)		Exams (weeks)			Internship	Holiday (weeks)		
	Sem. I	Sem. II	Winter session	Summer session	Retake session		Winter	Between semesters	Summer
Year I	14	14	3	3	2	-	2	1	12
Year II	14	14	3	3	2	112*	2	1	8
Year III	14	14	3	2	1	84**	2	1	-

* The practical hours are included in the 26 hours of weekly teaching activities during semesters I and II.
** For the preparation of the bachelor's thesis, distributed across the 14 weeks of semester II.

Practice is organized according to firm rules stated in documents conceived by the Mathematics & Computer Science and approved by the Faculty Council. Practice activities can take place both at faculty's laboratories and certain economic units (based on "practice cnventions").

HOURS PER WEEK OF COMPULSORY AND ELECTIVE COURSES

Year	Semester I (hours / week)	Semester II (hours / week)	
I	26	26	

II	26	26	The 112 practical hours are part of the 26 weekly teaching hours allocated per semester
III	26	26	

7. REQUIREMENTS FOR PASSING, PROMOTION AND COMEBACK

The requirements for passing (admission to the next academic year), promotion or comeback to studies are stated in the RAPS Regulations.

8. THE BACHELOR THESIS

The requirements for preparing, submitting and defending the Master Thesis are stated in the Regulation on the organization and conduct of bachelor/diploma and dissertation examinations.

- Communicating the subjects for the Bachelor Thesis: semester 4
- Preparing the Bachelor Thesis: the semesters 5 and 6
- Submitting and defending the Bachelor Thesis: July – 3rd year
- The final exam consists:
  - Testing the general and specialized knowledge – 5 credits
  - Defending the bachelor's thesis – 5 credits

9. THE ECTS CREDITS ASSOCIATED WITH THE STUDY PROGRAM

- 66 credits for fundamental disciplines
- 79 credits for specialty disciplines
- 35 credits for complementary disciplines

Total 180 ETC

- 145 credits for compulsory disciplines
- 35 credits for optional disciplines
- 24 credits for elective disciplines

RECTOR
Associate Professor, PhD Teodor-Florin CILAN

DEAN
Professor, PHD Sorin-Florin NĂDĂBAN

HEAD OF DEPARTMENT
Associate Professor, PhD Lorena Camelia POPA

„Aurel Vlaicu“ University of Arad
Faculty of Exact Sciences
Department: Mathematics and Computer Science
Field: Mathematics
Study program: Mathematics and Computer Science

CURRICULUM
Academic year 2025-2026
Year I

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	C	C	S	L	Pr	C	K
COMPULSORY COURSES															
GlCF1O01	Mathematic Analysis 1	DF	70	2	3	-	-	Ex	5	-	-	-	-	-	-
GlCF1O02	Algebra 1 (Algebraic Structures)	DF	84	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCF1O03	Mathematical Logic and Set Theory	DF	56	2	2	-	-	Ex	4	-	-	-	-	-	-
GlCF1O04	Algorithms and Programming	DF	84	2	-	2	-	Ex	5	-	-	-	-	-	-
GlCS1O05	Mathematical Software 1	DS	56	2	-	2	-	Ex	4	-	-	-	-	-	-
GlCC1O06	Sports 1	DC	28	-	2	-	-	V	2	-	-	-	-	-	-
GlCC1O07	Ethics and Academic Integrity	DC	42	1	-	-	-	V	2						
GlCF2O08	Mathematic Analysis 2	DF	70	-	-	-	-	-	-	2	3	-	-	Ex	5
GlCF2O09	Algebra 2 (Linear Algebra)	DF	70	-	-	-	-	-	-	2	3	-	-	Ex	5
GlCS2O10	WEB Programming	DS	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCS2O11	Operating Systems	DS	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCS2O12	Data Structures	DS	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCC2O13	Sports 2	DC	28	-	-	-	-	-	-	-	2	-	-	V	2
	TOTAL			**11**	**9**	**4**	**-**	**-**	**27**	**10**	**8**	**6**	**-**	**-**	**27**
ELECTIVE COURSES															
	Package1														
GlCC1A14	English 1	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
GlCC1A15	French 1	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
GlCC1A16	German 1	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
	Package 2														
GlCC2A17	English 2	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
GlCC2A18	French 2	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
GlCC2A19	German 2	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
	TOTAL				**2**	**-**	**-**	**-**	**3**	**-**	**2**	**-**	**-**	**-**	**3**
TOTAL				**11**	**11**	**4**	**-**	**-**	**30**	**10**	**10**	**6**	**-**	**-**	**30**
FACULTATIVE COURSES															
GlCC1F20	Mathematical Complements	DC	28	1	1	-	V	2	-	-	-	-	-	-	-
GlCC2F21	History of mathematics	DC	56	-	-	-	-	-	-	1	1	-	-	V	3

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Legend: C – Lecture; S – Seminar; L – Laboratory; P – Project; SI – Individual Study; Ev – Evaluation; K – Credits;
DF - Fundamentals course; DS – Specialty course; DC – Complementary course

„Aurel Vlaicu“ University of Arad
Faculty of Exact Sciences
Department: Mathematics and Computer Science
Field: Mathematics
Study program: Mathematics and Computer Science

CURRICULUM
Academic year 2026- 2027
Year II

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	C	C	S	L	Pr	C	
COMPULSORY COURSES															
GlCF3O01	Geometry	DF	84	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCF3O02	Differential Equations 1	DF	84	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCF3O03	Real Analysis	DF	84	2	2	-	-	Ex	5						
GlCS3O04	Computer Networks	DS	84	1	-	1	-	Ex	4	-	-	-	-	-	-
GlCS3O05	Databases	DS	84	2	-	2	-	Ex	5	-	-	-	-	-	-
GlCF3O06	Elements of Combinatorics	DF	56	1	1			V	3						
GlCF4O07	Complex Analysis	DF	84	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O08	Object Oriented Programming	DS	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCF4O09	Differential Equations 2 (Equations and with Partial Derivatives)	DF	84	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O10	Differential Geometry	DS	84	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O11	Specialty Practice	DS	112 ore de practică											V	2
	TOTAL			**10**	**7**	**3**	**-**	**-**	**27**	**8**	**6**	**2**	**-**	**-**	**22**
ELECTIVE COURSES															
	Package 1														
GlCC3A12	English 3	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
GlCC3A13	French 3	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
GlCC3A14	German 3	DC	56	-	2	-	-	V	3	-	-	-	-	-	-
	Package 2														
GlCC4A15	English 4	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
GlCC4A16	French 4	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
GlCC4A17	German 4	DC	56	-	-	-	-	-	-	-	2	-	-	V	3
	Package 3														
GlCC4A18	Computer Graphics	DC	84	-	-	-	-	-	-	2	-	2	-	V	5
GlCC4A19	Scientific and professional writing and communication	DC	84	-	-	-	-	-	-	2	-	2	-	V	5
	TOTAL			**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**	**2**	**-**	**-**	**8**
TOTAL				**10**	**9**	**3**	**-**	**-**	**30**	**10**	**8**	**4**	**-**	**-**	**30**
FACULTATIVE COURSES															
GlCC3F20	History of Computing Systems	DC	28	1	1	-	-	V	2	-	-	-	-	-	-
GlCC4F21	Formal languages and compilers	DC	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCC4F22	Introduction to entrepreneurship	DC	56	-	-	-	-	-	-	1	1	-	-	C	3

RECTOR
Associate Professor, PhD Teodor-Florin CILAN

DEAN
Professor, PHD Sorin-Florin NĂDĂBAN

HEAD OF DEPARTMENT
Associate Professor, PhD Lorena Camelia POPA

Legend: C – Lecture; S – Seminar; L – Laboratory; P – Project; SI – Individual Study; Ev – Evaluation; K – Credits;
DF - Fundamentals course; DS – Specialty course; DC – Complementary course

„Aurel Vlaicu“ University of Arad
Faculty of Exact Sciences
Department: Mathematics and Computer Science
Field: Mathematics
Study program: Mathematics and Computer Science

CURRICULUM
Academic year 2027- 2028
Year III

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GlCF5O01	Probability Theory	DF	84	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCS5O02	Numerical Analysis	DS	56	2	2	-	-	Ex	4	-	-	-	-	-	-
GlCS5O03	Artificial Intelligence 1	DS	56	2	-	2	-	Ex	4	-	-	-	-	-	-
GlCS5O04	Operational research	DC	84	2	-	2	-	Ex	5						
GlCC5O05	Methodology for Bachelor’s Thesis Writing	DC	28	-	-	2	-	V	2						
GlCS6O06	Functional Analysis	DS	84	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCF6O07	Theoretical Mechanics	DF	70	-	-	-	-	-	-	2	-	1	-	Ex	4
GlCS6O08	Mathematical Statistics	DS	84	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCS6O09	Modeling and simulation	DS	70	-	-	-	-	-	-	1		2		Ex	4
GlCS6O10	Bachelor’s Thesis Writing	DS	56	-	-	-	-	-	-	-	-	4	-	V	4
	TOTAL			**8**	**4**	**6**	**-**	**-**	**20**	**7**	**2**	**9**	**-**	**-**	**22**
ELECTIVE COURSES															
	Pachet 1														
GlCC5A11	Algorithmics of graphs	DC	84	2	2	-	-	V	5	-	-	-	-	-	-
GlCC5A12	Basics of Mathematical Statistics	DC	84	2	2	-	-	V	5	-	-	-	-	-	-
	Pachet 2														
GlCS5A13	Optimization Techniques	DS	84	2	-	2	-	Ex	5	-	-	-	-	-	-
GlCS5A14	Advanced programming methods	DS	84	2	-	2	-	Ex	5	-	-	-	-	-	-
	Pachet 3														
GlCS6A15	Artificial Intelligence 2	DS	56	-	-	-	-	-	-	2	-	2	-	Ex	4
GlCS6A16	Cryptography and Information Security	DS	56	-	-	-	-	-	-	2	-	2	-	Ex	4
	Pachet 4														
GlCS6A17	Mathematic software 2	DS	56	-	-	-	-	-	-	2	-	2	-	V	4
GlCS6A18	Mathematical modeling	DS	56	-	-	-	-	-	-	2	-	2	-	V	4
	TOTAL			**4**	**2**	**2**	**-**	**-**	**10**	**4**	**2**	**4**	**-**	**-**	**8**
TOTAL DISCIPLINE OBLIGATORII				**12**	**6**	**8**	**-**	**-**	**30**	**11**	**2**	**13**	**-**	**-**	**30**
FACULTATIVE COURSES															
GlCC5F19	Entrepreneurship – economic and financial aspects	DC	56	1	1	-	-	V	3	-	-	-	-	-	-
GlCC6F20	Volunteering	DC	56	-	-	-	-	-	-	-	-	2	-	V	3
GlCC6F21	Business Management	DC	56							1	1	-	-	V	3

The student who has accumulated the **180** credits by promoting the three-year bachelor's degree obtains a **Graduate Certificate in Computer Science Mathematics (without a Bachelor's Degree Exam).**

Activity	Evaluation	Credits
Final exam for the Bachelor's degree	Exam	10

The student who has accumulated the **190** credits by promoting the three years of bachelor studies and the bachelor's examination obtains a **Bachelor's degree in Mathematics and Computer Science.**

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