

## ANEXA 1

### CURRICULUM

Valid for the study cycle 2026-2028

"Aurel Vlaicu" University of Arad

#### Faculty of Exact Sciences

Department: **Mathematics and Computer Science**

Name of program: **Mathematical modeling in science and technology**

Field of studies: **Mathematics**

Type of program: **Professional**

Length of program / number of ECTS credits: **2 years /120 credits**

Type of education: **Full – Time study**

Graduate title earned : **Master 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 and aims the enhancement of the research capacity within the field of „Mathematics” and the improvement of the educational process and last but not least the opening of european opportunities through its international dimension.

### 2. OBJECTIVES

- Developing the analysis and synthesis capacity;
- Forming professionals in the field of mathematics that are recognized as such in the labour market;
- Perfecting communication skills (in English) specific for the activity domain as a mean to access more attractive jobs;
- Preparing for career opportunities in domains that do not necessarily have mathematics as the primary development goal.

### 3. COMPETENCES AND EXPECTED LEARNING OUTCOMES DEVELOPED WITHIN THE STUDY PROGRAM)

#### Professional competences

C1. Performs analytical mathematical calculations

C2. Synthesizes information

C3. Thinks abstractly

C4. Communicates mathematical information

C5. Studies relationships between quantities

C6. Uses data processing techniques

C7. Applies statistical analysis techniques

C8. Performs data analysis

C9. Identify statistical models

C10. Apply scientific methods

C11. Conducts scientific research

C12. Apply the principles of ethics and scientific integrity in research activities

#### Transversal competences

CT1. Think analytically

CT2. Approach challenges positively

CT3. He is attentive to details

CT4. It works efficiently

CT5. Work in teams

| No. crt.                                         | LEARNING OUTCOMES                                                                                                                                                                                           |                                                                                                                                                                            |                                                                                                                                                                                                 | Subjects Contributing to the Achievement of Learning Outcomes                                                                                                                                  |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | Knowledge                                                                                                                                                                                                   | Skills                                                                                                                                                                     | Responsibility and Autonomy                                                                                                                                                                     |                                                                                                                                                                                                |
| C1.Performs analytical mathematical calculations |                                                                                                                                                                                                             |                                                                                                                                                                            |                                                                                                                                                                                                 |                                                                                                                                                                                                |
|                                                  | The graduate:<br>a) knows advanced concepts in mathematical analysis, algebra, analytic geometry, differential equations, etc.<br>b) understands theories, formulas, and analytical calculation techniques: | The graduate:<br>a) performs complex analytical mathematical calculations accurately, applying rules and theorems rigorously<br>b) uses various computational technologies | The graduate:<br>a) has the ability to perform complex calculations<br>b) verifies and validates results obtained through critical analysis<br>c) takes responsibility for choosing the correct | Special Chapters of algebra<br>Special chapters of mathematical analysis<br>Data science<br>Mathematical optimization<br>Mathematics for Data Science<br>Neural networks<br>Stochastic systems |

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|                                                  | differentiation, integration, limits, series, transformations<br>c) is familiar with methods for solving equations and problems with initial or boundary conditions analytically and numerically                                                                                                                                                                                                                                        | to carry out analytical mathematical calculations and determine solutions to domain-specific problems<br>c) solves equations and logical-mathematical problems                                                                                                                                                                                                                                               | calculation methods<br>d) applies efficient work techniques in multidisciplinary teams                                                                                                                                                                                       | Computational mathematics                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>C2. Synthesizes information</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  | The graduate:<br>a) conducts research on a given topic<br>b) knows methods for collecting, classifying, and evaluating information from various sources<br>c) critically summarizes new and complex information related to a given topic                                                                                                                                                                                                | The Graduate:<br>a) correctly interprets information gathered on a given topic<br>b) classifies available information according to context<br>c) selects necessary information for solving a specific problem<br>d) uses digital tools to support information synthesis                                                                                                                                      | The Graduate:<br>a) coherently uses available information<br>b) demonstrates professionalism in managing available information<br>c) can work autonomously or in multidisciplinary teams                                                                                     | Data science<br>Convex Analysis<br>Fuzzy logic and quantum logic<br>Research project in mathematical logic<br>Stochastic Systems<br>Fuzzy Functional Analysis<br>Special Chapters of Stability Theory<br>Mathematical models in economics<br>Methodology of Scientific Research<br>Simulation and modeling techniques<br>Ethics and academic integrity<br>Dissertation Thesis<br>Modelling and optimizing decisions<br>Scientific seminar                                          |
| <b>C3. Thinks abstractly</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  | The graduate:<br>a) understands the fundamental concepts underlying abstract thinking: axioms, theorems, proofs, structures, functions, relations, and abstract data types<br>b) knows the principles of mathematical and formal logic, as well as methods of proof<br>c) formulates observations and differentiates notions, properties, and assertions from fundamental mathematical disciplines through examples and counterexamples | The Graduate:<br>a) provides examples of how to use basic theoretical concepts and results to solve exercises and problems related to topics covered in the curriculum.<br>b) represents and formulates concepts and problems in abstract, symbolic, or formal terms<br>c) creates abstract representations for computer science structures such as: trees, graphs, recursive functions, and object classes. | The Graduate:<br>a) demonstrates intellectual autonomy in exploring and manipulating abstract concepts<br>b) finds solutions to practical, operational, or conceptual problems across a wide range of contexts<br>c) generates argumentative procedures to support solutions | Special Chapters of algebra<br>Special chapters of mathematical analysis<br>Data science<br>Convex Analysis<br>Fuzzy logic and quantum logic<br>Special Chapters of Stability Theory<br>Mathematical models in economics<br>Mathematical optimization<br>Stochastic Systems<br>Methodology of Scientific Research<br>Simulation and modeling techniques<br>Ethics and academic integrity<br>Dissertation Thesis<br>Modelling and optimizing decisions<br>Computational mathematics |
| <b>C4. Communicates mathematical information</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  | The graduate:<br>a) knows advanced mathematical terminology in both Romanian and English<br>b) understands conventions for notation, symbolism, and the formal presentation of mathematical content<br>c) translates practical problems into mathematical language                                                                                                                                                                      | The graduate:<br>a) drafts rigorous proofs, logical arguments, and detailed explanations using specific language<br>b) solves a problem in the field by employing appropriate symbols, language, and mathematical tools<br>c) interprets and explains                                                                                                                                                        | The graduate:<br>a) communicates and interprets the solution to a problem<br>b) compares alternative solutions using specific mathematical language<br>c) presents ideas and processes using suitable symbols, language, and mathematical tools                              | Special Chapters of algebra<br>Special chapters of mathematical analysis<br>Data science<br>Convex Analysis<br>Fuzzy logic and quantum logic<br>Research project in mathematical logic<br>Special Chapters of Stability Theory<br>Mathematical models in                                                                                                                                                                                                                           |

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|                                                     | d) is capable of expressing mathematical problems or theorems with practical implications in everyday language                                                                                                                                                                                                                                                                                                                                                                     | graphs, tables, mathematical models, and numerical or symbolic results                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | d) demonstrates rigor and intellectual discipline in drafting and presenting their mathematical results                                                                                                                                                                                                                                                                                                                                                                                                                                             | economics<br>Stochastic Systems<br>Methodology of Scientific Research<br>Simulation and modeling techniques<br>Ethics and academic integrity<br>Simulation research project<br>Disertation Thesis<br>Modelling and optimizing decisions<br>Scientific seminar                                                                                            |
| <b>C5. Studies relationships between quantities</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                          |
|                                                     | The Graduate:<br>a) Has the ability to analyze and interpret complex relationships between quantities in interdisciplinary contexts.<br>b) Possesses knowledge of advanced methodologies for modeling and verifying relationships between quantities.<br>c) Can develop and evaluate hypotheses based on relationships between quantities in scientific research.<br>d) Has the capacity to communicate and argue relationships between quantities in a clear and academic manner. | The Graduate:<br>a) Can examine and interpret relationships between variables in advanced mathematical, economic, scientific, or social problems.<br>b) Can use statistical, mathematical, or computational techniques to construct and validate models involving relationships between variables.<br>c) Can formulate and test hypotheses related to quantitative relationships within research projects.<br>d) Can draft reports, presentations, or scientific publications that highlight and interpret relationships between variables. | The Graduate:<br>a) Assumes responsibility for the validity and accuracy of data interpretation and identified relationships.<br>b) Takes the liberty to choose relevant techniques and tools specific to the problem, assuming responsibility for the results obtained.<br>c) Manages the research process autonomously, ensuring scientific rigor and academic integrity.<br>d) Assumes responsibility for clearly and argumentatively presenting and explaining conclusions, asserting independence in drafting and supporting scientific works. | Mathematics for Data Science<br>Data science<br>Convex Analysis<br>Fuzzy logic and quantum logic<br>Mathematical models in economics<br>Mathematical optimization<br>Stochastic Systems<br>Simulation and modeling techniques<br>Modelling and optimizing decisions<br>Computational mathematics                                                         |
| <b>C6. Uses data processing techniques</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                          |
|                                                     | The Graduate:<br>a) Knows methods and techniques for data collection, processing, and analysis.<br>b) Identifies appropriate basic concepts for organizing data in databases.<br>c) Explains the choice of basic models for organizing and managing data in databases.                                                                                                                                                                                                             | The Graduate:<br>a) Collects, processes, and analyzes relevant data and information.<br>b) Stores and updates data appropriately.<br>c) Applies statistical methods for description, estimation, and hypothesis testing.<br>d) Creates relevant graphical visualizations to support data interpretation.                                                                                                                                                                                                                                    | The Graduate:<br>a) Interprets and communicates data processing results responsibly.<br>b) Shows interest in comparatively analyzing results obtained from solving problems with pre-existing data.<br>c) Can work individually or in teams on projects involving the manipulation and analysis of real or simulated data.                                                                                                                                                                                                                          | Data science<br>Machine Learning<br>Special Chapters of Stability Theory<br>Mathematical models in economics<br>Mathematical optimization<br>Stochastic Systems<br>Neural networks<br>Research project in imathematical modelling<br>Simulation and modeling techniques<br>Modelling and optimizing decisions<br>Computational mathematics<br>Internship |
| <b>C7. Applies statistical analysis techniques</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                          |
|                                                     | The Graduate:<br>a) Demonstrates advanced knowledge of fundamental concepts and modern methods of statistical analysis, including descriptive and inferential statistics, regression, analysis of variance, and multivariate                                                                                                                                                                                                                                                       | The Graduate:<br>a) Selects and applies appropriate statistical methods based on the nature of the data and research objectives.<br>b) Utilizes specialized computational tools to perform complex statistical                                                                                                                                                                                                                                                                                                                              | The Graduate:<br>a) Plans and autonomously conducts statistical analysis processes, taking responsibility for the correctness and relevance of the results.<br>b) Critically evaluates data quality and the validity of                                                                                                                                                                                                                                                                                                                             | Data science<br>Mathematics for Data Science<br>Mathematical models in economics<br>Machine Learning<br>Stochastic Systems<br>Modelling and optimizing decisions                                                                                                                                                                                         |

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|                                        | models.<br>b) Understands the theoretical principles underlying statistical methods, including their assumptions, limitations, and conditions of applicability.<br>c) Integrates statistical knowledge with the fundamentals of scientific research and data analysis in interdisciplinary and applied contexts.                                                                                                                                                                                                                                              | analyses.<br>c) Critically interprets statistical results, formulating relevant conclusions supported by data.<br>d) Visualizes and communicates results effectively, adapting their presentation to the target audience.                                                                                                                                                                                                                                                                                    | methods used, adhering to scientific and ethical standards.<br>c) Makes independent decisions regarding the selection of statistical techniques and the interpretation of results in complex contexts.                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                            |
| <b>C8. Performs data analysis</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                            |
|                                        | The Graduate:<br>a) Demonstrates advanced knowledge of the data lifecycle, from collection and cleaning to interpretation and reporting.<br>b) Understands quantitative and qualitative data analysis methods, including exploratory analysis, predictive modeling, and inferential statistical analysis.<br>c) Knows the structure and characteristics of different data types and their impact on the choice of analytical methods.                                                                                                                         | The Graduate:<br>a) Applies appropriate data analysis methods based on research or project objectives.<br>b) Utilizes digital tools and programming languages to process, analyze, and visualize data.<br>c) Interprets and synthesizes analysis results, formulating relevant conclusions supported by data.<br>d) Develops clear and coherent analytical reports, tailored to the target audience and the purpose of the analysis.                                                                         | The Graduate:<br>a) Plans and autonomously manages data analysis processes, from defining analytical questions to communicating results.<br>b) Critically evaluates data quality and the validity of methods used, taking responsibility for the rigor and ethics of the analytical process.<br>c) Makes independent decisions regarding the selection of techniques and the interpretation of results in complex and interdisciplinary contexts.<br>d) Contributes to the development of a data-driven organizational culture, promoting the responsible and efficient use of extracted information. | Data science<br>Mathematics for Data Science<br>Machine Learning<br>Mathematical models in economics<br>Mathematical optimization<br>Stochastic Systems<br>Neural networks<br>Modelling and optimizing decisions<br>Internship<br>Research project in imathematical modelling              |
| <b>C9. Identify statistical models</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                            |
|                                        | The graduate:<br>a) Demonstrates advanced knowledge of various types of statistical models, including linear, nonlinear, probabilistic, Bayesian models, as well as models for longitudinal or hierarchical data.<br>b) Understands the theoretical foundations of building and validating statistical models, along with the assumptions and limitations associated with each type of model.<br>c) Is familiar with model selection criteria (e.g., AIC, BIC, adjusted R <sup>2</sup> , cross-validation) and their impact on the interpretation of results. | The graduate:<br>a) Analyzes complex datasets to identify relevant statistical models based on the nature of the variables and the research objectives.<br>b) Applies estimation and validation techniques for models using specialized software tools.<br>c) Interprets the parameters and performance of statistical models, formulating rigorous, data-supported conclusions.<br>d) Compares and selects alternative models, justifying the choice based on statistical criteria and the applied context. | The graduate:<br>a) Plans and independently leads the process of identifying and validating statistical models in research projects or applied analyses.<br>b) Critically evaluates the appropriateness of the models used, taking responsibility for the accuracy and relevance of the results.<br>c) Makes independent decisions regarding model selection, adapting them to the specifics of the data and analytical objectives.<br>d) Promotes the responsible use of statistical modeling, adhering to ethical principles and best practices in research and analysis.                           | Data science<br>Mathematics for Data Science<br>Machine Learning<br>Mathematical models in economics<br>Mathematical optimization<br>Stochastic Systems<br>Neural networks<br>Mathematical models in economics<br>Simulation and modeling techniques<br>Modelling and optimizing decisions |

| C10. Apply scientific methods                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                     | <p>The graduate:</p> <p>a) Approaches scientific texts on a given topic constructively.</p> <p>b) Selects and organizes the necessary information for conducting research.</p> <p>c) Compares and distinguishes related concepts and their properties within advanced mathematical disciplines.</p> <p>d) Understands the stages of the scientific methodology: formulating a hypothesis, modeling the problem, selecting the method, experimenting, analyzing results, and validating or rejecting the hypothesis.</p>       | <p>The graduate:</p> <p>a) Applies scientific methods and techniques to investigate current phenomena or practical issues.</p> <p>b) Revises and integrates prior knowledge into contemporary studies.</p> <p>c) Utilizes digital technology in their research endeavors.</p> <p>d) Recognizes and analyzes the necessary and/or sufficient conditions in mathematical statements and specifies their role in proofs.</p>                                                                                                 | <p>The graduate:</p> <p>a) Writes, edits, and presents scientific texts.</p> <p>b) Takes responsibility for the accuracy, coherence, and clarity of the information presented.</p> <p>c) Analyzes and interprets research results responsibly.</p> <p>d) Adapts techniques and strategies used for solving routine problems to tackle synthesis problems and those with a higher degree of complexity.</p>                                                                                                                                                                                                                                                      | <p>Special Chapters of algebra</p> <p>Special chapters of mathematical analysis</p> <p>Data science</p> <p>Convex Analysis</p> <p>Fuzzy logic and quantum logic</p> <p>Special Chapters of Stability Theory</p> <p>Mathematical optimization</p> <p>Mathematical models in economics</p> <p>Mathematical optimization</p> <p>Stochastic Systems</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Disertation Thesis</p> <p>Modelling and optimizing decisions</p> <p>Computational mathematics</p> |
| C11. Conducts scientific research                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                     | <p>The graduate:</p> <p>a) Demonstrates advanced knowledge of the Methodology of Scientific Research, including hypothesis formulation, experimental design, and qualitative and quantitative methods.</p> <p>b) Understands the ethical and deontological principles of research, as well as applicable national and international regulations.</p> <p>c) Is familiar with modern techniques for data collection and analysis, as well as methods for validating and interpreting results in interdisciplinary contexts.</p> | <p>The graduate:</p> <p>a) Formulates relevant research questions and testable hypotheses, aligned with the literature and the needs of the field.</p> <p>b) Designs and conducts scientific studies, applying rigorous methods for data collection, analysis, and interpretation.</p> <p>c) Writes scientific papers and research reports, using appropriate academic language and adhering to citation and structuring standards.</p> <p>d) Utilizes digital and statistical tools to support the research process.</p> | <p>The graduate:</p> <p>a) Plans and independently carries out research activities, from defining objectives to disseminating results.</p> <p>b) Critically evaluates information sources, methods, and research conclusions, taking responsibility for the scientific rigor of the approach.</p> <p>c) Adheres to principles of ethics and scientific integrity, avoiding plagiarism, data manipulation, and other unethical practices.</p> <p>d) Actively contributes to the advancement of knowledge in their field of specialization through participation in conferences, publication of articles, and involvement in collaborative research projects.</p> | <p>Methodology of Scientific Research</p> <p>Research project in mathematical logic</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Ethics and academic integrity</p> <p>Simulation research project</p> <p>Disertation Thesis</p> <p>Scientific seminar</p>                                                                                                                                                                                                                                                                                |
| C12. Apply the principles of ethics and scientific integrity in research activities |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                     | <p>The graduate:</p> <p>a) Demonstrates in-depth knowledge of research ethics principles, including informed consent, confidentiality, participants' rights, and the responsible use of data.</p> <p>b) Is familiar with scientific</p>                                                                                                                                                                                                                                                                                       | <p>The graduate:</p> <p>a) Consistently applies ethical and integrity principles at all stages of research: design, data collection, analysis, interpretation, and dissemination.</p> <p>b) Identifies and manages</p>                                                                                                                                                                                                                                                                                                    | <p>The graduate:</p> <p>a) Takes responsibility for adhering to ethical and integrity standards in individual or collaborative projects.</p> <p>b) Acts as a role model for ethical best practices, contributing to the</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Research project in mathematical logic</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Ethics and academic integrity</p>                                                                                                                                                                                                                                                                                                                                                                       |

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|  | <p>integrity standards, such as avoiding plagiarism, data falsification, and fabrication, as well as adhering to academic publishing standards.</p> <p>c) Understands the legal and institutional framework regulating research activities at both national and international levels.</p> | <p>ethical dilemmas that may arise in research activities, proposing solutions in accordance with professional standards.</p> <p>c) Prepares necessary ethical documentation (e.g., ethics approval requests, consent forms), complying with institutional and deontological requirements.</p> <p>d) Uses sources and data responsibly, respecting copyright and academic citation norms.</p> | <p>prevention and correction of unethical behavior in research.</p> <p>c) Makes autonomous decisions in complex ethical situations, demonstrating discernment and professional responsibility.</p> <p>d) Promotes a culture of ethics and scientific integrity within academic and professional environments through training, mentoring, and institutional engagement.</p> | <p>Disertation Thesis</p> <p>Scientific seminar</p> |
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#### CT1. Think analytically

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|  | <p>The graduate:</p> <p>a) Demonstrates advanced knowledge of the concepts and models of analytical thinking, including logical reasoning, causal analysis, critical evaluation of information, and evidence-based decision-making.</p> <p>b) Understands methods for structuring complex problems, such as SWOT analysis, decision analysis, logical modeling, and systemic approaches.</p> <p>c) Is familiar with techniques for assessing the validity and coherence of arguments in academic and professional contexts.</p> | <p>The graduate:</p> <p>a) Analyzes complex problems by breaking them down into essential components, identifying causal relationships and relevant factors.</p> <p>b) Critically evaluates information and arguments, identifying reasoning errors, cognitive biases, and sources of uncertainty.</p> <p>c) Formulates rational and well-argued solutions based on data, facts, and logical principles.</p> <p>d) Applies analytical methods in decision-making, within interdisciplinary contexts and under conditions of uncertainty.</p> | <p>The graduate:</p> <p>a) Takes responsibility for the quality of the analytical process, demonstrating rigor, objectivity, and coherence in reasoning.</p> <p>b) Makes autonomous decisions in complex situations, relying on critical evaluation of alternatives and consequences.</p> <p>c) Promotes analytical thinking within teams and organizations, contributing to the development of a culture of reflection and informed decision-making.</p> <p>d) Demonstrates initiative in applying analytical thinking to solve real-world problems in academic, professional, or social contexts.</p> | <p>Special Chapters of algebra</p> <p>Special chapters of mathematical analysis</p> <p>Data science</p> <p>Convex Analysis</p> <p>Fuzzy logic and quantum logic</p> <p>Research project in mathematical logic</p> <p>Special Chapters of Stability Theory</p> <p>Mathematical models in economics</p> <p>Neural networks</p> <p>Mathematical optimization</p> <p>Stochastic Systems</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Ethics and academic integrity</p> <p>Disertation Thesis</p> <p>Modelling and optimizing decisions</p> <p>Scientific seminar</p> <p>Computational mathematics</p> |
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#### CT2. Approach challenges positively

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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|  | <p>The graduate:</p> <p>a) Is knowledgeable about concepts and theories related to resilience, emotional intelligence, and positive thinking, applicable in professional and personal contexts.</p> <p>b) Understands the psychological and social mechanisms of stress and uncertainty responses, as well as effective adaptation strategies.</p> <p>c) Is familiar with models of positive leadership and change management relevant for constructively addressing challenges within teams and</p> | <p>The graduate:</p> <p>a) Identifies and analyzes challenges objectively, maintaining a balanced and solution-oriented attitude.</p> <p>b) Applies emotional self-regulation and effective communication strategies to manage conflicts and pressures constructively.</p> <p>c) Transforms obstacles into opportunities for learning and growth, demonstrating cognitive flexibility and openness to change.</p> <p>d) Encourages a positive attitude within the team, contributing to maintaining</p> | <p>The graduate:</p> <p>a) Takes responsibility for their own reactions to challenges, demonstrating emotional maturity and professionalism.</p> <p>b) Makes autonomous decisions in difficult situations, maintaining a constructive and progress-oriented perspective.</p> <p>c) Acts as a role model for positive behavior, positively influencing team dynamics and organizational culture.</p> <p>d) Promotes resilience and positive thinking in complex contexts,</p> | <p>Special Chapters of algebra</p> <p>Special chapters of mathematical analysis</p> <p>Data science</p> <p>Convex Analysis</p> <p>Fuzzy logic and quantum logic</p> <p>Research project in mathematical logic</p> <p>Special Chapters of Stability Theory</p> <p>Mathematical models in economics</p> <p>Stochastic Systems</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Ethics and academic integrity</p> <p>Disertation Thesis</p> |
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|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | a collaborative and motivating work environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | contributing to the sustainable development of professional and academic environments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Modelling and optimizing decisions<br>Volunteering<br>Internship                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>CT3. He is attentive to details</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                        | <p>The graduate:</p> <p>a) Understands the importance of accuracy and precision in academic and professional activities, especially in writing, analysis, research, and decision-making.</p> <p>b) Recognizes the impact of minor errors on final outcomes in contexts such as data analysis, scientific writing, project management, or professional communication.</p> <p>c) Is familiar with methods and techniques for quality verification and control, applicable across various fields.</p> | <p>The graduate:</p> <p>a) Identifies inconsistencies, errors, or omissions in documents, data, or processes, demonstrating a rigorous and systematic approach.</p> <p>b) Applies review and verification techniques to ensure the correctness and coherence of information.</p> <p>c) Adheres to formatting, structuring, and presentation standards when drafting texts, reports, or scientific papers.</p> <p>d) Monitors details in complex activities without losing sight of the overall project objectives.</p> | <p>The graduate:</p> <p>a) Takes responsibility for the accuracy of their work, demonstrating rigor and professionalism in delivering results.</p> <p>b) Works independently with a high level of attention to detail, even under pressure or tight deadlines.</p> <p>c) Contributes to maintaining quality standards within the team by providing constructive feedback and supporting quality control processes.</p> <p>d) Demonstrates consistency and discipline in verification and validation activities, helping to reduce risks and increase efficiency.</p> | <p>Special Chapters of algebra</p> <p>Special chapters of mathematical analysis</p> <p>Data science</p> <p>Convex Analysis</p> <p>Fuzzy logic and quantum logic</p> <p>Research project in mathematical logic</p> <p>Special Chapters of Stability Theory</p> <p>Mathematical models in economics</p> <p>Neural networks</p> <p>Mathematical optimization</p> <p>Stochastic Systems</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Mathematical optimization</p> <p>Ethics and academic integrity</p> <p>Disertation Thesis</p> <p>Modelling and optimizing decisions</p> <p>Computational mathematics</p> |
| <b>CT4. It works efficiently</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                        | <p>The graduate:</p> <p>a) Knows principles and methods for efficient work organization, including planning, task prioritization, and time management.</p> <p>b) Understands concepts of personal productivity and professional performance in both individual and team contexts.</p> <p>c) Is familiar with digital tools and modern activity management techniques useful for optimizing work processes.</p>                                                                                     | <p>The graduate:</p> <p>a) Plans and structures activities efficiently, setting clear objectives, realistic deadlines, and appropriate resources.</p> <p>b) Manages time and workload, adapting to priorities and deadlines without compromising quality.</p> <p>c) Uses agile or traditional tools and methods to increase efficiency in individual or collaborative projects.</p> <p>d) Monitors progress and optimizes workflows by identifying and eliminating bottlenecks or resource waste.</p>                  | <p>The graduate:</p> <p>a) Takes responsibility for achieving established goals, demonstrating consistency and results-orientation.</p> <p>b) Works autonomously and efficiently in complex contexts, maintaining a balance between quality, time, and resources.</p> <p>c) Contributes to improving team efficiency by proposing solutions and best organizational practices.</p> <p>d) Shows initiative in the continuous improvement of work methods, adapting to changes and learning from experience.</p>                                                       | <p>Special Chapters of algebra</p> <p>Special chapters of mathematical analysis</p> <p>Data science</p> <p>Convex Analysis</p> <p>Fuzzy logic and quantum logic</p> <p>Research project in mathematical logic</p> <p>Mathematical models in economics</p> <p>Stochastic Systems</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p> <p>Simulation and modeling techniques</p> <p>Modelling and optimizing decisions</p> <p>Internship</p>                                                                                                                                                                                                                    |
| <b>CT5. Work in teams</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                        | <p>a) The graduate:</p> <p>a) Understands the principles of effective collaboration, including group dynamics, team roles, interpersonal communication, and conflict resolution.</p> <p>b) Comprehends</p>                                                                                                                                                                                                                                                                                         | <p>The graduate:</p> <p>a) Collaborates effectively with team members, actively contributing to the achievement of common goals while respecting diverse opinions and perspectives.</p>                                                                                                                                                                                                                                                                                                                                | <p>The graduate:</p> <p>a) Takes responsibility for their own role within the team, respecting deadlines and commitments.</p> <p>b) Demonstrates autonomy in fulfilling individual tasks, efficiently</p>                                                                                                                                                                                                                                                                                                                                                            | <p>Data science</p> <p>Mathematical models in economics</p> <p>Stochastic Systems</p> <p>Methodology of Scientific Research</p> <p>Research project in mathematical modeling</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                 |                                                                                        |
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| collaborative work models such as multidisciplinary, self-organized, and virtual teams.<br>c) Is familiar with facilitation and team coordination techniques applicable in academic and professional contexts. | b) Communicates clearly and constructively, adapting communication style to the team context and the needs of other members.<br>c) Participates in team decision-making, supporting well-founded arguments and accepting consensus.<br>d) Contributes to conflict management and maintaining a positive work environment through empathy, active listening, and a cooperative attitude. | integrating them into collective activities.<br>c) Contributes to evaluating and improving team performance by providing constructive feedback and proposing solutions.<br>d) Promotes collaboration and mutual learning, acting as a facilitator of a team culture based on trust and respect. | Modelling and optimizing decisions<br>Scientific seminar<br>Volunteering<br>Internship |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|

#### 4. ACADEMIC CAREER DEVELOPMENT

The graduates of the Master of Science (MSc) program in “**Mathematical modeling in science and technology**”, according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions:

2120 – cod 212002 – expert mathematician

2120 – cod 212013 – statistical inspector

#### 5. FINAL STIPULATIONS

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

Approved Curriculum valid for study cycle 2026-2028.

#### 6. ANALYZIS OF THE CURRICULUM

- For the curriculum of the Master of Science (MSc) program in “**Mathematical modeling in science and technology**”, the classification of the courses is presented in the following tables:
- The total number of courses divided in categories according the subject type (proficiency, synthesis, advanced):

| No. crt. | Subject Type       | Hours /Study program |         |
|----------|--------------------|----------------------|---------|
|          |                    | Hours                | Ratio % |
| 1        | Fundamentals (DF)  | 308                  | 34,4%   |
| 2        | Specialty (DS)     | 560                  | 62,5%   |
| 3        | Complementary (DC) | 28                   | 3,1%    |
| TOTAL    |                    | 896                  | 100%    |

- The total number of hours of this program is 896 divided as follows:
  - Compulsory requirements ..... **896 hours**
  - Internship..... **112hours**
  - Internship to prepare the Master Thesis (included in the 896)..... **112hours**
  - Total 896 hours**
- Curriculum structure, according course types (compulsory and elective):

| Courses                                 | Hours per curriculum |         |
|-----------------------------------------|----------------------|---------|
|                                         | Hours                | Ratio % |
| Compulsory courses (including practice) | 784                  | 87,5%   |
| Elective courses                        | 112                  | 12,5%   |
| TOTAL Ob+Op                             | 896                  | 100%    |

- The ratio between practice (seminars, laboratories, projects, internship) and lecturer is 2,55/1 complying with the ARACIS regulations.
- The Master of Science (MSc) program in “**Mathematical modeling in science and technology**” complies with the national qualifications provided by the Government Decree HG 192/2026.
- The courses included in the Curriculum and the subjects studied are perfectly aligned with the Master’s degree program in Mathematics (HG 192/2026)
- The curriculum of the Master of Science (MSc) program in “**Mathematical modeling in science and technology**” complies with the European Credit Transfer and Accumulation System (ECTS) and with the Romanian Law 288/2004 on the organizing of university master studies.

## 7. TIME SKEDULLING OF THE ACADEMIC YEAR (WEEKS)

| Year    | Didactic activities (weeks) |         | Exams (weeks)  |                |                | Practice | 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              | 2              | 1              | 112*     | 2               | 1                 | -      |

\*The 112 hours of practical training are mandatory and take place in the 4 sem.

## 8. HOURS PER WEEK OF COMPULSORY AND ELECTIVE COURSES

| Year | Semester I (hours / week) |                  | Semester II (hours / week) |                  |
|------|---------------------------|------------------|----------------------------|------------------|
|      | Compulsory courses        | Elective courses | Compulsory courses         | Elective courses |
| I    | 11                        | 3                | 11                         | 3                |
| II   | 9                         | 5                | 14                         | 0                |

## 9. 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](#).

## 10. THE MASTER 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 Master Thesis: semester 2

- Preparing the Master Thesis: November – the semesters 3 and 4
- Submitting and defending the Master Thesis: July – 2<sup>nd</sup> year
- The final exam consists of defending the Master Thesis (10 credits)

## 11. THE ECTS CREDITS ASSOCIATED WITH THE MASTER PROGRAM

**Total 120 credits**

- 100 credits for compulsory courses
- 20 credits for elective courses
- 3 credits for facultative courses

**RECTOR**  
Dr.Habil. Ramona LILE

**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: Mathematical modeling in science and technology

**CURRICULUM**  
**Academic year 2026-2027**  
**Year I**

| Code               | Subject                                                                            | Course status | S.I./ Sem (hrs) | Hours per week and Evaluation type   |   |   |    |    |    |                                      |   |   |    |    |    |
|--------------------|------------------------------------------------------------------------------------|---------------|-----------------|--------------------------------------|---|---|----|----|----|--------------------------------------|---|---|----|----|----|
|                    |                                                                                    |               |                 | 1 <sup>st</sup> Semester<br>14 weeks |   |   |    |    |    | 2 <sup>st</sup> Semester<br>14 weeks |   |   |    |    |    |
|                    |                                                                                    |               |                 | C                                    | S | L | Pr | Ev | C  | C                                    | S | L | Pr | C  | K  |
| COMPULSORY COURSES |                                                                                    |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |    |    |
| GmEF1O01           | Capitole speciale de algebră/ Special Chapters of algebra                          | DF            | 133             | 1                                    | 2 | - | -  | Ex | 7  | -                                    | - | - | -  | -  | -  |
| GmEF1O02           | Matematică pentru Data Science/ Mathematics for Data Science                       | DF            | 133             | 1                                    | 2 | - | -  | Ex | 7  | -                                    | - | - | -  | -  | -  |
| GmEF1O03           | Capitole speciale de analiză matematică/ Special chapters of mathematical analysis | DF            | 133             | 1                                    | 2 | - | -  | Ex | 7  | -                                    | - | - | -  | -  | -  |
| GmES1O04           | Data science                                                                       | DS            | 119             | 2                                    | - | 2 | -  | Ex | 7  | -                                    | - | - | -  | -  | -  |
| GmEC1O05           | Etică și integritate academică/ Ethics and academic integrity                      | DC            | 36              | 1                                    | - | - | -  | V  | 2  |                                      |   |   |    |    |    |
| GmEF2O06           | Învățare automată/ Machine Learning                                                | DF            | 119             | -                                    | - | - | -  | -  | -  | 2                                    | - | 2 | -  | Ex | 7  |
| GmES2O07           | Tehnici de simulare și modelare/ Simulation and modeling techniques                | DS            | 133             | -                                    | - | - | -  | -  | -  | 1                                    | - | 2 | -  | Ex | 7  |
| GmES2O08           | Proiect de cercetare în logică matematică / Research project in mathematical logic | DS            | 47              | -                                    | - | - | -  | -  | -  | -                                    | - | - | 2  | C  | 3  |
|                    | TOTAL                                                                              |               |                 | 6                                    | 6 | 2 | -  | -  | 30 | 3                                    | - | 4 | 2  | -  | 17 |
| ELECTIVE COURSES   |                                                                                    |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |    |    |
|                    | Pachet 1                                                                           |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |    |    |
| GmES2A11           | Capitole speciale de teoria stabilității/ Special Chapters of Stability Theory     | DS            | 122             | -                                    | - | - | -  | -  | -  | 1                                    | 1 | - | -  | Ex | 6  |
| GmES2A12           | Modele matematice în economie/ Mathematical models in economics                    | DS            | 122             | -                                    | - | - | -  | -  | -  | 1                                    | 1 | - | -  | Ex | 6  |
|                    | Pachet 2                                                                           |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |    |    |
| GmES2A21           | Optimizare matematică/ Mathematical optimization                                   | DS            | 133             | -                                    | - | - | -  | -  | -  | 1                                    | 2 | - | -  | Ex | 7  |
| GmES2A22           | Logică fuzzy și logică cuantică / Fuzzy logic and quantum logic                    | DS            | 133             | -                                    | - | - | -  | -  | -  | 1                                    | 2 | - | -  | Ex | 7  |
|                    | TOTAL                                                                              |               |                 | -                                    | - | - | -  | -  | -  | 2                                    | 3 | - | -  | -  | 13 |
| TOTAL              |                                                                                    |               |                 | 6                                    | 6 | 2 | -  | -  | 30 | 5                                    | 3 | 4 | 2  | -  | 30 |

**RECTOR**  
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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

**CURRICULUM**  
**Academic year 2027 - 2028**  
**Year II**

| Code                | Subject                                                                                 | Course status | S.I./ Sem (hrs) | Hours per week and Evaluation type   |   |   |    |    |    |                                      |   |   |    |   |    |
|---------------------|-----------------------------------------------------------------------------------------|---------------|-----------------|--------------------------------------|---|---|----|----|----|--------------------------------------|---|---|----|---|----|
|                     |                                                                                         |               |                 | 1 <sup>st</sup> Semester<br>14 weeks |   |   |    |    |    | 2 <sup>st</sup> Semester<br>14 weeks |   |   |    |   |    |
|                     |                                                                                         |               |                 | C                                    | S | L | Pr | Ev | C  | C                                    | S | L | Pr | C | K  |
| COMPULSORY COURSES  |                                                                                         |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |   |    |
| GmEF3O01            | Rețele neuronale/ Neural networks                                                       | DF            | 133             | 1                                    | - | 2 | -  | Ex | 7  | -                                    | - | - | -  | - | -  |
| GmEF3O02            | Sisteme stochastice/ Stochastic systems                                                 | DF            | 133             | 2                                    | 1 | - | -  | Ex | 7  | -                                    | - | - | -  | - | -  |
| GmES3O03            | Modelarea și optimizarea deciziilor/ Modelling and optimizing decisions                 | DS            | 119             | 2                                    | - | 2 | -  | Ex | 7  | -                                    | - | - | -  | - | -  |
| GmEC3O04            | Metodologia cercetării științifice/ Methodology of Scientific Research                  | DC            | 36              | 1                                    |   | - | -  | V  | 2  | -                                    | - | - | -  | - | -  |
| GmES3O05            | Practica de specialitate/ Internship                                                    | DS            | 88              | -                                    | - | - | -  | -  | -  | 112 hours of practice                |   |   |    | C | 8  |
| GmES4O06            | Seminarul științific/ Scientific seminar                                                | DS            | 158             | -                                    | - | - | -  | -  | -  | -                                    | - | - | 3  | V | 8  |
| GmES4O07            | Proiect de cercetare în modelare matematică/ Research project in imathematical modeling | DS            | 108             | -                                    | - | - | -  | -  | -  | -                                    | - | - | 3  | C | 6  |
| GmES4O08            | Elaborarea lucrării de disertație / Dissertation Thesis                                 | DS            | 88              | -                                    | - | - | -  | -  | -  | -                                    | - | - | 8  | C | 8  |
|                     | TOTAL                                                                                   |               |                 | 6                                    | 1 | 4 | -  | -  | 23 | -                                    | - | - | 14 | - | 30 |
| ELECTIVE COURSES    |                                                                                         |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |   |    |
|                     | Pachet 1                                                                                |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |   |    |
| GmEF3A31            | Matematici computaționale/ Computational mathematics                                    | DF            | 133             | 1                                    | 2 | - | -  | Ex | 7  | -                                    | - | - | -  | - | -  |
| GmEF3A32            | Analiză convexă/ Convex analysis                                                        | DF            | 133             | 1                                    | 2 | - | -  | Ex | 7  | -                                    | - | - | -  | - | -  |
|                     | TOTAL                                                                                   |               |                 | 1                                    | 2 | - | -  | -  | 7  | -                                    | - | - | -  | - | -  |
| TOTAL               |                                                                                         |               |                 | 7                                    | 3 | 4 | -  | -  | 30 | -                                    | - | - | 14 | - | 30 |
| FACULTATIVE COURSES |                                                                                         |               |                 |                                      |   |   |    |    |    |                                      |   |   |    |   |    |
| GmEC4F09            | Voluntariat/ Volunteering                                                               | DC            | 22              | -                                    | - | - | -  | -  | -  | -                                    | - | 2 | -  | C | 2  |

|                                    |            |         |
|------------------------------------|------------|---------|
| Activity                           | Evaluation | Credits |
| Final exam for the Master's degree | Exam       | 10      |

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