

ANEXA 1

CURRICULUM

Valid for the study cycle 2024-2026
"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. SPECIFIC EDUCATIONAL OBJECTIVES (COMPETENCES TO BE ACQUIRED)

Professional educational objectives

- C1. Operating with advanced terms and methods of functional and numeric analysis.
- C2. Statistical data processing, analyzing and interpreting stochastic phenomena and processes.
- C3. Solving problems in the field of dynamic systems, optimal control and operational research.
- C4. Conceiving and applying mathematical models for analyzing processes and phenomena.
- C5. Solving problems of financial and actuarial mathematics.

Transversal educational objectives

- CT1. Showing a responsible attitude towards the scientific and didactic fields, valorizing the own professional potential, obeying to efficient labor rules for performing complex professional tasks.
- CT2. Coordinating or efficiently leading team work or interdisciplinary activities.
- CT3. Selecting informational resources, efficiently using the professional development resources, ability of correlating the professional activity with the demands of a dynamic society.

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 2024-2026.

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):

Nr. crt.	Subject Type	Hours /Study program _____		
		Hours	Ratio %	
			Study program _____	ARACIS regulations
1	proficiency course (DA)	266	33,93%	min. --,0
2	synthesis course (DT)	238	30,36%	min. --,0
3	advanced course (DU)	280	35,71%	min. --,0
TOTAL		784		-

- The total number of hours of this program is 784, divided as follows:

- Compulsory requirements **784 hours**
 - Internship to prepare the Master Thesis **70 hours**
 Total..... **784 hours**
 ARACIS regulations (____ ÷ ____ hours)

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

Course	Hours per curriculum	
	Hours	Ratio %
Compulsory courses	630	80%
Elective courses	154	20%
TOTAL	784	100%

- The ratio between practice (seminars, laboratories, projects, internship) and lecturer is 1,33 complying with the ARACIS regulations (1,2-1,5).
- The Master of Science (MSc) program in “**Mathematical modeling in science and technology**” complies with the national qualifications provided by the Government Decree HG 413/2024.
- The courses included in the Curriculum and the subjects studied are perfectly aligned with the Bachelor program (BSc) in Mathematics (HG 413/2024)
- 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.

TIME SKEDULLING OF THE ACADEMIC YEAR (WEEKS)

Year	Didactic activities (weeks)		Exams (weeks)			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	2	1	-

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	12	2	11	3

7. REQUIREMENTS FOR PASSING, PROMOTION AND COMEBACK

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

8. THE 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: October

- Preparing the Master Thesis: November – June
- Submitting and defending the Master Thesis: July
- The final exam consists of defending the Master Thesis (10 credits)

9. THE ECTS CREDITS ASSOCIATED WITH THE MASTER PROGRAM

Total 120 credits

- 80% credits from compulsory courses
- 20% credits from elective courses

RECTOR
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HEAD OF DEPARTMENT
Lect.univ.dr. Lorena Camelia POPA

CURRICULUM
Academic year 2024-2025
Year I

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1 st Semester 14 weeks						2 st Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GmEA1001	Capitole speciale de algebră/ Special Chapters of algebra	DA	122	1	1	-	-	Ex	6	-	-	-	-	-	-
GmEA1002	Operatori pe spații Hilbert/ Hilbert space operators	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEU1003	Analiză convexă/ Convex Analysis	DA	108	1	2	-	-	Ex	6	-	-	-	-	-	-
GmEU1004	Modelare matematică / Mathematical modeling	DU	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEA2005	Data science/ Data science	DA	108	-	-	-	-	-	-	1	-	2	-	Ex	6
GmEA2006	Capitole speciale de analiză matematică/ Special chapters of mathematical analysis	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmEU2007	Modele neuronale pentru inteligența artificială/ Neural models for artificial intelligence	DU	108	-	-	-	-	-	-	2	-	1	-	Ex	6
GmET2008	Proiect de practică A/ Practice Project A	DT	122	-	-	-	-	-	-	-	-	-	2	C	6
	TOTAL			6	5	-	-	-	24	5	1	3	2	-	24
ELECTIVE COURSES															
	Pachet 1														
GmET1A11	Sisteme fuzzy / Fuzzy Systems	DT	108	1	2	-	-	Ex	6	-	-	-	-	-	-
GmET1A12	Teoria dilatării și modele operatoriale/ Theory of Dilatation and Operatorial	DT	108	1	2	-	-	Ex	6	-	-	-	-	-	-
	Pachet 2														
GmEA2A21	Capitole speciale de teoria stabilității/ Special Chapters of Stability Theory	DA	108	-	-	-	-	-	-	1	-	2	-	Ex	6
GmEA2A22	Modele matematice aplicate în economie/ Mathematical models in economics	DA	108	-	-	-	-	-	-	1	-	2	-	Ex	6
	TOTAL			1	2	-	-	-	6	1	-	2	-	-	6
TOTAL ELECTIVE COURSES				7	7	-	-	-	30	6	1	5	2	-	30

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Legend: C – Lecture; S – Seminar; L – Laboratory; P – Project; SI – Individual Study; Ev – Evaluation; K – Credits;
DA– proficiency course; DT – synthesis course; DU – advanced course

CURRICULUM
 Academic year 2025 - 2026
 Year II

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1 st Semester 14 weeks						2 st Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GmEA3O01	Optimizare matematică/ Mathematical optimization	DA	97	1	1	-	-	Ex	5	-	-	-	-	-	-
GmEU3O02	Sisteme stochastice și predicție/ Stochastic Systems and Prediction	DU	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEU3O03	Analiză funcțională fuzzy/ Fuzzy Functional Analysis	DU	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmET3O04	Metodologia cercetării științifice/ Methodology of Scientific Research	DT	72	1	1	-	-	C	4	-	-	-	-	-	-
GmET3O05	Proiect de cercetare/ Research Project	DT	72	-	-	-	2	C	4	-	-	-	-	-	-
GmEU4O06	Tehnici de simulare și modelare/ Simulation and modeling techniques	DU	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmET4O07	Etică și integritate academică/ Ethics and academic integrity	DT	36	-	-	-	-	-	-	1	-	-	-	C	2
GmET4O08	Proiect de practică B/ Practice Project B	DT	147	-	-	-	-	-	-	-	-	-	2	C	7
GmET4O09	Elaborarea lucrării de disertație/ Internship for Writing the Master Thesis	DT	105	-	-	-	-	-	-	-	-	-	5	C	7
	TOTAL			6	4	-	2	-	25	3	-	1	7	-	23
ELECTIVE COURSES															
	Pachet 1														
GmEU3A31	Sisteme dinamice și control optimal/ Dynamic Systems and Optimal Control	DU	97	1	1	-	-	Ex	5	-	-	-	-	-	-
GmEU3A32	Analiza și prelucrarea datelor statistice/ Statistic Data Analysis and Processing	DU	97	1	1	-	-	Ex	5	-	-	-	-	-	-
	Pachet 2														
GmEU4A41	Capitole speciale de geometrie/ Special chapters of geometry	DU	133	-	-	-	-	-	-	1	-	2	-	Ex	7
GmEU4A42	Modelarea și optimizarea deciziilor/ Modelling and optimizing decisions	DU	133	-	-	-	-	-	-	1	-	2	-	Ex	7
	TOTAL			1	1	-	-	-	5	1	-	2	-	-	7
TOTAL ELECTIVE COURSES				7	5	-	2	-	30	4	-	3	7	-	30

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

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