

ANEXA 1

CURRICULUM

Valid for the study cycle 2022-2024
"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 National Education Law, art.137 (2), by the university Senate and after being signed on each page the President of the Senate.

Approved Curriculum valid for study cycle 2022-2024.

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 **784hours**
 - Internship to prepare the Master Thesis **70hours**
 Total..... **784hours**
 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% (ARACIS regulations - min --%)
TOTAL	784	100%

- The ratio between lectures and practice (seminars, laboratories, projects, internship) is 1:1,24, 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 1175/2006.
- The courses included in the Curriculum and the subjects studied are perfectly aligned with the Bachelor program (BSc) in Mathematics (HG 1175/2006, HG 676/2007)
- 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)			Holiday (weeks)		
	Sem. I	Sem. II	Winter session	Summer session	Retake session	Winter	Between semesters	Summer
Year I	14	14	3	3	2	4	1	10
Year II	14	14	3	2	1	4	1	-

*Distributed along the 14 weeks of Sem.II

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	12	2	11	3

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 ECTS Regulations, in the Procedure of organizing the didactic activity and students grading and in the Regulation of students' professional activity based on credits transfer.

10. THE MASTER THESIS

The requirements for preparing, submitting and defending the Master Thesis are stated in the Methodology regarding the organizing and conducting the final exams.

- Communicating the subjects for the Master Thesis: 1-30 October
- Preparing the Master Thesis: 1st of November – 31st of May
- Submitting and defending the Master Thesis: 15th of June – 15st of July
- The final exam consists of defending the Master Thesis (10 credits)

11. THE ECTS CREDITS ASSOCIATED WITH THE MASTER PROGRAM

Total 120credits

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

RECTOR
Ramona LILE

DEAN
Marius-Lucian TOMESCU

HEAD OF DEPARTMENT
Lorena-Camelia POPA

CURRICULUM
 Academic year 2022-2023
 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															
GmEA1O01	Capitole speciale de algebră/ Special Chapters of algebra	DA	122	1	1	-	-	Ex	6	-	-	-	-	-	-
GmEA1O02	Operatori nemărginiți pe spații Hilbert/ Unbounded Hilbert space operators	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEU1O03	Analiză convexă/ Convex Analysis	DA	108	1	2	-	-	Ex	6	-	-	-	-	-	-
GmEU1O04	Modelare matematică în fizică/ Mathematical modeling in physics	DU	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEA2O05	Capitole speciale de geometrie/ Special chapters of geometry	DA	108	-	-	-	-	-	-	1	2	-	-	Ex	6
GmEA2O06	Capitole speciale de analiză matematică/ Special chapters of mathematical analysis	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmEU2O07	Teoria dilatării și modele operatoriale/ Theory of Dilatation and Operatorial Models	DU	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmET2O08	Proiect de practică A/ Practice Project A	DT	122	-	-	-	-	-	-	-	-	-	2	C	6
	TOTAL			6	5	-	-	-	24	5	4	-	2	-	24
ELECTIVE COURSES															
	Pachet 1														
GmET1A11	Utilizarea soft-urilor în predarea matematicii/ Using software in teaching mathematics	DT	108	1	2	-	-	Ex	6	-	-	-	-	-	-
GmET1A12	Capitole speciale de teoria stabilității/ Special Chapters of Stability Theory	DT	108	1	2	-	-	Ex	6	-	-	-	-	-	-
	Pachet 2														
GmEA2A21	Sisteme fuzzy/ Fuzzy Systems	DA	108	-	-	-	-	-	-	1	-	2	-	Ex	6
GmEA2A22	Analiza și prelucrarea datelor statistice/ Statistic Data Analysis and Processing	DA	108	-	-	-	-	-	-	1	-	2	-	Ex	6
	TOTAL			1	2	-	-	-	6	1	-	2	-	-	6
TOTAL ELECTIVE COURSES				7	7	-	-	-	30	6	4	2	2	-	30
FACULTATIVE COURSES															
GmET1F09	Psihopedagogia adolescenților, tinerilor și adulților/ Psycho-pedagogy of adolescents, young people and adults	DT	83	2	1	-	-	Ex	5	-	-	-	-	-	-
GmEA1F10	Didactica domeniului și dezvoltări în didactica matematicii/ The didactics of the field and developments in the didactics of mathematics	DA	83	2	1	-	-	Ex	5	-	-	-	-	-	-
GmET2F11	Proiectarea și managementul programelor educaționale/ Design and management of educational programs	DT	83	-	-	-	-	-	-	2	1	-	-	Ex	5
GmEA2F12	Consiliere și orientare/ Counseling and guidance	DA	83	-	-	-	-	-	-	1	2	-	-	Ex	5

RECTOR
 Ramona LILE

DEAN
 Marius-Lucian TOMESCU

HEAD OF DEPARTMENT
 Lorena-Camelia POPA

Legend: DA – proficiency course; DT – synthesis course; DU – advanced course

CURRICULUM
Academic year 2023 - 2024
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	Modele matematice în economie/ Mathematical models in economics	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	Geometrie diferențială aplicată/ Differential geometry applied	DU	97	1	1	-	-	Ex	5	-	-	-	-	-	-
Pachet 2															
GmEU4A41	Optimizare neliniară/ Non-Linear Optimization	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
FACULTATIVE COURSES															
GmEA3F10	Practică pedagogică în învățământul preuniversitar și universitar/ Pedagogical practice in pre-university and university education	DA	83	-	3	-	-	C	5	-	-	-	-	-	-
GmEA3F11	Educație interculturală/ Intercultural Education	DA	83	1	2	-	-	Ex	5	-	-	-	-	-	-
Examen de absolvire a Programul de formare psihopedagogică în vederea certificării competențelor pentru profesia didactică Nivel II/ Final Assessment: Level II										Examen			5 credite		

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

RECTOR
Ramona LILE

DEAN
Marius-Lucian TOMESCU

HEAD OF DEPARTMENT
Lorena-Camelia POPA

Legend: DA– proficiency course; DT – synthesis course; DU – advanced cours