CURRICULUM

Valid for the study cycle 2020-2022
"AurelVlaicu" University of Arad

Faculty of Exact Sciences
Department: **Mathematics and Computer Science**
Name of program: **Mathematical modeling in research and didactics (in English)**
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 mathematatics 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 research and didactics**", according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions:

2120 – cod 212016 – mathematics research assistant
2120 – cod 212004 – mathematics reviewer
2120 – cod 212001 – mathematics counsellor

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. The Curriculum is valid until the next revision.

6. ANALYZIS OF THE CURRICULUM

- For the curriculum of the Master of Science (MSc) program in "**Mathematical modeling in research and didactics**", 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)	322	41,07%	min. --,0
2	synthesis course (DT)	336	42,85%	min. --,0
3	advanced course (DU)	126	16,08%	min. --,0
TOTAL		784		-

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

- Compulsory requirements..... **784hours**
- Internship..... **84 hours**
- Internship to prepare the Master Thesis..... **84hours**

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 1:1,15 (364 course hours / 420 practice hours), complying with the ARACIS regulations.

- The Master of Science (MSc) program in "**Mathematical modeling in research and didactics**" 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 research and didactics**"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)			Internship	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	84 hrs*	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)
I	14	14
II	14	14

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: 4th of July – 31st of July
- The final exam consists of defending the Master Thesis (10 credits)

11. THE ECTS CREDITS ASSOCIATED WITH THE MASTER PROGRAM

Total 120**credits**

- 82% credits from compulsory courses
- 18% credits from elective courses

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Academic year 2020-2021
Year I

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2nd Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GmEA1O01	Special Chapters of Operator Theory	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEA1O02	Special Chapters of Algebra	DA	108	1	2	-	-	Ex	6	-	-	-	-	-	-
GmEU1O03	Lie Algebra and Mathematical Modelling in Physics	DU	97	1	1	-	-	Ex	5	-	-	-	-	-	-
GmEU1O04	Optimization Models for Decision Making	DU	97	1	-	1	-	Ex	5	-	-	-	-	-	-
GmEU1O05	Ethics and academic integrity	DT	36	1	-	-	-	Cn	2	-	-	-	-	-	-
GmEA2O06	Theory of Dilatation and Operatorial Models	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmEA2O07	C* Algebra and Hilbert Modules	DA	133	-	-	-	-	-	-	2	1	-	-	Ex	7
GmEA2O08	Convex Analysis	DA	133	-	-	-	-	-	-	2	1	-	-	Ex	7
GmET2O09	Practice Project A	DT	72	-	-	-	-	-	-	-	-	-	2	Cn	4
	TOTAL			**6**	**4**	**1**	**-**	**-**	**24**	**6**	**3**	**-**	**2**	**-**	**24**
ELECTIVE COURSES															
	Package 1														
GmET1A11	Using software in teaching mathematics	DT	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmET1A12	Special Chapters of Stability Theory	DT	108	2	1	-	-	Ex	6	-	-	-	-	-	-
	Package 2														
GmET2A21	Fuzzy Systems	DT	108	-	-	-	-	-	-	1	2	-	-	Ex	6
GmET2A22	Statistic Data Analysis and Processing	DT	108	-	-	-	-	-	-	1	2	-	-	Ex	6
	TOTAL			**2**	**1**	**-**	**-**	**-**	**6**	**1**	**2**	**-**	**-**	**-**	**6**
TOTAL ELECTIVE COURSES				**8**	**5**	**1**	**-**	**-**	**30**	**7**	**5**	**-**	**2**	**-**	**30**
FACULTATIVE COURSES															
GmET1F10	Psycho-pedagogy of adolescents, young people and adults	DT	83	2	1	-	-	Ex	5	-	-	-	-	-	-
GmEA1F11	The didactics of the field and developments in the didactics of mathematics	DA	83	2	1	-	-	Ex	5	-	-	-	-	-	-
GmET2F12	Design and management of educational programs	DT	83	-	-	-	-	-	-	2	1	-	-	Ex	5
GmEA2F13	Counseling and guidance	DA	83	-	-	-	-	-	-	1	2	-	-	Ex	5

RECTOR
Prof. dr. Ramona Lile

DEAN
Prof. dr. Mariana Nagy

HEAD OF DEPARTAMENT
Lect. dr. Lorena Popa

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

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Department: Mathematics and Computer Science
Field: Mathematics
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CURRICULUM

Academic year 2021 - 2022
Year II

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2nd Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GmET3O01	Stochastic Systems and Prediction	DT	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmEA3O02	Fuzzy Functional Analysis	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmET3O03	Special Chapters of Analysis	DT	122	1	1	-	-	Ex	6	-	-	-	-	-	-
GmEA3O04	Methodology of Scientific Research	DA	97	1	1	-	-	Ex	5	-	-	-	-	-	-
GmET3O05	Research Project	DT	47	-	-	-	2	Cn	3	-	-	-	-	-	-
GmEU4O06	Gauge Models	DU	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmET4O07	Practice Project B	DT	122										2	Cn	6
GmET4O08	Internship for Writting the Master Thesis	DT	216	-	-	-	-	-	-	-	-	-	6	Cn	12
	TOTAL			**6**	**4**	**-**	**2**	**-**	**26**	**2**	**1**	**-**	**8**	**-**	**24**
ELECTIVE COURSES															
	Package 1														
GmEU3A11	Dynamic Systems and Optimal Control	DU	72	1	-	1	-	Ex	4	-	-	-	-	-	-
GmEU3A12	Financial Mathematical Models	DU	72	1	-	1	-	Ex	4	-	-	-	-	-	-
	Package 2														
GmEA4A21	Non-Linear Optimization	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmEA4A22	Harmonic Analysis	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
	TOTAL			**1**	**-**	**1**	**-**	**-**	**4**	**2**	**1**	**-**	**-**	**-**	**6**
TOTAL ELECTIVE COURSES				**7**	**4**	**1**	**2**	**-**	**30**	**4**	**2**	**-**	**8**	**-**	**30**
FACULTATIVE COURSES															
GmEA3F09	Pedagogical practice in pre-university and university education	DA	83	-	3	-	-	C	5	-	-	-	-	-	-
GmEA3F10	Intercultural Education	DA	83	1	2	-	-	Ex	5	-	-	-	-	-	-
GmEA4F11	Final Assessment: Level II	DA	-	-	-	-	-	-	-	-	-	-	-	Ex	5

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

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