ANEXA 1

CURRICULUM
Valid for the study cycle 2021-2024
"Aurel Vlaicu" University of Arad

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

1. MISSION STATEMENT

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

2. OBJECTIVES

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

3. SPECIFIC EDUCATIONAL OBJECTIVES (COMPETENCES TO BE ACQUIRED)

Professional educational objectives

C1. Working with mathematical concepts and methods.
C2. Mathematical processing of data, analysis of phenomena and processes.
C3. Designing and analysing algoritms for solving different problems.
C4. Conceiving models for describing phenomena.
C5. Programming in high level programming languages.
C6. Analysing, testing and exploiting information systems.

Transversal educational objectives

CT1. Applying the rules of organized and efficient work, of responsibie attitudes towards teaching-scientific field, to value the own creative potential, while respecting the principles and norms of professional ethics.
CT2. Efficient conduct of team activities.
CT3. Efficient use of information, communication resources and assisted education both in Roumanian and in an internationally widespread language.

4. ACADEMIC CAREER DEVELOPMENT

Bachelor's degree graduates "**Computer Science Mathematics**" according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions:

2120 – cod 212009 – mathematician
2120 – cod 212001 – mathematical consultant
2120 – cod 212014 – statistical analist

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.

Aproved Curriculum valid for study cycle 2021-2024.

6. ANALYZIS OF THE CURRICULUM

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

Nr. crt.	Subject Type	Hours /Study program		
		Hours	Ratio %	
			Study program	ARACIS regulations
1	Fundamentals (DF)	714	38,6%	35-45%
2	Specialty (DS)	840	45,5%	35-50%
3	Complementary (DC)	294	15,9%	10-20%
TOTAL		1848		-

- The total number of hours of this program is 1848, divided as follows:

- Compulsory requirements.....**1848 hours**
- Internship.....**120 hours**
- Internship to prepare the Bachelor Thesis ..... **84 hours**

Total.....**1848 hours**

ARACIS regulations (1848 ÷ 2352 hours)

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

Course	Hours per curriculum	
	Hours	Ratio %
Compulsory courses	1484	80,3% (ARACIS regulations 70%-83%)
Elective courses	364	19,7% (ARACIS regulations 30%-17%)
TOTAL	1848	100%

- The ratio between lectures and practice (seminars, laboratories, projects, internship) is 1:1,16, complying with the ARACIS regulations 1:1+50%.

- **The ratio of the facultative disciplines** (pedagogical training included) to the total number of hours 25,4%.

- Study program **Computer Science Mathematics** and Mathematical domain fit the national qualifications in 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 with the Bachelor program (BSc) program **"Computer Science Mathematics"** 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	Spring	Summer
Year I	14	14	3	3	2	-	4	1	1	10
Year II	14	14	3	3	2	4	4	1	1	6
Year III	14	14	3	2	1	84*	3	1	1	-

*Distributed along the 14 weeks of Sem.II

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

HOURS PER WEEK OF COMPULSORY AND ELECTIVE COURSES

Year	Semester I (hours / week)	Semester II (hours / week)	
I	22	22	
II	22	22	4 weeks – Internship (112-132 hours)
III	22	22	84 hours (14 weeks x 6 hours) - Internship to prepare the Bachelor Thesis

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 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.

8. THE BACHELOR THESIS

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

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

- Testing the general and specialized knowledge – 5 credits
- Defending the bachelor's thesis – 5 credits

9. THE ECTS CREDITS ASSOCIATED WITH THE STUDY PROGRAM

- 72 ETC for fundamental disciplines
- 84 ETC for specialty disciplines
- 28 ETC for complementary disciplines

Total 184 ETC

- 147 ETC from compulsory courses (included 4 ETC for Sport)
- 37 ETC from elective courses
- 60 ETC supplementary for diploma
- The disciplines for the program of Psycho-pedagogical training: 35 ETC for level I (initial, double qualification) to certify the didactic lineare included in the facultative disciplines package. Graduate exam : 5 ETC for level I.

RECTOR
Ramona **LILE**

DEAN
Marius-Lucian **TOMESCU**

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Lorena-Camelia **POPA**

ROMÂNIA
MINISTERUL EDUCAȚIEI
UNIVERSITATEA „AUREL VLAICU" DIN ARAD

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

CURRICULUM
Academic year 2021-2022
Year I

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	C	C	S	L	Pr	C	K
COMPULSORY COURSES															
GlCF1O01	Mathematic Analysis 1	DF	94	2	2	-	-	Ex	6	-	-	-	-	-	-
GlCF1O02	Algebra 1 (Algebraic Structures)	DF	94	2	2	-	-	Ex	6	-	-	-	-	-	-
GlCF1O03	Mathematical Logic and Set Theory	DF	69	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCF1O04	Algorithms and Programming 1	DF	83	2	-	1	-	Ex	5	-	-	-	-	-	-
GlCS1O05	Mathematical Software 1	DS	83	2	-	1	-	Ex	5	-	-	-	-	-	-
GlCC1O06	Sports 1	DC	22	-	2	-	-	C	2	-	-	-	-	-	-
GlCF2O07	Mathematic Analysis 2	DF	94	-	-	-	-	-	-	2	2	-	-	Ex	6
GlCF2O08	Algebra 2 (Linear Algebra)	DF	94	-	-	-	-	-	-	2	2	-	-	Ex	6
GlCS2O09	Object Oriented Programming	DS	69	-	-	-	-	-	-	2	-	2	-	Ex	5
GlCS2O10	Operating Systems	DS	83	-	-	-	-	-	-	2	-	1	-	Ex	5
GlCS2O11	Data Structures	DS	83	-	-	-	-	-	-	2	-	1	-	Ex	5
GlCC2O12	Sports 2	DC	-	-	-	-	-	-	-	-	2	-	-	C	2
	TOTAL			**10**	**8**	**2**	-	-	**27 +2**	**10**	**6**	**4**	-	-	**27+ 2**
ELECTIVE COURSES															
	Pachet 1														
GlCC1A13	English 1	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
GlCC1A14	French 1	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
GlCC1A15	German 1	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
	Pachet 2														
GlCC2A16	English 2	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
GlCC2A17	French 2	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
GlCC2A18	German 2	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
	TOTAL				**2**	-	-	-	**3**	-	**2**	-	-	-	**3**
TOTAL				**10**	**10**	**2**	-	-	**30 +2**	**10**	**8**	**4**	-	-	**30+ 2**
FACULTATIVE COURSES															
GlCF1F19	The Psychology of education	DF	69	2	2	-	Ex	5	-	-	-	-	-	-	-
GlCF2F20	Pedagogy (Pedagogy Basics – Curriculum Theory and Methodology	DF	69	-	-	-	-	-	-	2	2	-	-	Ex	5

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

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

CURRICULUM
Academic year 2022 - 2023
Year II

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	C	C	S	L	Pr	C	K
COMPULSORY COURSES															
GlCF3O01	Geometry	DF	94	2	2	-	-	Ex	6	-	-	-	-	-	-
GlCF3O02	Differential Equations 1	DF	94	2	2	-	-	Ex	6	-	-	-	-	-	-
GlCF3O03	Real Analysis	DF	69	2	2	-	-	Ex	5						
GlCS3O04	Computer Networks	DS	69	2	-	2	-	Ex	5	-	-	-	-	-	-
GlCS3O05	Databases	DS	69	2	-	2	-	C	5	-	-	-	-	-	-
GlCF4O06	Complex Analysis	DF	69	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O07	WEB Programming	DS	69	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCF4O08	Differential Equations 2 (Equations and with Partial Derivatives)	DF	69	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O09	Differential Geometry	DS	69	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCS4O10	Specialty Practice	DS	120 hrs (4 week. x 6 hrs x 5 day) taking place after the active conclusion. didactic of the sem. 4											C	2
	TOTAL			**10**	**6**	**4**	-	-	**27**	**8**	**8**	-	-	-	**22**
ELECTIVE COURSES															
	Pachet 1														
GlCC3A11	English 3	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
GlCC3A12	French 3	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
GlCC3A13	German 3	DC	47	-	2	-	-	C	3	-	-	-	-	-	-
	Pachet 2														
GlCC4A14	English 4	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
GlCC4A15	French 4	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
GlCC4A16	German 4	DC	47	-	-	-	-	-	-	-	2	-	-	C	3
	Pachet 3														
GlCC4A17	Computer Graphics	DC	69	-	-	-	-	-	-	2	-	2	-	C	5
GlCC4A18	Scientific and professional writing and communication	DC	69	-	-	-	-	-	-	2	-	2	-	C	5
	TOTAL			-	**2**	-	-	-	**3**	**2**	**2**	**2**	-	-	**8**
TOTAL				**10**	**8**	**4**	-	-	**30**	**10**	**10**	**2**	-	-	**30**
FACULTATIVE COURSES															
GlCF3F19	Pedagogy II Theory and methodology of training. Evaluation theory and methodology	DF	69	2	2	-	-	Ex	5	-	-	-	-	-	-
GlCS4F20	Didactics A - Mathematics	DS	69	-	-	-	-	-	-	2	2	-	-	Ex	5
GlCC4F21	Formal languages and compilers	DC	69	-	-	-	-	-	-	2	-	2	-	C	5
GlCS4F22	Web application development	DS	69	-	-	-	-	-	-	2	-	2	-	C	5

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Department: Mathematics and Computer Science
Field: Mathematics
Study program: Computer Science Mathematics

CURRICULUM
Academic year 2023 - 2024
Year III

Code	Subject	Course status	S.I./ Sem (hrs)	Hours per week and Evaluation type											
				1st Semester 14 weeks						2st Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
G1CF5O01	Probability Theory	DF	69	2	2	-	-	Ex	5	-	-	-	-	-	-
G1CS5O02	Numerical Analysis	DS	69	2	2	-	-	Ex	5	-	-	-	-	-	-
G1CS5O03	Functional Analysis 1	DS	69	2	2	-	-	Ex	5	-	-	-	-	-	-
G1CS5O04	Artificial Intelligence	DS	83	2	-	1	-	Ex	5	-	-	-	-	-	-
GlCC6O05	Ethics and academic integrity	DC	36	-	-	-	-	-	-	1	-	-	-	C	2
GlCF6O06	Theoretical Mechanics	DF	94	-	-	-	-	-	-	2	-	2	-	Ex	6
GlCS6O07	Mathematical Statistics	DS	94	-	-	-	-	-	-	2	-	2	-	Ex	6
G1CS6O08	Writing and Editing the Diploma Thesis	DS	66	-	-	-	-	-	-	-	-	6	-	C	6
	TOTAL			**8**	**6**	**1**	-	-	**20**	**5**	-	**10**	-	-	**20**
ELECTIVE COURSES															
	Pachet 1														
G1CC5A09	Algorithmics of graphs	DC	69	2	2	-	-	C	5	-	-	-	-	-	-
G1CC5A10	Operational research	DC	69	2	2	-	-	C	5	-	-	-	-	-	-
	Pachet 2														
G1CS5A11	Optimization Techniques	DS	83	2	-	1	-	C	5	-	-	-	-	-	-
G1CS5A12	Advanced programming methods	DS	83	2	-	1	-	C	5	-	-	-	-	-	-
	Pachet 3														
G1CS6A13	Mathematical Software 2	DS	69	-	-	-	-	-	-	2	-	2	-	C	5
G1CS6A14	Cryptography and Information Security	DS	69	-	-	-	-	-	-	2	-	2	-	C	5
	Pachet 4														
G1CS6A15	Functional Analysis 2	DS	83	-	-	-	-	-	-	2	1	-	-	Ex	5
G1CS6A16	Mathematical modeling	DS	83	-	-	-	-	-	-	2	1	-	-	Ex	5
	TOTAL			**4**	**2**	**1**	-	-	**10**	**4**	**1**	**2**	-	-	**10**
TOTAL				**12**	**8**	**2**	-	-	**30**	**9**	**1**	**12**	-	-	**30**
FACULTATIVE COURSES															
GlCC5F17	History of Mathematics	DC	69	2	-	2	-	Ex	5	-	-	-	-	-	-
G1CS5F18	Didactics B - Computer Science	DS	69	2	2	-	-	Ex	5	-	-	-	-	-	-
G1CF5F19	Classroom Management	DF	47	1	1	-	-	Ex	3	-	-	-	-	-	-
G1CS5F20	Pedagogical practice in compulsory pre-university education -Specialization A - Mathematics	DS	33	-	3	-	-	C	3	-	-	-	-	-	-
G1CC6F21	Modeling and simulation	DC	83	-	-	-	-	-	-	2	-	1	-	Ex	5
G1CS6F22	Computer Assisted Teaching	DS	22	-	-	-	-	-	-	1	1	-	-	C	2
G1CS6F23	Pedagogical practice in compulsory pre-university education -Specialization B – Computer Science	DS	8	-	-	-	-	-	-	-	3	-	-	C	2
Final Assessment: *Psycho-pedagogical training program in order to certify the competencies for the teaching profession* - Level I								Exam				5 credits			

The student who has accumulated the **184** credits by promoting the three-year bachelor's degree obtains a **Graduate Certificate in Computer Science Mathematics (without a Bachelor's Degree Exam).**

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

The student who has accumulated the **194** credits by promoting the three years of bachelor studies and the bachelor's examination obtains a **Bachelor's degree in Computer Science Mathematics.**

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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