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 **Advanced Studies in Applied Computer Science** (English)
Field of studies **Informatics**
Type of program **Professional**
Length of program / number of ECTS credits **2 years /120 credits**
Type of education **With attendance**
Graduate title earned **Master in informatics**

1. MISSION STATEMENT

The mission of the Master of Science (MSc) program in "Advanced Studies in Applied Computer Science (English)" is to provide academic, research and public service leadership in a field perfectly aligned with the Faculty of Exact Sciences. The aims of this program are to:

- foster research-oriented critical thinking in Informatics and related applications;
- enhancing the educational offer by developing and nurturing a professional environment conducive to scholarship in the pursuit of knowledge; and
- open the European and international dimensions by building communication skills to excel in the profession.

2. OBJECTIVES

- Constantly improving skills and expanding knowledge to analyze socio-economical facts and phenomena for discovering solutions andproposing alternatives;
- Applying the acquired knowledge in scientific/professional projects with the aim of finding solutions to the challenges raised by the Romanian as well as European economy
- Developing the skills to find and use methods, procedures and scientific instruments, as well as fostering theability to propose and convey scientific explanations for socio-economical processes and phenomena
- Nurturing English professional communication proficiency, effectiveintegration within multinational/internationalresearch teams

3. SPECIFIC EDUCATIONAL OBJECTIVES (COMPETENCES TO BE ACQUIRED)

Professional educational objectives

C1. Analyze real systems and develop mathematical models for processes and systems that can be applied in engineering and economics.
C2. Solve problems in various fields of sciences using mathematical models and computer systems, and use computer related tools for developing software.
C3. Read specifications and perform data analysis, design, development as well as deployment of databases using software systems.
C4. Perform data analysis and generate and interpret results for supporting decision making processes.
C5. Model various processes, design and deploy computational and symbolic models.
C6. Elaborate comparative studies of computer systems with respect to their functionalities, efficiency, effectiveness and information security.
C7. Offer consultancy on the use of computers and computer applications in sciences, technology and economics.

Transversal educational objectives

CT1. General knowledge of computer systems and their integration in various organizations, and continuously learning new concepts and new technologies in the field of computer science.

CT2. Communicate in English on professional subjects with computer specialists, engineers and economists; elaborate technical reports and scientific memos.

CT3. Teaching and lecturing at high school and university levels in the fields of computer science and informatics and on related subjects.

CT4. Perform efficiently within a multidisciplinary team while observing, respecting, and abiding by the professional ethics rules of the specific field.

4. ACADEMIC CAREER DEVELOPMENT

The graduates of the Master of Science (MSc) program in "Advanced Studies in Applied Computer Science", according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions:

2512 – code 251206, Manager of informatics project

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. Aproved Curriculum valid for study cycle 2024-2026.

6. ANALYZIS OF THE CURRICULUM

For the curriculum of the Master of Science (MSc) program in "Advanced Studies in Applied Computer Science", 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 per week		
		Hours	Ratio %	
			Study program	ARACIS regulations
1	proficiency course (DA)	350	44,6%	min. ---,0
2	synthesis course (DT)	224	28,6%	min. ---,0
3	advanced course (DU)	210	26,8%	min. ---,0
TOTAL		**784**	**100,00%**	---

- The total number of hours of this program is 784 (392 hours oflectures and 392 hours of practical activities) divided as follows:
  - Compulsory requirements **784hours**
  - Internship..... **112hours**
  - Internship to prepare the Master Thesis **70hours**
  Total..... **784hours**
- Curriculum structure, according course types (compulsory and elective):

Course	Hours per curriculum	
	Hours	Ratio %
Compulsory courses	602	76,8%
Elective courses	182	23,2%
TOTAL	784	100%

- The ratio between lectures and practice (seminars, laboratories, projects, internship) is 1:1 (392 course hours / 392 practice hours), complying with the ARACIS regulations.
- The Master of Science (MSc) program in "Advanced Studies in Applied Computer Science (English)" 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 Informatics (English) (HG 413/2024).
- The curriculum of the Master of Science (MSc) program in "Advanced Studies in Applied Computer Science" complies with the European Credit Transfer and Accumulation System (ECTS) and with the Law 199/2023 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	-	2	1	12
Year II	14	14	3	2	1	70 hrs*	2	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	14	0	14	0
II	7	7	8	6

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: 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)

11. THE ECTS CREDITS ASSOCIATED WITH THE MASTER PROGRAM

Total 120**credits**

- 76,8% credits from compulsory courses
- 23,2% credits from elective courses

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CURRICULUM
Academic year 2024-2025
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															
GmFA1O01	Analiza avansată a datelor/ Advanced Topics in Data Analysis	DA	133	2	-	1	-	Ex	7	-	-	-	-	-	-
GmFA1O02	Optimizare matematică/ Mathematical optimization	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmFA1O03	Matematici computaționale / Computational mathematics	DA	108	2	-	1	-	Ex	6	-	-	-	-	-	-
GmFU1O04	Rețele neuronale/ Neural Networks	DU	108	2	-	1	-	Ex	6	-	-	-	-	-	-
GmFT1O05	Proiect în Big data / Project in Big data	DT	97	-	-	-	2	C	5	-	-	-	-	-	-
GmFU2O06	Programare pe platforme mobile/ Programming on mobile platforms	DU	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmFA2O07	Limbaje de programare pentru baze de date / Programming languages for databases	DA	108	-	-	-	-	-	-	2	-	1	-	Ex	6
GmFA2O08	Sisteme dinamice și control optimal/ Dynamic systems and optimal control	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmFU2O09	Quantum Computing	DU	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmFT2O10	Proiect în programare pe platforme mobile/ Project in programming on mobile platforms	DT	97	-	-	-	-	-	-	-	-	-	2	C	5
TOTAL				**8**	**1**	**3**	**2**	**-**	**30**	**8**	**2**	**2**	**2**	**-**	**30**
FACULTATIVE COURSES															

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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

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CURRICULUM
Academic year 2025-2026
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	K	C	S	L	Pr	Ev	K
COMPULSORY COURSES															
GmFU3O01	Tehnici avansate de criptare și securitate a informatiei / Advanced encryption and information security techniques	DU	133	2	-	1	-	Ex	7	-	-	-	-	-	-
GmFT3O02	Metode de cercetare/ Research methods	DT	97	1	1	-	-	C	5	-	-	-	-	-	-
GmFT3O03	Proiect în tehnici avansate de criptare și securitate a informatiei / Project in advanced encryption and information security techniques	DT	97	-	-	-	2	C	5	-	-	-	-	-	-
GmFT4O04	Proiect în inteligență artificială / Project in artificial intelligence	DT	97	-	-	-	-	-	-	-	-	-	2	C	5
GmFT4O05	Etică și integritate academică / Academic ethics and integrity	DT	36	-	-	-	-	-	-	1	-	-	-	C	2
GmFT4O06	Elaborarea lucrării de disertaţie / Elaboration of the dissertation thesis	DT	105	-	-	-	-	-	-	-	-	-	5	C	7
	TOTAL			**3**	**1**	**1**	**2**	**-**	**17**	**1**	**-**	**-**	**7**	**-**	**14**
ELECTIVE COURSES															
	Package 1														
GmFA3A11	Data science	DA	108	2	-	1	-	Ex	6	-	-	-	-	-	-
GmFA3A12	Aplicații ale algebrei Lie/ Applications of Lie algebra	DA	108	2	-	1	-	Ex	6	-	-	-	-	-	-
	Package 2														
GmFA3A21	Soluții moderne pentru E-business/ Modern solutions for E-business	DA	133	2	-	2	-	Ex	7	-	-	-	-	-	-
GmFA3A22	Sisteme stochastice/ Stochastic systems	DA	133	2	-	2	-	Ex	7	-	-	-	-	-	-
	Package 3														
GmFU4A31	Calcul neuronal aplicat/ Neural Computations	DU	158	-	-	-	-	-	-	2	-	1	-	Ex	8
GmFU4A32	Programare în aplicații CAD/ Programming in CAD applications	DU	158	-	-	-	-	-	-	2	-	1	-	Ex	8
	Package 4														
GmFA4A41	Sisteme de control fuzzy/ Fuzzy control systems	DA	158	-	-	-	-	-	-	2	-	1	-	Ex	8
GmFA4A42	Statistică aplicată în științe tehnice și naturale/ Statistics applied in technical and natural sciences	DA	158	-	-	-	-	-	-	2	-	1	-	Ex	8
	TOTAL			**4**	**-**	**3**	**-**	**-**	**13**	**4**	**-**	**2**	**-**	**-**	**16**
TOTAL				**7**	**1**	**4**	**2**	**-**	**30**	**5**	**-**	**2**	**7**	**-**	**30**

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

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