

## 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 **Applied computer science in technology, economics and science**

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

An integral part of the Faculty of Exact Sciences, the master's program, Applied Computer Science in Science, Technology and Economics has as main mission the training of specialists in computer science, programming, databases, in the spirit of democracy, equal opportunities and human personality development.

### 2. OBJECTIVES

- Development of skills to analyze economic and social facts and phenomena and to propose solutions;
- Capitalizing on the knowledge acquired by graduates in professional and scientific projects in order to meet the challenges of the Romanian and European economy;
- Training skills to develop and use methods, procedures and tools of scientific research, as well as developing in graduates the ability to formulate scientific explanations for economic and social phenomena and processes
- Stimulating the interest of graduates for continuous professional, scientific and specialized training in order to effectively adapt to the requirements of the knowledge-based society;
- Training of professional communication skills in English, of effective integration in both work teams and multinational / international research teams.

### 3. SPECIFIC EDUCATIONAL OBJECTIVES (COMPETENCES TO BE ACQUIRED)

#### Professional competencies:

C1 Developing mathematical models for processes and systems that can be applied in engineering and economics.

C2 Model various processes, design and deploy computational and symbolic models.

C3 Use computer related tools for developing software dedicated to solve problems in various fields of sciences, technology and economics.

C4 Read specifications and perform data analysis, design, development as well as deployment of databases using software systems.

C5 Perform data analysis and generate results for supporting decision making processes.

C6 Elaborate comparative studies of computer systems with respect to their functionalities, efficiency and information security, and perform consultancy in the field of informatics.

C7 Ability to provide consultancy in the application of informatics in science, technology and economics.

#### Transversal educational competencies:

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 Ability to educate and instruct in the field of high school and higher education in the domain of computer science and 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 “**Applied computer science in technology, economics and science**”, according to the Romanian Occupational Catalogue (COR – ISCO-08), can be hired in the following positions:

2511 – code 251101 Computer System Designer

#### 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 “Applied computer science in technology, economics and 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)	322	41,1%	min. ---,0
2	synthesis course (DT)	280	35,7%	min. ---,0
3	advanced course (DU)	182	23,2%	min. ---,0
<b>TOTAL</b>		<b>784</b>	<b>100,00%</b>	<b>---</b>

- 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	616	78,6%
Elective courses	168	21,4%
<b>TOTAL</b>	<b>784</b>	<b>100%</b>

- 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 “**Applied computer science in technology, economics and science**” 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 “**Applied computer science in technology, economics and 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	8	6	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

- 78,6% credits from compulsory courses
- 21,4% credits from elective courses

**RECTOR**  
Conf.univ.dr. Teodor-Florin CILAN

**DEAN**  
Prof.univ.dr. Sorin-Florin NĂDĂBAN

**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 <sup>st</sup> Semester 14 weeks						2 <sup>st</sup> Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
GmDA1O01	Securitatea informației/ Information security	DA	108	2	-	1	-	Ex	6	-	-	-	-	-	-
GmDA1O02	Modelare matematică și optimizare/ Mathematical modeling and optimization	DA	108	2	1	-	-	Ex	6	-	-	-	-	-	-
GmDU1O03	Fundamentele cuantice ale informaticii/ Quantum Fundamentals of Computer Science	DU	108	2	-	1	-	Ex	6	-	-	-	-	-	-
GmDT1O04	Metode avansate de analiza datelor/ Advanced data analysis methods	DT	133	2	-	1	-	Ex	7	-	-	-	-	-	-
GmDT1O05	Proiect de cercetare în analiza datelor/ Data analysis research project	DT	97	-	-	-	2	C	5	-	-	-	-	-	-
GmDA2O06	Programare pe platforme mobile/ Programming on mobile platforms	DA	108	-	-	-	-	-	-	2	-	1	-	Ex	6
GmDT2O07	Programarea bazelor de date/Database programming	DT	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmDA2O08	Sisteme dinamice/Dynamic systems	DA	108	-	-	-	-	-	-	2	1	-	-	Ex	6
GmDA2O09	Matematici computaționale/ Computational mathematics	DA	108	-	-	-	-	-	-	2	-	1	-	Ex	6
GmDT2O10	Proiect în programare pe platforme mobile/ Project in programming on mobile platforms	DT	97	-	-	-	-	-	-	-	-	-	2	C	5
<b>TOTAL ELECTIVE COURSES</b>				<b>8</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>30</b>	<b>8</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>30</b>

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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 <sup>st</sup> Semester 14 weeks						2 <sup>st</sup> Semester 14 weeks					
				C	S	L	Pr	Ev	K	C	S	L	Pr	Ev	K
GmDU3O01	Tehnici avansate de modelare si simulare/ Advanced Modeling and Simulation techniques	DU	119	2	-	2	-	Ex	7	-	-	-	-	-	-
GmDT3O02	Proiect în e-business/ Projects in e-business	DT	97	-	-	-	2	C	5	-	-	-	-	-	-
GmDA3O03	Metodologia cercetării științifice/ Scientific research methodologies	DA	72	1	1	-	-	C	4	-	-	-	-	-	-
GmDT4O04	Proiect de cercetare în inteligență artificială/ Research project in artificial intelligence	DT	147	-	-	-	-	-	-	-	-	-	2	C	7
GmDT4O05	Etică și integritate academică/ Academic ethics and integrity	DT	36	-	-	-	-	-	-	1	-	-	-	C	2
GmDT4O06	Elaborarea lucrării de disertație/ Elaboration of the dissertation thesis	DT	105	-	-	-	-	-	-	-	-	-	5	C	7
<b>TOTAL</b>				<b>3</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>16</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>7</b>	<b>-</b>	<b>16</b>
<b>ELECTIVE COURSES</b>															
<b>Pachet 1</b>															
GmDA3A11	Fundamente ale rețelelor neuronale biologice/ Biological Neural Networks Fundamentals	DA	133	2	1	-	-	Ex	7	-	-	-	-	-	-
GmDA3A12	Quantum Computing/ Quantum Computing	DA	133	2	1	-	-	Ex	7	-	-	-	-	-	-
GmDA3A13	Teoria sistemelor stochastice/ The theory of stochastic systems	DA	133	2	1	-	-	Ex	7	-	-	-	-	-	-
<b>Pachet 2</b>															
GmDU3A21	E-business/ E-business	DU	133	2	-	1	-	Ex	7	-	-	-	-	-	-
GmDU3A22	Sisteme suport pentru decizii/ Decision support systems	DU	133	2	-	1	-	Ex	7	-	-	-	-	-	-
<b>Pachet 3</b>															
GmDA4A31	Sisteme fuzzy/ Fuzzy systems	DA	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmDA4A32	Statistică aplicată în științe tehnice și naturale/ Statistics applied in technical and natural sciences	DA	133	-	-	-	-	-	-	2	-	1	-	Ex	7
<b>Pachet 4</b>															
GmDU4A41	Programare în Mathcad și MATLAB/ Programming in Mathcad and MATLAB	DU	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmDU4A42	Probleme computaționale ale rețelelor neuronale artificiale/ Computational Aspects of Artificial Neural Networks	DU	133	-	-	-	-	-	-	2	-	1	-	Ex	7
GmDU4A43	Sisteme inteligente/ Intelligent systems	DU	133	-	-	-	-	-	-	2	-	1	-	Ex	7
<b>TOTAL</b>				<b>4</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>14</b>	<b>4</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>14</b>
<b>TOTAL ELECTIVE COURSES</b>				<b>7</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>30</b>	<b>5</b>	<b>-</b>	<b>2</b>	<b>7</b>	<b>-</b>	<b>30</b>

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

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