

## COURSE DESCRIPTION

*Internship in Specialization*

Academic year 2026/2027

### 1. Programme-related data

1.1. Higher Education Institution	<b>Babeş Bolyai University</b>
1.2. Faculty	<b>Faculty of Mathematics and Computer Science</b>
1.3. Department	<b>Department of Computer Science</b>
1.4. Field	<b>Computer Science</b>
1.5. Level of study	<b>Master</b>
1.6. Degree programme / Qualification	<b>Artificial Intelligence for Connected Industries</b>
1.7. Form of education	<b>Full time studies</b>

### 2. Course-related data

2.1. Course title	<b>Internship in Specialization</b>			Course code	<b>MME9012</b>
2.2. Course coordinator	Prof. dr. Camelia Chira				
2.3. Seminar coordinator	Prof. dr. Camelia Chira				
2.4. Year of study	2	2.5. Semester	4	2.6. Type of assessment	Viva voce
2.7. Course status	Compulsory			2.8. Course type	Specialisation subject

### 3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	<b>16</b>	of which: 3.2. course	<b>0</b>	3.3. seminar/ laboratory/ project	<b>16</b>
3.4. Total of hours in the curriculum	192	of which: 3.5. course	0	3.6. seminar/ laboratory	<b>192</b>
<b>Time allocation for individual study (IS) and self-taught activities (ST)</b>					<b>hours</b>
Learning from textbooks, course materials, bibliography, and notes (IS)					76
Additional research in the library, on subject-specific electronic platforms, and on-site					76
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					60
Tutoring (professional guidance)					76
Examinations					20
Other activities					
<b>3.7. Total hours of individual study (IS) and self-taught activities (ST)</b>				<b>308</b>	
<b>3.8. Total hours per semester</b>				<b>500</b>	
<b>3.9. Number of credits</b>				<b>20</b>	

### 4. Prerequisites (where applicable)

4.1. curriculum-related	Computer Science Curriculum
4.2 skills-related	Theoretical and experimental knowledge in the master specialization Knowledge of modelling of relevant applications Advanced software development knowledge and skills

### 5. Specific conditions (where applicable)

5.1. course-related	-
5.2. seminar/laboratory-related	The hosting institutions should provide at least the following resources: <ul style="list-style-type: none"> <li>• Scientific references for the scientific problem to be investigated</li> <li>• Relevant data to help in the validation of any software implementation</li> <li>• Fully licensed computer space</li> <li>• Fully licensed software development tools</li> </ul>

**6.1. Competencies resulting from the completion of the degree programme (as referred to in the curriculum)<sup>1</sup>**

<b>Professional competencies</b>	
<b>Competency code</b>	<b>Competency</b>
PC7	Develop software
PC9	Define technical requirements
PC11	Design information system
PC15	Debug software
PC25	Identify customer requirements
PC26	Interpret technical requirements
PC27	Utilise computer-aided software engineering tools
PC28	Manage engineering projects
PC30	Perform dimensionality reduction
PC34	Perform data mining
PC35	Creatively use digital technologies
<b>Transversal competencies</b>	
<b>Competency code</b>	<b>Competency</b>
TC1	Think analytically
TC2	Apply knowledge of science, technology and engineering
TC3	Work in teams
TC4	Solve problems
TC5	Show entrepreneurial spirit

**6.2. Learning outcomes relevant to the degree programme (as referred to in the curriculum)<sup>2</sup>**

<b>Learning outcomes targeted by the subject</b>		
<b>Competency code</b>	<b>Knowledge and comprehension</b>	<b>Specific academic skills</b>
PC7 PC9	The graduate possesses the fundamental knowledge in automatics and robotics, advanced networks architectures and IoT systems, being able to use and apply this knowledge to produce new relevant solutions.	The graduate knows and respects the ethical and legal principles and rules in scientific research.

<sup>1</sup> The professional and/or transversal skills targeted by the subject for which the course description is prepared will be copied from the curriculum of the degree programme. For each competency, the complete entry, including the competency code, will be copied with the exact wording that appears in the curriculum, without any changes. If no competency is copied from either of the two categories, the row corresponding to that category is deleted from the table.

<sup>2</sup> The learning outcomes relevant for the degree programme and targeted by the subject for which the course description is prepared will be listed. The entries, copied without any changes from the Curriculum by subject type (Core Subject/Specialisation Subject/Complementary Subject), are listed under the corresponding competency.

<b>PC11</b>	The graduate has the necessary knowledge to devise, model and design of complex software applications in the field of artificial intelligence for connected industries.	The graduate has the ability to perform educational activities in the domain of algorithmics and programming for schools and high schools.
<b>PC15</b>	The graduate has the ability of interdisciplinary vision between computer science subdomains in order to combine them in a software system in the field of artificial intelligence for connected industries.	The graduate has the skills to perform research in the domain of educational sciences, particularly in domains that rely on algorithmic thinking and critical thinking.
<b>PC25 PC26 PC27</b>	The graduate possesses the fundamental knowledge in automatics and robotics, advanced networks architectures and IoT systems, being able to use and apply this knowledge to produce new relevant solutions.	The graduate proves knowledge related to specifying the requirements of research activities in the domain of computer science in general and the domain of artificial intelligence and its applications for connected industries in particular and he/she understands the role of research in promoting progress.
<b>PC28 PC30</b>	The graduate can apply advanced knowledge in artificial intelligence, machine learning, robotics and networks, being able to offer implementation solutions for applications in connected industries.	The graduate has the ability to communicate and develop professional relations and partnerships with industrial partners and with all actors involved in the development process of software and solutions based on artificial intelligence, network architectures and IoT systems .
<b>PC34 PC35</b>	The graduate has the ability to identify and develop applications of artificial intelligence for connected industries and systems.	
<b>TC1</b>	The graduate has the necessary knowledge to devise, model and design of complex software applications in the field of artificial intelligence for connected industries.	The graduate has the ability to perform educational activities in the domain of algorithmics and programming for schools and high schools.
<b>TC2 TC3 TC4 TC5</b>	The graduate proves advance programming skills which will allow learning, accumulating solid knowledge and rapid understanding of modern technologies.	

## 7. Subject-specific learning outcomes

<b>Knowledge and comprehension</b>
The graduate has the necessary knowledge to conceive, model and design complex software systems in the field of artificial intelligence for connected industries.
The graduate possesses fundamental modeling knowledge through which he/she analyzes real-life problems, translates them into concrete requirements and develops an appropriate software model.
<b>Specific academic skills</b>
The graduate is able to use specialized language and terminology specific to the field of artificial intelligence, so that he or she can communicate and interact with members of work teams.
The graduate demonstrates the ability to reflect on their own learning sources and resources.
The graduate demonstrates that they possess knowledge related to the specific requirements of the research approach in the field of computer science in general and the field of artificial intelligence in particular and understands the role of research in promoting progress.
The graduate knows and respects ethical and legal principles and rules in scientific research.

## 8. Contents

8.1. Course	Teaching and learning methods	Remarks <sup>3</sup>
<b>8.2. Seminar/ laboratory</b>	<b>Teaching and learning methods</b>	<b>Remarks</b>
Phase 1. Establish the problem statement to be solved. Study the theoretical implications.	Exposure, description, explanation,	
Phase 2. Establish the scientific methods and models to pursue Scientific investigation on the methods and models and their suitability for the task	Dialog lecture, discussions, team debate	
Phase 3. Develop detailed specifications of the project Project analysis: entities and relations identification, use scenarios, data flow diagrams	Dialog lecture, discussions, team debate	
Phase 4. Design: conceptual data model, logical data model, computation design, physical data model, user interface, application architecture Implementation and testing.	Questioning, discovery	
Phase 5. Integration Testing Experiments, data collection, results evaluation	Case study, cooperation, questioning	
Phase 6. Project presentation and defence	Evaluation	
Bibliography 1. M. Frențiu, I. Lazăr, Bazele Programării: Proiectarea Algoritmilor, Ed. Univ. Petru Maior, Tg.Mureș, 2000. 2. M. Frențiu, I. Lazăr, S. Motogna, V. Prejmerean, Elaborarea algoritmilor, Ed. Presa Universitara, Clujeana, Cluj-Napoca, 1998. 3. M. Frențiu, I.A. Rus, Metodologia cercetării științifice de informatică, Presa universitară clujeană, 2014. 4. Electronic resources for the specific investigated research subject		

## 9. Evaluation

Type of activity	9.1 Evaluation criteria <sup>4</sup>	9.2 Evaluation methods <sup>5</sup>	9.3 Percentage in the final grade
9.4. Course			



















<sup>3</sup> For example, organisational aspects, recommendations for students, specific aspects relating to the course/seminar, such as inviting experts in the field, etc.

<sup>4</sup> The evaluation criteria must directly reflect the learning outcomes targeted at the level of the degree programme respectively at the level of the subject. More specifically, the learning outcomes set out in the expected learning outcomes are assessed.

<sup>5</sup> Both final evaluation methods and ongoing evaluation strategies should be established.

9.5. Seminar/ laboratory	Project evaluation	The institution tutor assesses the performance of the interns.	80%
		The faculty mentor assesses the activities (based on the Activity Report).	20%
9.6 Minimum standard for passing			
At least grade 5 (from a scale of 1 to 10)			

## 10. SDG labels (Sustainable Development Goals)<sup>6</sup>

	<input type="radio"/>	Sustainable Development Generic Label						
								
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
								No label applies
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Date of entry:  
12/05/2026

Signature of course coordinator

Prof. dr. Camelia Chira

Signature of seminar coordinator

Prof. dr. Camelia Chira

Date of approval in the department:

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Signature of the head of department

Conf. dr. Adrian STERCA

<sup>6</sup> Select a single label which, according to the [Implementation of SDG labels in the academic process](#), best matches the subject. If the subject addresses sustainable development in a generic manner (i.e. by presenting/introducing the general framework of sustainable development, etc.), then the Sustainable Development generic label may be applied. If none of the labels describe the subject, select the last option: "No label applies."