COURSE DESCRIPTION

Applied Artificial Intelligence

Academic year 2026-2027

1. Programme-related data

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

2. Course-related data

2.1. Course title	Applied Artificial Intelligence			Course code	MME8235
2.2. Course coordinator	Lect. dr. Mihoc Tudor Dan				
2.3. Seminar coordinator	Lect. dr. Mihoc Tudor Dan				
2.4. Year of study	2	2.5. Semester	3	2.6. Type of assessment	Colloquium
2.7. Course status	Optional			2.8. Course type	Specialisation subject

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

3.1. Number of hours per week	2	of which: 3.2. course	1	3.3. seminar/ laboratory/ project	0/0/1
3.4. Total of hours in the curriculum	28	of which: 3.5. course	14	3.6. seminar/ laboratory/ project	0/0/14

Time allocation for individual study (IS) and self-taught activities (ST)	**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)	12
Additional research in the library, on subject-specific electronic platforms, and on-site	12
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays (greater than or equal to the total number of hours specified in the course calendar for evaluation tasks)	16
Tutoring (professional guidance)	5
Examinations	2
Other activities [i.e.: two-way communication with the course coordinator/tutor]	0

3.7. Total hours of individual study (IS) and self-taught activities (ST)	47
3.8. Total hours per semester	75
3.9. Number of credits	3

4. Prerequisites (where applicable)

4.1. curriculum-related	Algorithms and Programming, OOP Master programme AI4CI first semester courses
4.2 skills-related	Working knowledge of Python. Working knowledge of standard Python ML/DL libraries (sklearn, pytorch). Understanding of core ML/DL concepts.

5. Specific conditions (where applicable)

5.1. course-related	Projector

5.2. seminar/laboratory-related	Computers

6.1. Competencies resulting from the completion of the degree programme *(as referred to in the curriculum)*[1]

Professional competencies	
Competency code	**Competency**
CP7	Develop software
CP21	Use software libraries
CP35	Creatively use digital technologies
Transversal competencies	
Competency code	**Competency**
CT1	Think analytically
CT2	Apply knowledge of science, technology and engineering
CT4	Solve problems

6.2. Learning outcomes relevant to the degree programme (as referred to in the curriculum)[2]

Learning outcomes targeted by the subject		
Competency code	**Knowledge and comprehension**	**Specific academic skills**
CP28 CP29 CP30 CP31	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.

7. Subject-specific learning outcomes (referred to by each subject coordinator across the range of competencies and learning outcomes at the level of the degree programme)

Knowledge and comprehension
1. Understanding the practical applications of artificial intelligence across different industrial domains.
2. Understanding the main AI, machine learning, and deep learning models and methods used in applied contexts.
3. Understanding the principles of model training, fine tuning, overfitting, performance evaluation, deployment, and integration.
4. Understanding the role of computer vision, natural language processing, sequential data, cloud-based AI services, LLMs, and ethical considerations in applied AI.
Specific academic skills
1. Analysing real-world AI applications and identifying suitable models and methods for specific industrial use cases.

[1] 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.

[2] 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.

2. Designing and implementing an AI solution for a selected practical problem using appropriate tools and libraries.
3. Presenting, documenting, and critically evaluating an applied AI project, including ethical and operational aspects.

8. Contents

8.1. Course	**Teaching and learning methods**	**Remarks[3]**
• Introduction to Applied Artificial Intelligence: overview of AI applications in different industries; ethical considerations and responsible AI practices. • Brief recap: Foundations of Machine Learning/Deep Learning: supervised, unsupervised, and reinforcement learning; classification, regression, forecasting; training, fine tuning and overfitting; performance evaluation of ML/DL models. • Domains: computer vision, natural language processing, sequential data. • AI Deployment and Integration: model deployment strategies; introduction to cloud-based AI services; integrating AI models into applications and systems.	• Interactive exposure • Presentation • Explanation • Practical examples	
Bibliography		
Presentation materials will be distributed.		
8.2. Seminar/ laboratory	Teaching and learning methods	Remarks
• Case Studies and Project Work: analysis of real-world AI applications across industries. • Team project: design and implementation of an AI solution for a specific use case. • Project Presentation and Wrap-Up: final project presentations by student groups. • Reflection on key learnings and future directions in applied AI.	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Bibliography		
Presentation materials will be distributed.		

9. Evaluation

Type of activity	9.1 Evaluation criteria[4]	9.2 Evaluation methods[5]	9.3 Percentage in the final grade

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

[4] 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.

[5] Both final evaluation methods and ongoing evaluation strategies should be established.

9.4. Course	Understand the main concepts related to Applied Artificial Intelligence and demonstrate the ability to design and develop an applied AI solution.	Project work; a project assignment	100%
9.5. Seminar/ laboratory	Apply the acquired concepts in practical activities and demonstrate the ability to document, present, and report the obtained results.	Project evaluation and presentation	
9.6 Minimum standard for passing			
Each student should obtain a minimum grade of 5 for the final grade.			

10. SDG labels (Sustainable Development Goals)[6]

	○	Sustainable Development Generic Label						
								
○	○	○	○	○	○	○	○	✔
								No label applies
○	○	○	○	○	○	○	○	○

Date of entry:
20.05.2026

Signature of course coordinator
Lect. dr. Mihoc Tudor Dan

Signature of seminar coordinator
Lect. dr. Mihoc Tudor Dan

Date of approval in the department:
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Signature of the head of department
Assoc. Prof. dr. Adrian Sterca

[6] 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."*