



UNIVERSITY OF MITROVICA “ISA BOLETINI”

Course Curriculum Model (Syllabus)		
Faculty:	Faculty of Mechanical and Computer Engineering	
Department:	Computer Science and Engineering	
Level:	I	
Code of the course:	205-CSE	
Course:	Fundamentals of Artificial Intelligence	
Course Status:	Elective	(elective)
Semester:	II	(summer)
Number of hours per week:	2+2	
ECTS:	4	
Time / location:		
Year of studies:	I	
Lecturer:	Berat Ujkani	
Assistant:	Shkëmb Abdullahu	
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Tel:		

Content	This course introduces core concepts and methods in Artificial Intelligence (AI): intelligent agents; problem solving via search (uninformed, informed/heuristic, local, and adversarial), constraint satisfaction, knowledge representation and logical reasoning (propositional and first-order logic), planning, uncertainty (probability, Bayesian networks, decision theory), Markov decision processes; and fundamentals of machine learning (decision trees, neural networks, and reinforcement learning). Laboratory sessions emphasize Python implementations and small empirical experiments.
Purpose	The aim of this course is to introduce students to the foundational ideas and methods of modern artificial intelligence and to enhance their ability to formulate challenge, reason under constraints and uncertainty, and design effective computational agents. With a balanced integration of theory and practice lectures, python laboratories, and reproducible mini-experiments, students create rigorous analytical thinking and ethical awareness. By the end of the course, they will be prepared to pursue more advanced AI topics and to contribute meaningfully to entry-level AI projects in academia or industry.

Accessibility	By the end of this course, students will be able to: 1. Clarify the concepts of intelligent agents and challenges that arises in building AI models. 2. Develop heuristic and uninformed searches and design basic admissible heuristics. 3. Apply local and adversarial searches in challenging environments. 4. Formulate and solve constraint satisfaction challenges. 5. Express the knowledge and perform logical reasoning in propositional and first-order logic. 6. Develop basic strategies for agents. 7. Model uncertainty with probability and Bayesian networks. 8. Describe Markov decision processes and the foundation of reinforcement learning. 9. Use machine learning algorithms such as decision trees, support vector machines, and k-Nearest Neighbors and evaluate their performance.	
Program	weeks	Lecture
	First week:	Introduction to AI scope and applications.
	Second week:	Intelligent agents, environments, and problem formulation.
	Third week:	Uninformed search (BFS, DFS, Uniform-Cost).
	Fourth week:	Informed search: Best-First, heuristic design and optimality.
	Fifth week:	Local search (hill-climbing, simulated annealing), overview of meta-heuristics.
	Sixth week:	Adversarial search: minimax, alpha–beta, evaluation heuristics.
	Seventh week:	Constraint satisfaction problems (AC-3, backtracking, variable/value ordering).
	Eighth week:	Knowledge representation; propositional logic, inference, intro to first-order logic.
	Ninth week:	Planning (search-based and rule-based)
	Tenth week:	Uncertainty: probability, basic inference, Bayesian networks.
	Eleventh week:	Inference in Bayesian networks; decision theory.
	Twelfth week:	Markov Decision Processes: policies, policy iteration/value.
	Thirteenth week:	Supervised learning: decision trees; performance metrics, SVM, KNN.
	Fourteenth week:	Neural networks (intro); reinforcement learning.
	Fifteenth week :	Final projects

Literature	Principal literature: - Stuart Russell & Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i> (latest edition), Pearson/Prentice Hall. Recommended Literature: - Poole, David L., and Alan K. Mackworth. <i>Artificial Intelligence: Foundations of Computational Agents</i> (3rd ed.). Cambridge University Press, 2023. https://www.geeksforgeeks.org/ https://scikit-learn.org/stable/																																																				
Teaching methodology	- Lecture - Discussion - Group work - Exercises - Homework - Real world projects																																																				
	Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours) <table><tr><th>Activity</th><th>Hours</th><th>Days/weeks</th><th>Total</th></tr><tr><td>Lectures</td><td>2</td><td>15</td><td>30</td></tr><tr><td>Exercise sessions (with TA)</td><td>2</td><td>15</td><td>30</td></tr><tr><td>Practical work</td><td></td><td></td><td></td></tr><tr><td>Office hours</td><td>1</td><td>15</td><td>15</td></tr><tr><td>Fieldwork</td><td></td><td></td><td></td></tr><tr><td>Midterms, seminars</td><td></td><td></td><td></td></tr><tr><td>Homework</td><td></td><td></td><td></td></tr><tr><td>Self-study</td><td>1</td><td>15</td><td>15</td></tr><tr><td>Final exam preparation</td><td>2</td><td>2</td><td>4</td></tr><tr><td>Time spent in exams</td><td>2</td><td>1</td><td>2</td></tr><tr><td>Projects, presentations, etc</td><td>2</td><td>2</td><td>4</td></tr><tr><td>Total</td><td></td><td></td><td>100</td></tr></table>	Activity	Hours	Days/weeks	Total	Lectures	2	15	30	Exercise sessions (with TA)	2	15	30	Practical work				Office hours	1	15	15	Fieldwork				Midterms, seminars				Homework				Self-study	1	15	15	Final exam preparation	2	2	4	Time spent in exams	2	1	2	Projects, presentations, etc	2	2	4	Total			100
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Evaluation	Teaching methodology: (according to the Statute and Regulation for studies of UMIB)	
	Tests / Colloquia	
	Practical test during exercises	
	Seminary work	
	Interpretation and presentation of artistic creativity and other works	
	Assignments and other courses during the semester	
	Professional activities	
	Others (specify) - Project	50 %
	Final exam	50 %

Essential instructions;

The regular presence of students during course lecturers and exercises is obligatory. All seminar works that need to be submitted in written form are to be provided in printed format. It is obligatory that the visual and the content aspect of the required works is fully respected. Additionally, it is mandatory that all work adhere fully to the language spelling rules and APA style for citing sources.

Further instructions:

The students are required to prepare their seminar works on independent basis. There will be no tolerance for cases where the students have copy and paste materials written by someone else or from the Internet without detailed citation and source. All cases where the source is not cited, are treated as plagiarism and accordingly will be negatively assessed during the final evaluation of the student.

Ethics in teaching:

Active participation of students in lectures
Participation in discussion and comments
Mandatory independent work by utilizing alternative sources of information
Respect for lecture time schedules and no usage of cellular phones during lectures or e
Low tolerance for late arrivals and departures without valid reasons
Distribution of slides and teaching materials by the lecturer.

Deadlines

The deadlines for submission of seminars will be agreed in advance with students;
Students are for to deliver their work within the agreed submission deadline
Failure to arrive at the time when the assignment is explained does not justify the student for not submitting the seminar work.
In case of any travel or envisaged absence, the student has to submit in advance the assigned seminar work.
The student is entitled to request a consultation with the lecturer whenever he/she deems it reasonable and necessary for the performance of his/her work.

Course provider:

Berat Ujkani, PhD

(Signature)