

<b>Obuda University</b> Bánki Donát Faculty of Mechanical and Safety Engineering		Institute of Mechatronics and Vehicle Engineering		
<b>Name and Neptun-code:</b> Artificial Intelligence, BMVAI15BNE		<b>Credits:</b> 3		
<i>Full time</i>				
Subject lecturer: Peter Juma Ochieng				
Prerequisites (with code):		-		
Weekly hours:	Lecture: <b>0</b>	Seminar.:0	Lab. hours: <b>2</b>	Consultation:0
Way of assessment:	Exam and Practical			
<b>Syllabus:</b>				
<p><b>Aim:</b> This course is aimed at enabling students have solid understanding of both the achievements of AI and the theory underlying those achievements. Understand the engineering issues underlying the design of AI systems. Demonstrate a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. Contrast basic issues of knowledge representation and blind and heuristic search, as well as of other topics such as minimax, resolution, etc. that play an important role in AI programs. Describe and evaluate some of the more advanced topics of AI such as Learning, natural language processing, agents and robotics, expert systems, and planning.</p>				
<p><b>Course description:</b> The course provides engineering students with an in-depth introduction to artificial intelligence fundamentals and types of knowledge-based systems. Reasoning and knowledge engineering. Proposition and predicate logic. Strategies for space search such as data and goal driven, and heuristics. Inference in logic, belief networks, decision theory, fuzzy logic and evolutionary techniques, neural networks, robotics.</p>				

<b>Lecture schedule</b>	
<i>Education week</i>	<i>Topic</i>
1.	Introduction to Artificial Intelligence
2.	Intelligent Agents
3.	Searching as a problem-solving technique
4.	Knowledge-Based Agents
5.	First-Order Logic
6.	Knowledge Engineering Automated Reasoning
7.	Handling Uncertainty
8.	Learning and Planning Agents:
9.	Introduction to Reinforcement learning, Natural Language Processing and Voice recognition
10.	Robotic Systems
11.	Practical use case
12.	Midterm
13.	Midterm re-take
<b>Midterm requirements</b>	
<i>Education week</i>	<i>Topic</i>
6	Test 1
13	Test 2
14	Retake Test

The participation is governed by TVSZ III.23.§ (1)-(4).

All main areas of the course are evaluated by tests. The course is to be considered successfully completed if and only if test and project work are successful (at least 50%), as a prerequisite for obtaining a **signature**.

Signature is **denied** if the student cannot justify the absence for the test, has failed to write both tests, failed to submit the project task, or absences exceed the number of classes specified in TVSZ.

**During the semester**, the signature requirements can be **replaced** in the following cases: one of the laboratory tests failed; illness. In this way, only one of the tests can be rewritten.

### Final grade calculation methods

Achieved result	Grade
89%-100%	excellent (5)
76%-88<%	good (4)
63%-75<%	average (3)
51%-62<%	satisfactory (2)
0%-50<%	failed (1)

All matters which are not covered in this document, the Study and Examination Rules and the provisions of the Study Regulations, valid at Óbuda University, prevails.

### Type of exam

Theoretical and Practical test to solve a given task.

### Type of replacement

Retake of the midterm on the last week.

### Programming Environment

The programming environment in the lab will be Python, SWI-Prolog and MATLAB, which can be downloaded for free.

### Course Text Books

1. Russell, S. and Norvig, P. (2010). Artificial Intelligence: A Modern Approach. Third edition. Prentice Hall, ISBN-10: 0136042597, ISBN-13: 978-0136042594.
2. Gonzalez, A. J. and Dankel, D. D. (1993). The Engineering of Knowledge-based Systems. Prentice Hall, ISBN-10: 0132769409, ISBN-13: 978-0132769402.
3. Witten, I. H., Frank, E., and Hall, M. A. (2011). Data Mining: Practical Machine Learning Tools and Techniques 3rd Edition, ISBN-10: 0123748569 | ISBN-13: 978-0123748560.

### Reference Text Books

1. Durkin, J. (1994). Expert Systems: Design and Development. Prentice Hall, New York, NY, ISBN-10: 0023309709, ISBN-13: 978-0023309700.
2. Puppe, F. (2011). Systematic Introduction to Expert Systems: Knowledge Representations and Problem-Solving Methods, Springer, ISBN-10: 3642779735, ISBN-13: 978-3642779732.
3. Mitchell, T. (1997). Machine Learning, McGraw-Hill, ISBN-10: 0070428077, ISBN-13: 978-0070428072.

### Course Journals

1. Machine Learning Journal. Springer. ISSN: 0885-6125.
2. IEEE Transactions on Pattern Analysis and Machine Intelligence. ISSN: 0162-8828.
3. IEEE Transactions on Intelligent Systems. ISSN: 1524-9050.

<b>Reference Journals</b>
1. Thinking & Reasoning journal. ISSN: 1354-6783.
2. Artificial Intelligence. Elsevier. ISSN: 0004-3702.
3. AI Magazine. ISSN: 0738-4602.