**Foundations of artificial intelligence**

2021/22. spring

(Balazs Harangi Ph.D)

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| Period | 4 |
| **Classes/week** | 2 + 0 + 2 |
| **Credit** | 6 |

Requirements for the seminar:

* Attendance (max. 3 missed seminars)
* Achieving at least 60% of the total possible points. You can collect points with:
* 2 mid-term tests,

Exam for final mark:

* written exam in the exam period

Topics:

1. History of Artificial Intelligence, scientific environment (reading: Chapter 1)
2. Concept of agents, structures of agents, rational agent, type of environments (reading: Chapter 2)
3. Solving problem by searching (reading: Section 3.1-3.3)
4. Uninformed search strategies (reading: Section 3.4)
5. Informed/heuristic search strategies, heuristic functions (reading: Section 3.4)
6. Local search algorithms & optimization problems, implementation issues (reading: Section 4.1)
7. Adversarial search
8. game tree, labelling (reading: Section 5.1-5.2)
9. minimax search, alpha-beta pruning, implementation issues (reading: Section 5.3)
10. Constraint satisfaction problem (reading: Chapter 6)
11. CSP implementation issues
12. Logical agents, propositional theorem proving, resolution (reading: Chapter 7)
13. Quantifying uncertainty, probability (reading: Chapter 13)
14. Probabilistic reasoning, Bayesian networks (reading: Chapter 14.)
15. Decision trees (reading: Chapter 18.)
16. Statistical learning (reading: Chapter 20.)
17. Perceptions, neural nets, outlook (reading Chapter 20.)

Course description:

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| 1. week | concept of agents: sensors, actuators, environments, rationality |
| 2. week | state-space representations - typical problems |
| 3. week | state-space representations – alternative representations |
| 4. week | state-space representations - implementation issues |
| 5. week | implementations based on state-space representations |
| 6. week | informed/uninformed tree search in weighted graphs, graph search in weighted graphs |
| 7. week | **MID-TERM TEST 1.** (22th March.) |
| 8. week | game-trees and their labelling, winning strategies |
| 9. week | alpha-beta pruning, game implementations |
| 10. week | constraint satisfaction problems |
| 11. week | Professional week |
| 12. week | classifiers |
| 13. week | neural networks |
| 14. week | **MID-TERM TEST 2.** (9th May.) |
| 14. week | EXTRA MID-TERM TEST (13th May.) |

Consulting hours:

Monday: 2 p.m. – 3 p.m.

Wednesday: 2 p.m. – 3 p.m.

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