

Faculty of Transportation Engineering and Vehicle Engineering

1. Subject name **Reinforcement Learning for vehicle control** Megerősítéses tanulás a járműirányításban 2. Subject name in Hungarian BMEKOKAD017 4. Evaluation type exam grade 5. Credits 3 3. Code 0 (0) Practice 6. Weekly contact 2 (0) Lecture 0 (0) Lab hours 7. Curriculum **PhD Programme** 8. Role Specific course 9. Working hours for fulfilling the requirements of the subject 90 **Contact hours Preparation for** 14 Homework 30 28 seminars 0 Exam preparation 18 **Reading written** 0 **Midterm** materials preparation **10. Department** Department of Control for Transportation and Vehicle Systems

 11. Responsible
 Dr. Bécsi Tamás

 lecturer
 Dr. Pásci Tamás

 12. Lecturers
 Dr Bécsi Tamás, Dr. Aradi Szilárd

13. Prerequisites

14. Description of lectures

Problem solving, placement in machine learning. Heuristics, dynamic and static heuristics. Effectiveness and complexity of algorithms. Curse of dimensions. The Markov decision model, the hidden Markov decision model. Traceability problem. Classic solutions for self-learning systems, case study for routing algorithms. Fundamentals of neural networks, supervised teaching, general network structures. Discrete, continuous and regular tasks. Reverse learning, Imitation learning. Demonstrator and demonstration, policy, loss function and algorithms. Value based learning, Q-learning. The exploration-exploitation dilemma. Variations of Q learning, Deep Q, DQN. Behavior based learning algorithms, Policy gradients, deterministic, and stochastic policy.

15. Description of practices

16. Description of labortory practices

17. Learning outcomes

A. Knowledge B. Skills C. Attitudes D. Autonomy and Responsibility

18. Requirements, way to determine a grade (obtain a signature)

Final exam and three homeworks.

19. Opportunity for repeat/retake and delayed completion

20. Learning materials

Effective date 27 November 2019 This Subject Datasheet is valid for Inactive courses