Budapest University of Technology and Economics
Faculty of Transportation Engineering and Vehicle Engineer

1. Subject name	**Reinforcement Learning for vehicle control**

2. Subject name in Hungarian	Megerősítéses tanulás a járműirányításban

3. Code	**BMEKOKAD017**	4. Evaluation type	exam grade	5. Credits	**3**

6. Weekly contact hours	**2 (0) Lecture**	**0 (0) Practice**	**0 (0) Lab**

7. Curriculum	**PhD Programme**	8. Role	**Specific course**

9. Working hours for fulfilling the requirements of the subject					**90**
Contact hours	28	Preparation for seminars	14	Homework	30
Reading written materials	0	Midterm preparation	0	Exam preparation	18

10. Department	**Department of Control for Transportation and Vehicle Systems**
11. Responsible lecturer	Dr. Bécsi 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