



<b>1. Subject name</b>	<b>Road traffic modelling, simulation and control</b>				
<b>2. Subject name in Hungarian</b>	Közúti járműforgalom modellezése, szimulációja és irányítása				
<b>3. Code</b>	<b>BMEKOKAD016</b>	<b>4. Evaluation type</b>	<b>exam grade</b>	<b>5. Credits</b>	<b>4</b>
<b>6. Weekly contact hours</b>	<b>2 (0) Lecture</b>	<b>0 (0) Practice</b>	<b>2 (0) Lab</b>		
<b>7. Curriculum</b>	<b>PhD Programme</b>	<b>8. Role</b>	<b>Basic course</b>		
<b>9. Working hours for fulfilling the requirements of the subject</b>					<b>76</b>
<b>Contact hours</b>	56	<b>Preparation for seminars</b>	0	<b>Homework</b>	4
<b>Reading written materials</b>	0	<b>Midterm preparation</b>	8	<b>Exam preparation</b>	8
<b>10. Department</b>	<b>Department of Control for Transportation and Vehicle Systems</b>				
<b>11. Responsible lecturer</b>	Dr. Tettamanti Tamás				
<b>12. Lecturers</b>	Dr. Tettamanti Tamás				
<b>13. Prerequisites</b>					
<b>14. Description of lectures</b>	<ul style="list-style-type: none"><li>- Road traffic dynamics and traffic parameters.</li><li>- Functions and architectures of road traffic control systems.</li><li>- Traffic detection technologies: smoothing, filtering, prediction, Recursive Least Square Estimator, Kalman Filter, Moving Horizon Estimation.</li><li>- Urban and freeway traffic control: theories, strategies, tools, software.</li><li>- Urban road traffic modeling and control: Store-and-forward model, LQ and MPC control design.</li><li>- Freeway traffic modeling and control: LWR model, shockwave theory, PID / LQ / nonlinear MPC control design.</li></ul>				
<b>15. Description of practices</b>					
<b>16. Description of laboratory practices</b>	Road traffic modelling and traffic control algorithm realization in Matlab environment.				
<b>17. Learning outcomes</b>	<p>A. Knowledge</p> <ul style="list-style-type: none"><li>• organization and functioning of road traffic control systems; levels and methods of traffic modeling; urban traffic management strategies, tools and software; control systems of public transport and highway systems.</li></ul> <p>B. Skills</p> <ul style="list-style-type: none"><li>• modeling road traffic dynamics; design of traffic measurement and estimation systems.</li></ul> <p>C. Attitudes</p> <ul style="list-style-type: none"><li>• open to research on traffic management and autonomous vehicles.</li></ul> <p>D. Autonomy and Responsibility</p> <ul style="list-style-type: none"><li>• independently design road traffic control.</li></ul>				
<b>18. Requirements, way to determine a grade (obtain a signature)</b>	Completed homework and successful oral exam at the end of semester.				
<b>19. Opportunity for repeat/retake and delayed completion</b>	Possibilities for supplementation takes place in accordance with the applicable study and examination rules.				
<b>20. Learning materials</b>	Tettamanti T., Luspay T. and Varga I.: Road Traffic Modeling and Simulation, Akadémiai Kiadó, Budapest, 2019				
<b>Effective date</b>	27 November 2019	<b>This Subject Datasheet is valid for</b>	Inactive courses		