



1. Subject name	Mathematical methods II.				
2. Subject name in Hungarian	Matematikai módszerek II.				
3. Code	BMEKOKAD007	4. Evaluation type	exam grade	5. Credits	4
6. Weekly contact hours	1 (0) Lecture	0 (0) Practice	0 (0) Lab		
7. Curriculum	PhD Programme	8. Role	Basic course		
9. Working hours for fulfilling the requirements of the subject					120
Contact hours	28	Preparation for seminars	28	Homework	12
Reading written materials	16	Midterm preparation	20	Exam preparation	16
10. Department	Department of Control for Transportation and Vehicle Systems				
11. Responsible lecturer	Dr. Péter Tamás				
12. Lecturers	Dr. Péter Tamás				
13. Prerequisites					
14. Description of lectures					
1. The symbolic calculations. Definition of Computer algebra. Key features of symbolic calculations. The limitations of symbolic calculations. Symbolic and numerical calculations. Mathematical analysis in Maple environment. Graphic applications. 2. Modeling of transport systems. Vehicle dynamics modeling. Mathematical modeling of spatial non-linear swing system. Modeling of road transport systems. Modeling large-scale networks. Automating mathematical modeling for large complex systems. 3. The notable equations and their applications. Euler equation. Euler-Lagrange equation. The Lagrange's equations of the first kind. The Lagrange's equations of the second kind. 4. Designing Optimum Linear Systems. To solve the Riccati equation by Anderson's iteration method. Kalman-Bucy filter by Maple.Design of nonlinear systems. Maple Analysis of Lyapunov Functions					
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)					
The credits are obtained by completing the assignment and by passing the oral exam.					
19. Opportunity for repeat/retake and delayed completion					
20. Learning materials					
Effective date	27 November 2019	This Subject Datasheet is valid for		2023/2024 semester II	