1. Subject name	**Vehicle mechanics fundamentals**				
2. Subject name in Hungarian	Járműmechanikai alapok				
3. Code	**BMEKOGGM713**	4. Evaluation type	**exam grade**	5. Credits	**4**
6. Weekly contact hours	**2 (28) Lecture**	**0 (0) Practice**	**1 (14) Lab**		
7. Curriculum	**Autonomous Vehicle Control Engineering MSc (A)**	8. Role	**Optional (oc) at Autonomous Vehicle Control Engineering MSc (A)**		
9. Working hours for fulfilling the requirements of the subject					**120**
Contact hours	42	Preparation for seminars	0	Homework	20
Reading written materials	18	Midterm preparation	20	Exam preparation	20
10. Department	**Department of Automotive Technologies**				
11. Responsible lecturer	Dr. Zöldy Máté				
12. Lecturers	Vass Sándor				
13. Prerequisites					

14. Description of lectures

Introduction into the basics of vehicle dynamics. Description of motion equation of vehicles. Longitudinal, lateral and vertical dynamics of road vehicles. In the Autonomous Vehicle Control Enginees MSc tematics, the target of the subject is to caught up the students, who do not have vehicle engineer BSc. By the subject the students are able to analyse and modelling the dynamics of a vehicle.
The course starts with the basic definitions of vehicle dynamics, coordinate systems, simple vehicle motions. Starting with tyre dynamics the longitudinal and lateral slip conditions will be presented. The vehicle dynamics are separated to longitudnial, lateral and vertical behaviour. The longitudinal motion consists the acceleration performance and the brake dynamics. In lateral direction the low speed turning, the steady state cornering. As the vertical motion of the vehicle the ride behaviour is demonstrated as well. Motion equation are set up to describe the vehicle behaviour under different circumstances. Vehicle stability aspects.

15. Description of practices

16. Description of labortory practices

In laboratory exercises, the theoretical background is studied through various models and its practical aspects.

17. Learning outcomes

A. Knowledge
- is familiar with the mathematical basis for vehicle dimensional modeling
- is familiar with simple description paradigms, coordinate systems, and descriptions of simple vehicle movements
- is familiar with basic length and transverse vehicle behavior
- knows the basics of vertical vehicle dynamics
- knows wheel models at an introductory level
- knows the limitations of modeling

B. Skills
- is able to understand more complex vehicle dynamics models in later studies
- capable of modeling simple vehicle movements
- is able to systematically view a vehicle dynamics model

C. Attitudes
- is interested in a more detailed description of vehicle movements
- endeavor to embrace technical approaches and thinking
- continually expanding its mathematical and modeling skills

D. Autonomy and Responsibility
- independently fulfils the responsible task

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

The prerequisite for obtaining the signature is the successful completion of the midterm test and individual student work. The final mark is determined by the written exam.

19. Opportunity for repeat/retake and delayed completion

The midterm test can be retried once, tasks must be given accurately.

20. Learning materials

Lecture Notes

Effective date	10 October 2019	**This Subject Datasheet is valid for**	Inactive courses