1. Subject name	**Environment Sensing in the Vehicle Industry**					
2. Subject name in Hungarian	Járműipari környezetérzékelés					
3. Code	**BMEKOKAM656**	4. Evaluation type	exam grade	5. Credits	4	
6. Weekly contact hours	**2 (10) Lecture**	**0 (0) Practice**	**2 (11) Lab**			
7. Curriculum	**Vehicle Engineering MSc (J)**	8. Role	Specialization (sp) at Vehicle Engineering MSc (J)			

9. Working hours for fulfilling the requirements of the subject				**120**	
Contact hours	56	Preparation for seminars	18	Homework	0
Reading written materials	24	Midterm preparation	12	Exam preparation	10

10. Department	**Department of Control for Transportation and Vehicle Systems**
11. Responsible lecturer	Dr. Bécsi Tamás
12. Lecturers	Dr. Bécsi Tamás, Dr. Aradi Szilárd, Törő Olivér
13. Prerequisites	

14. Description of lectures

The course aims the studying of the technologies developed for the tasks of environment sensing of an automated vehicle, the currently available technologies and the corresponding signal processing techniques.
First, the course introduces the inner sensors of the vehicles, such as position, velocity, translation or rotation, basics of their physical operation and their limitations. After this, the main principles of environment sensing, such as ultrasonic, radar, lidar and machine vision systems are introduced through application examples. To strengthen the robustness of the collected data, several typical sensor fusion techniques are also studied.

15. Description of practices

16. Description of labortory practices

During the laboratory courses of the subject, The main goal is the software implementation of the knowledge and methods learned during the lecture and the examination of the known algorithms .

17. Learning outcomes

A. Knowledge
- is familiar with the sensors for measuring vehicle status, their operating principles
- is familiar with the possibilities and limitations of environmental sensors used today (Radar, Lidar, Ultrasound, Camera Systems)
- is familiar with the sensory fusion techniques used in environmental sensing
- is familiar with the methods of processing the data of environmental sensors

B. Skills
- can interpret the data of different sensors
- is able to design an algorithm for simple determination of the environmental situation based on sensor data
- is able to select an appropriate sensor architecture for the implementation of a designated driving support / autonomous vehicle function

C. Attitudes
- is interested in the latest developments of automotive sensors
- is interested in the algorithmization aspect of the sensor information processing tasks

D. Autonomy and Responsibility
- Being able to work in a team responsibly to design an autonomous vehicle function

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

Final exam can be taken in case the two midsemester exams are succesful

19. Opportunity for repeat/retake and delayed completion

One exam can be retried at the end of the semester

20. Learning materials	
Lecture Notes	
Effective date	10 October 2019

		This Subject Datasheet is valid for	Inactive courses