

1. Subject name	Automotive network and communication systems				
2. Subject name in Hungarian	Automatizált járművek kommunikációs rendszerei				
3. Code	BMEKOGGM709	4. Evaluation type	mid-term grade	5. Credits	4
6. Weekly contact hours	2 (28) Lecture 0 (0) Practice 2 (28) Lab				
7. Curriculum	Autonomous Vehicle Control Engineering MSc (A)	8. Role	Mandatory (mc) at Autonomous Vehicle Control Engineering MSc (A)		
9. Working hours for fulfilling the requirements of the subject 120					
Contact hours	56	Preparation for seminars	10	Homework	20
Reading written materials	34	Midterm preparation	0	Exam preparation	0
10. Department	Department of Automotive Technologies				
11. Responsible lecturer	Dr. Szalay Zsolt				
12. Lecturers	Dr. Árpád Török, Dr. Zsombor Pethő, Dr. László Bokor (BME HIT), Tivadar Jakab (BME HIT)				
13. Prerequisites					
14. Description of lectures					
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The aim of the course is to introduce the communication systems of classic and highly automated vehicles. ECU level communication, and in-vehicle communication protocols like CAN, LIN, MOST, FlexRay and Automotive Ethernet. Intervehicle communication, V2X. Communication protocols. Automotive cybersecurity issues. Electromagnetic compatibility. Testing and validation of communication systems. Vehicle diagnostics. Intelligent transport systems, implementation. Computer network basics, protocols. Introduction to vehicle communication (V2X communication). Vehicle to vehicle communication (V2V), vehicle to infrastructure communication (V2I). V2X architectures and protocols. Standard V2X security and privacy. Electronic Control Units (ECUs) and ECU level communication (UART, SPI, I2C). Automotive invehicle communication protocols and their applications (CAN, LIN, FlexRay, MOST, Automotive Ethernet) Cybersecurity of in-vehicle communication systems. Electromagnetic compatibility of communication systems. Diagnostic capabilities of communication systems. Testing and validation of vehicle communication systems.

15. Description of practices

16. Description of labortory practices

The lab enables the practical implementation of individual student work. Some of the systems presented in the presentation are also presented in practice.

17. Learning outcomes

A. Knowledge

- Knows the automotive communication systems,
- knows the communication technologies of the automotive industry,
- is familiar with the communication security issues of automotive systems,
- knows electromagnetic compatibility issues of communication systems, their testing and validation.

B. Skills

- Is able to use in-vehicle communication protocols,
- is capable of designing appropriate communication interfaces,
- can select a protocol for a particular autonomous vehicle function.
- C. Attitudes
 - Responsive to understanding new communication solutions.
- D. Autonomy and Responsibility

• Takes responsibility of the work done.

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

Successful completion of 2 midterm exams and laboratories and submission of the laboratory assignment.

19. Opportunity for repeat/retake and delayed completion

Delayed completion of individual homework.

20. Learning materials

Slides and lecture notes.

Effective date 10 October 2019 This Subject Datasheet is valid for 2024/2025 semester II