

**Budapest University of Technology and Economics
Faculty of Transportation Engineering and
Vehicle Engineering**

**Faculty's recommended elective subjects on
the Bachelor programmes**

List and subject descriptions

Valid from September 2025

Faculty's recommended elective subjects on the Bachelor programmes

Subject name	Subject code	Language
Accident and malicious intervention analysis in the automotive industry	BMEKOGJBsM8008-00	HU EN
Air Traffic Control	BMEKORHBsM8007-00	HU EN
Aircraft maintenance, repair, and overhaul	BMEKORHBsM8003-00	HU EN
Aircrafts	BMEKORHBsM8009-00	HU EN
Airworthiness requirements	BMEKORHBsM8004-00	HU EN
Automotive network and communication systems	BMEKOGJBsM8011-00	EN
Aviation incidents and their investigations	BMEKORHBsM8008-00	HU EN
Detailed maintenance process procedure	BMEKORHBsM8011-00	HU EN
Environmental awareness in aviation	BMEKORHBsM8002-00	HU EN
Introduction to Computational Fluid Dynamics (CFD)	BMEKORHBsM8005-00	HU EN
Introduction to Matlab programming	BMEKOKJBsM8019-00	HU EN
Modern automotive products and development methods	BMEKOKJBsM8007-00	HU EN
Passenger transportation systems	BMEKOKKMSK1004-00	HU EN
Reinforcement learning in vehicle control	BMEKOKJBsM8011-00	HU EN
Road safety, legislative environment, human factors	BMEKOGJBsM8005-00	HU EN
Selected topics from the advanced material sciences	BMEKOGJBsM8007-00	HU EN
Smart city	BMEKOKKMSK2A01-00	EN
Strategic policy instruments in transportation	BMEKOKKMSK2C03-00	HU EN
Sustainable aviation	BMEKORHBsM8006-00	HU EN
Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 1.	BMEKOKKBsM8001-00	EN
Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 2.	BMEKOKKBsM8002-00	EN
Transport Infrastructure and Regional Development	BMEKOKKBsM8003-00	EN
Transport infrastructure management	BMEKOKKMSK2C01-00	HU EN
Vehicle maintenance	BMEKOGJBsM8009-00	HU EN

Subject description explanation

1. Subject name	official name of the subject
2. Subject name in Hungarian	official name of the subject in Hungarian
3. Programme	related programmes: k – transportation eng., j – vehicle engineering, l – logistics engineering, p – professional pilot
4. Subject code	Neptun code of the subject
5. Restrictions	special subject registration rules for selected study programmes
6. Credits	credit value of the subject
7. Evaluation type	type of academic performance assessment, e - exam grade; m - mid-term grade; s - signature
8. Nature	nature of teaching
9. Weekly contact hours	number of lessons for students by lecture, practice and lab
10. Language	language of teaching
11. SDG	learning outcomes' contribution to the EU/UN sustainable development goals
12. Working hours for fulfilling the requirements of the subject	contact hours – personal appearance at classes in a university preparation for seminars – preparation at home for the classes homework – preparation of homework and other assignments for the classes reading written materials – reviewing and understanding the taken lessons at home midterm preparation – recommended preparation time at home for the midterm test during the semester exam preparation – recommended preparation time at home for the exam
13. Organisational unit in charge	name of the organisational unit in charge of the subject
14. Subject coordinator and its position	name and position of the subject coordinator
15. Email address	email address of the subject coordinator
16. ... organisational unit	name of the organisational unit for the subject coordinator
17. Instructors	name of the subject's instructor(s)
18. Indicative prerequisites	predefined criteria for registering the subject
19. Purpose	subject's role and purpose in the training programme
20. Programme of lectures	detailed content of the lecture course
21. Programme of practices	detailed content of the practice course
22. Programme of laboratories	detailed content of the laboratory course
23. Learning outcomes	results to achieve at the end of the learning process, grouped by competences (lower case), furthermore their link to the training programme's learning outcomes (upper case)
24. Midterm assessments	name and code of assessments in the study period, their share in the final grade, and the evaluated learning outcomes
25. Exams	a name and code of assessments in the exam period, their share in the final grade, and the evaluated learning outcomes
26. Criteria to obtain a signature / midterm grade	criteria that shall be met to obtain the signature / midterm grade from the subject
27. Grading rules	rules of grading in share (%) of the summarised results of assessments
28. Attendance and participation requirements	derogations from the main rule laid down by the Code of Studies
29. Retake and delayed completion	requirements for passing the subject, aspects of performance evaluation, way to determine a grade (obtain a signature)
30. Consultation	consultation opportunities offered by the instructor(s)
31. Learning materials	notes, textbooks, suggested literature, recommended learning support materials in printed or electronic form
32. Start of validity for the subject description	start of validity for the information laid down by the subject description



1. Subject name	Accident and malicious intervention analysis in the automotive industry				
2. Subject name in Hungarian	Balesetek és rosszindulatú beavatkozások elemzése a járműiparban	3. Programme	BSc_MSc		
4. Subject code	BMEKOGJBsM8008-00	5. Restrictions	-		
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	10 hours	Homework	0 hours
Reading written materials	20 hours	Midterm preparation	32 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Automotive Technologies				
14. Subject coordinator and its position	Dr. Török Árpád senior research fellow	15. Email address	torok.arpad@kjk.bme.hu		
16. ...organisational unit	Department of Automotive Technologies				
17. Instructor(s)	Dr. Török Árpád				
18. Indicative prerequisites	---				
19. Purpose	Understanding the factors affecting the safety and security of automotive systems and reviewing the design and testing considerations				
20. Programme of lectures	<ol style="list-style-type: none"> 1. Introduction of safety and security theory in the automotive industry 2. System architecture of the state of the art road transport system 3. Risk factors, attack and perpetrator profiles 4. System of protection, passive and active safety I. 5. System of protection, passive and active safety II. 6. Standards and regulations 7. General models of testing 8. Evaluating safety and security risks 9. Popular safety and security models 10. Model evaluation 11. General strategies 12. Demonstration 13. Test. 14. Test retake. 				
21. Programme of practices	-				
22. Programme of laboratories	-				
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	<p>The student</p> <p>a) knowledge (t)</p> <ol style="list-style-type: none"> 1. has a basic understanding of the concepts used in the development and testing process and general safety/security principles. 2. knows the background of vehicle and functional safety: fundamentals and modern contexts, key subsystems and challenges in the field of safety/security. 3. understands the role of the forensic field in the analysis of incidents and events and knows the legal implications. 4. understands the behaviour of vehicles at theoretical and practical level in different circumstances. 				

5. knows the techniques of modelling attacks and accidental incidents, event chain construction using evidence and physics.
6. knows the basics of creating predictive or explanatory models of attack scenarios.
7. knows the importance of data recording and statistical analysis: proficiency in data collection techniques, interpretation and statistical tools.

b) skills (k)

1. is able to effectively analyse defence, accident, failure data, attack models and vehicle dynamics data.
2. applies key analytical methods and statistical tools to draw conclusions from the data.
3. applies FMEA and fault tree analysis to identify risks and propose mitigation strategies.
4. reconstructs attack/incident scenarios based on limited and fragmented evidence.
5. operates software and tools for incident analysis, data capture and statistical evaluation.
6. communicates findings in technical reports and presentations.

c) attitude (a)

1. consistently strives to perform at their highest capability, maintaining precision and error-free workmanship, is committed to adhering to safety regulations and fostering collaborative relationships with colleagues.

d) autonomy and responsibility (o)

1. feels a strong sense of responsibility to set an example for their peers through the quality of the performed work and adherence to ethical standards, conscientiously applying the knowledge acquired during the course.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH1	1. 50%	1. t1-7,k1-6,a1,o1
2. midterm test	2. ZH2	2. 50%	2. t1-7,k1-6,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Passing the midterm tests

28. Attendance and participation requirements

According to TVSZ

29. Retake and delayed completion

The midterm tests can be retaken twice.

30. Consultation

Every lecture

31. Learning materials

Course bulletins available in moodle.

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

0-<50%: fail (1),
 50-<62%: pass (2),
 62-<75%: satisfactory (3),
 75-<87%: good (4),
 87-100%: excellent (5).



1. Subject name	Air Traffic Control				
2. Subject name in Hungarian	Légiforgalmi irányítás			3. Programme	BSc_MSc
4. Subject code	BMEKORHBsM8007-00	5. Restrictions		except for students on ATM spec, MSc in Transportation	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	9 hours	Homework	0 hours
Reading written materials	27 hours	Midterm preparation	26 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Rohács Dániel associate professor	15. Email address	rohacs.daniel@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Dr. Roács Dániel, Gál István				
18. Indicative prerequisites	---				

19. Purpose

The student will acquire knowledge of the operation of air traffic control. They will have a detailed knowledge of ATC types, tasks, airspaces and their elements, as well as the main challenges.

20. Programme of lectures

TRAFFIC DATA - Traffic and statistical data from air traffic control. Types of forecasts, forecasting methods.

SUBSIDIES OF AIR CONTROL - History of air traffic control. Elements of air traffic control. Airport traffic control (TWR). Approach control (APP). Area control (ACC).

BASIC AIRSPACE TYPES AND PLACES - Concept of airspace. Classification of airspace. Elements of airspace. Hungarian airspace. Sectorisation. Special airspaces.

MODERN AIR CONTROL PROCEDURES - Limitations of previous procedures. National and European specificities. Introduction of functional airspace blocks (FABs). Flexible use of airspace (FUA). Free use of airspace. HUFRA (Hungarian Free Route Airspace)

SUPPORT SYSTEMS - Air traffic controllers' tasks, division of labour. Separation. Dangerous situations. Short and medium range conflict detection (STCA and MTCA). Proximity warning (MSAW and APW).

HUMAN ACTIVITIES IN AIR FORCE MANAGEMENT - Minimum capabilities and knowledge base. Methods of assessing skills, FEAST test. Psychological factors. Health factors. Human factors impact.

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows and understands the basic processes and necessities of air traffic flow management
2. knows the system of traffic management and sub-processes, related methods and technologies and their capabilities
3. gains knowledge of the main areas of current research and specific research

b) skills (k)

1. can easily and quickly acquire deeper, more specific knowledge of ATM activities

c) attitude (a)

1. strives for precise, aesthetic, clear and transparent documentation
2. is interested, responsive, meeting deadlines

d) autonomy and responsibility (o)

1. is able to produce documentation independently
2. understands the importance of their work and the consequences of errors

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH	1. 100%	1. t1-3,k1,a1-2,o1-2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

pass the final examination with at least 50% of the marks

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Retake exam possible according to the general rules of BME.

30. Consultation

at a time and in a form agreed with the lecturers

31. Learning materials

Supplementary materials published within the scope of the subject
Articles

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 80-100%
Good 70-79%
Satisfactory 60-69%
Pass 50-59%
Fail 0-49%



1. Subject name		Aircraft maintenance, repair, and overhaul			
2. Subject name in Hungarian		Légijárművek karbantartása, javítása és nagyjavítása	3. Programme		BSc_MSc
4. Subject code		BMEKORHBsM8003-00	5. Restrictions		-
6. Credits		3	7. Evaluation type		m
9. Weekly contact hours		1 lecture	0 practice	1 laboratory	8. Nature contact lessons
10. Language		HU EN			
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals		 			
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours		28 hours	Preparation for lessons		17 hours
Homework		24 hours		Reading written materials	
21 hours		Midterm preparation		0 hours	
0 hours		Exam preparation		0 hours	
13. Organisational unit in charge		Department of Aeronautics and Naval Architecture			
14. Subject coordinator and its position		Dr. Rohács Dániel associate professor	15. Email address		rohacs.daniel@kjk.bme.hu
16. ...organisational unit		Department of Aeronautics and Naval Architecture			
17. Instructor(s)		Dr. Rohács Dániel, Gál István			
18. Indicative prerequisites		---			
19. Purpose					
Introduction to procedures, processes, methods and regulations related to aircraft maintenance, repair and overhaul.					
20. Programme of lectures					
<ol style="list-style-type: none"> 1. Introduction to MRO Operations (Overview of MRO: Line, base, and depot maintenance. Regulatory frameworks: EASA Part 145, FAA 14 CFR Part 43. Roles and responsibilities in MRO operations.) 2. Maintenance Planning and Scheduling (Maintenance program development: MSG-3 methodology. Maintenance checks: A-checks to D-checks. Reliability-centered maintenance (RCM).) 3. Aircraft Maintenance Manuals and Documentation (Introduction to Aircraft Maintenance Manuals (AMM), Structural Repair Manuals (SRM), and Illustrated Parts Catalogs (IPC). Technical records management and compliance. Digital maintenance tracking systems.) 4. Human Factors and Safety in Maintenance (Principles of Human Factors in maintenance (e.g., fatigue, communication, teamwork. Safety Management Systems (SMS) and incident reporting. Human error case studies and lessons learned.) 5. Non-Destructive Testing (NDT) in MRO (Introduction to NDT methods: Ultrasonic, radiographic, eddy current, and magnetic particle inspection. Applications of NDT in structural and engine inspections. Advances in NDT technology.) 6. Corrosion Control and Structural Integrity (Common types of corrosion affecting aircraft structures. Corrosion prevention, detection, and repair techniques. Aging aircraft management and fatigue analysis.) 7. Avionics and Electrical Systems Maintenance (Overview of avionics systems and their role in modern aircraft. Electrical Wiring Interconnection Systems (EWIS) maintenance. Fault diagnosis and troubleshooting of avionics systems.) 8. Engine Maintenance and Overhaul (Maintenance of different engine types (turbofan, turboprop, and piston. Engine condition monitoring (ECM) and performance trend analysis. Procedures and challenges in engine overhaul.) 9. Tooling and Ground Support Equipment (Specialized tools for MRO tasks. Calibration and maintenance of tools. Ground support equipment (GSE) and its role in MRO operations.) 10. Emerging Technologies in MRO (Predictive maintenance using AI and IoT. Drones and robotics in aircraft inspections. Additive manufacturing (3D printing) for spare parts.) 11. Quality Assurance and Compliance (MRO quality assurance processes and audits. Aircraft inspection standards and best practices. Ensuring compliance with regulatory requirements.) 12. MRO Business and Industry Trends (Economic aspects of MRO: Cost management and optimization. Supply chain and inventory challenges. Trends in outsourcing, partnerships, and sustainability in MRO.) 					
21. Programme of practices					
-					
22. Programme of laboratories					
Access, opening, reading, revising, understanding and analysing of documents about aircraft maintenance, repair and overhaul in printed and electronic formats.					

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows and understands the major components, steps and processes involved in the maintenance, repair and overhaul of aircraft.

b) skills (k)

1. is able to understand the processes involved in aircraft maintenance, repair and overhaul.

c) attitude (a)

1. shall endeavour to maximise the knowledge and skills to the highest possible standard, in the shortest possible time, and to acquire in-depth knowledge capable of independent work.
2. shall cooperate with the teacher and fellow students in the development of the knowledge.
3. expands the knowledge through continuous independent learning to complement the knowledge acquired in the classroom.

d) autonomy and responsibility (o)

1. has the responsibility to set an example to the peers by the quality of the work and by respecting ethical standards.
2. shall apply the knowledge acquired in the course of the subject with responsibility, having regard to its scope.
3. is open to well-founded critical comments and uses them constructively.
4. accepts the framework of collaboration and is able to work independently or as part of a team, depending on the situation.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework	1. HF	1. 100%	1. t1,k1,a1-3,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Participation in the laboratory practices and completing the homework according to the specification.

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The participation in laboratory practices is compulsory. The replacement and last possibility for completing the task is according to the Code of Studies.

27. Grading rules

Excellent 88-100%
 Good 75-87%
 Satisfactory 63-74%
 Pass 50-62%
 Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, materials and documentations in printed and/or electronic version given by the lecturer.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Aircrafts				
2. Subject name in Hungarian	Légijárművek			3. Programme	BSc_MSc
4. Subject code	BMEKORHBsM8009-00		5. Restrictions	except for student on airtransport/ATM/aircrafts/aerospace spec, BSc and MSc in Transportation, Vehicle	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	20 hours	Homework	0 hours
Reading written materials	22 hours	Midterm preparation	20 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Rohács Dániel associate professor	15. Email address	rohacs.daniel@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Gál István				
18. Indicative prerequisites	---				
19. Purpose	The student will acquire knowledge of the basic elements, systems and solutions of aircraft and aviation.				
20. Programme of lectures	History, types and operation of aircraft (civil and military), trends in development Flight fundamentals (aerodynamics and flight mechanics) Aircraft structure and systems Propulsion and engines Safety, environmental and aviation regulations Aircraft production, operation, maintenance and repair Air transport Air traffic control Airports and air traffic services				
21. Programme of practices	-				
22. Programme of laboratories	-				
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	The student a) knowledge (t) 1. knows the purposes for which aircraft are used, the types of aircraft, their operation and their expected evolution 2. knows the processes, infrastructure, tools, equipment and activities related to the operation and management of aircraft b) skills (k) 1. is able to formulate a professional opinion on the most relevant aspects of aircraft operations on the basis of the knowledge acquired c) attitude (a) 1. has vision, systems thinking, teamwork, planning, prioritising and documenting tasks accurately 2. complies with the safety rules and regulations to which he/she is familiar 3. respects sustainability and the environment d) autonomy and responsibility (o)				

1. can represent safety, technical and sustainability aspects in decision-making situations

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm exam that can be substituted by a submitted individual assignment.	1. ZH or optionally BF	1. 100%	1. t1-2,k1,a1-3,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

pass the final examination with at least 50% of the mark or acceptance of the assignment to be submitted

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Late completion of summative assessments is allowed for a second time in the late completion period upon payment of a special charge.

27. Grading rules

Excellent 80-100%
 Good 70-79%
 Satisfactory 60-69%
 Pass 50-59%
 Fail 0-49%

30. Consultation

at a time and in a form agreed with the lecturers



31. Learning materials

Lecture notes by the Department

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Airworthiness requirements				
2. Subject name in Hungarian	Légügyi előírások			3. Programme	BSc
4. Subject code	BMEKORHBsM8004-00	5. Restrictions		only for students in cooperative MRO spec	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	0 practice	1 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals	 				
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	17 hours	Homework	0 hours
Reading written materials	21 hours	Midterm preparation	24 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Veress Árpád associate professor	15. Email address	veress.arpad@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Nahóczky Balázs, Pásztor Zoltán, Kanti Dominik Máté, Maresch Norbert				
18. Indicative prerequisites	---				
19. Purpose					
To study, know and learn the rules and regulations used in aviation.					
20. Programme of lectures					
System and the content of the airworthiness requirements. Regulations for aircraft design, production, repair and maintenance; Basic Regulations /(EU)2018/1139 /; Implementing Regulations: Initial Airworthiness /(EU)748/2012/ Part 21 "CS-25" (Certification Specification for Large Aeroplanes); Additional airworthiness specifications /(EU)2015/640/; Part-26 CS-26; Continuing Airworthiness /(EU)1321/2014/, Part -M, Part-145, Part-66, Part-147, Part-T), Airport incl. Security Requirements (EK 300/2008), Special military requirements for air force applications (EMAR).					
21. Programme of practices					
-					
22. Programme of laboratories					
Access, opening, reading, revising, understanding, analysing and developing (if it is relevant) of documents about airworthiness requirements in printed and electronic formats.					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. knows and understands the system, processes and the methodology of the airworthiness requirements for having certificate of airworthiness.					
b) skills (k)					
1. can complete and develop tasks, processes and procedures in case of need in conjunction with airworthiness requirements by using available and relevant specifications.					
c) attitude (a)					
1. aims to complete the studies at the highest level, under the shortest time, by providing the knowledge and capacity at the best to obtain knowledge for deep and independent professional work.					
2. cooperates with professors and mates during the studies.					
3. continuously increases the knowledge independently by having information from the external literature to complete the studies given by the lectures.					
d) autonomy and responsibility (o)					
1. takes responsibility for guiding mates by the quality of the work and by keeping ethic norms.					

2. takes responsibility for applying the knowledge in line with the studied conditions, limitations and constraints.
3. can friendly accept the well-established constructive criticism and can utilize that in future.
4. can accept the form of the cooperation; can work alone or in a team member depends on the actual situation.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test 1	1. ZH 1.	1. 50%	1. t1,k1,a1-3,o1-4
2. Midterm test 2	2. ZH 2.	1. 50%	2. t1,k1,a1-3,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

successful (min. 50%) completion of the midterm tests

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The participation in laboratory practices is compulsory. The replacement and last possibility for completing the task is according to the Code of Studies.

27. Grading rules

Excellent 88-100%
 Good 75-87%
 Satisfactory 63-74%
 Pass 50-62%
 Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, materials and documentations in printed and/or electronic version given by the lecturer.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Automotive network and communication systems				
2. Subject name in Hungarian	Autóipari hálózati és kommunikációs rendszerek	3. Programme	BSc		
4. Subject code	BMEKOGJBsM8011-00	5. Restrictions	-		
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	22 hours	Homework	0 hours
Reading written materials	20 hours	Midterm preparation	20 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Automotive Technologies				
14. Subject coordinator and its position	Dr. Pethő Zsombor research fellow	15. Email address	petho.zsombor@kjk.bme.hu		
16. ...organisational unit	Department of Automotive Technologies				
17. Instructor(s)	Dr. Szalay Zsolt, Dr. Török Árpád, Dr. Pethő Zsombor, Kazár Tamás Márton				
18. Indicative prerequisites	---				
19. Purpose	<p>The course aims to provide comprehensive knowledge of vehicle communication systems, focusing on the communication technologies of both conventional and highly automated vehicles. The course provides the necessary theoretical foundations and practical ski</p>				
20. Programme of lectures	<p>Introductory course - Intelligent Transportation System Introduction to vehicle communication V2X nowadays: standardization organizations and activities V2X architectures Standard V2X network and transport solutions Standard V2X security and privacy protection In-vehicle network communication protocols ECUs operation and structure, ECU-level communication In-vehicle network cybersecurity In-vehicle network diagnostics Functional Safety</p>				
21. Programme of practices	-				
22. Programme of laboratories	-				
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	<p>The student</p> <p>a) knowledge (t)</p> <ol style="list-style-type: none"> 1. Understands network communication and its configuration for V2X and in-vehicle systems. 2. Knows about analyzing and interpreting V2X and in-vehicle communication protocol data. 3. Gets familiar with developing basic applications for V2X communication systems. 4. Knows about implementing cybersecurity measures in in-vehicle networks. 5. Understands how to conduct OBD and UDS diagnostics and troubleshooting for in-vehicle communication systems. 6. Gains proficiency with tools and software commonly used in automotive industry. <p>b) skills (k)</p> <ol style="list-style-type: none"> 1. Is able to apply in-vehicle communication protocols. 				

2. Is able to design appropriate communication interfaces.
3. Is able to select the appropriate protocol for a specific autonomous vehicle function.

c) attitude (a)

1. Is open to understanding new communication solutions.

d) autonomy and responsibility (o)

1. takes responsibility for the work done

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test	1. ZH1	1. 50%	1. t1-t6,k1-k3,a1,o1
2. Midterm test	2. ZH2	2. 50%	2. t1-t6,k1-k3,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Successful completion of both midterm tests.

28. Attendance and participation requirements

According to CoS.

29. Retake and delayed completion

In the delayed completion week, it is possible to retake both midterm tests.

27. Grading rules

0%-49%: fail
 50%-61%: pass
 62-74%: satisfactory
 75%-87%: good
 88%-100%: excellent

30. Consultation

After the lectures and in specified time slots previously agreed appointment.



31. Learning materials

Lupini, Christopher A. In-Vehicle Networking Technology for 2010 and. s.l. : SAE International, 2010
 Douss, A. B. C., Abassi, R., & Sauveron, D. (2023). State-of-the-art survey of in-vehicle protocols and automotive Ethernet security and vulnerabilities.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name		Aviation incidents and their investigations			
2. Subject name in Hungarian		Légijármű események, balesetek kivizsgálása	3. Programme		BSc_MSc
4. Subject code		BMEKORHBsM8008-00	5. Restrictions		-
6. Credits		3	7. Evaluation type		m
9. Weekly contact hours		2 lecture	0 practice	0 laboratory	10. Language
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals		 			
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours		28 hours	Preparation for lessons		22 hours
Reading written materials		11 hours	Midterm preparation		0 hours
13. Organisational unit in charge		Department of Aeronautics and Naval Architecture			
14. Subject coordinator and its position		Dr. Rohács Dániel associate professor	15. Email address		rohacs.daniel@kjk.bme.hu
16. ...organisational unit		Department of Aeronautics and Naval Architecture			
17. Instructor(s)		Gál István			
18. Indicative prerequisites		---			

19. Purpose

Fundamentals of aircraft accident and incident investigation, basic investigation procedures, case studies, and experiences in aircraft design and development.

20. Programme of lectures

- Week 1: Introduction to aviation incidents and investigations
- Definition of incidents and accidents
 - The importance of safety and investigation in aviation
 - Regulatory frameworks: EASA, FAA, NTSB
 - Introduction to accident investigation authorities worldwide
- Week 2: Fundamentals of aircraft safety and human factors
- The concept of aviation safety management
 - The Swiss cheese model of accident causation
- Week 3: Aircraft systems and their role in accidents
- Overview of key aircraft systems (engines, avionics, hydraulics, etc.)
 - How system failures contribute to aviation incidents
 - Case studies of system-related failures
- Week 4: Accident scene management and investigation techniques
- Securing the scene and collecting evidence
 - Recovery of black boxes (FDR and CVR) and data analysis
 - Role of investigators in aviation accidents in his investigation
- Week 5: Meteorological factors in aviation accidents
- Adverse weather and its impact on aviation (icing, wind shear, turbulence)
 - Case studies of weather-related aviation accidents
- Week 6: Air traffic control (ATC) and its role in aviation incidents
- Air traffic control tasks and procedures
 - Mid-air collisions and air traffic control errors
 - Case studies of air traffic control-related aviation incidents
- Week 7: Human error and crew resource management
- The role of pilots and crew in aviation safety
 - CRM principles and training
 - Case studies of human error

Week 8: Structural defects and aircraft design defects

- Metal fatigue, composite defects and manufacturing defects
- Notable aircraft structural defects and lessons learned

Week 9: Terrorism, sabotage and security incidents

- Unlawful interference in aviation
- Famous aviation incidents related to terrorism
- Security measures in aviation

Weeks 10-11: Case study analysis and lessons learned

- In-depth analysis of famous aviation accidents (e.g. Tenerife disaster, Air France 447, United 232).
- Group discussion and findings

Weeks 12-14: Final project and summary

- Student presentations on selected aviation accidents
- Discussion on future trends in aviation safety
- Concluding remarks and key lessons learned

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows aviation incidents, the justification for their investigation, the means and methods of investigation
2. knows vehicle, infrastructure and service factors associated with aviation incidents and their relationship to the incident

b) skills (k)

1. is able to interpret and compile case studies using the knowledge
2. is able to visually communicate ideas and plans clearly to others.

c) attitude (a)

1. works in a precise, aesthetic, clear and concise manner.
2. is interested, receptive, able to meet deadlines.

d) autonomy and responsibility (o)

1. is able to prepare documentation independently,
2. is aware of the importance of the work and the consequences of errors.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework	1. HF	1. 100%	1. t1-2,k1-2,a1-2,o1-2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

submission and presentation of task on time

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Late completion of summative assessments is allowed for a second time in the late completion period upon payment of a special charge.

27. Grading rules

Excellent 88-100%
 Good 75-87%
 Satisfactory 63-74%
 Pass 50-62%
 Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher



31. Learning materials

Lecture notes, materials and documentations in printed and/or electronic version given by the lecturer.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Detailed maintenance process procedure				
2. Subject name in Hungarian	Karbantartási folyamat eljárásrendszere			3. Programme	BSc
4. Subject code	BMEKORHBsM8011-00	5. Restrictions	only for students in cooperative MRO spec		
6. Credits	6	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	2 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals	 				
12. Working hours for fulfilling the requirements of the subject					180 hours
Contact hours	56 hours	Preparation for lessons	34 hours	Homework	0 hours
Reading written materials	44 hours	Midterm preparation	46 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Veress Árpád associate professor	15. Email address	veress.arpad@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Bartalos András, Pásztor Zoltán, Kanti Dominik Máté, Maresch Norbert				
18. Indicative prerequisites	BMEKORHBsM8004-00 Légügyi előírások recommended core, ---, ---				
19. Purpose	The aim of the course is to provide students with a comprehensive understanding of the processes, procedures, and methods related to aircraft operation, maintenance, and repair, as well as to enable them to independently apply, interpret, and, when necessary				
20. Programme of lectures	Method for Scheduled Maintenance Development - MSG-3 Maintenance Review Board - MRB Maintenance Planning Document - MPD Operator's Aircraft Maintenance Program - OAMP				
21. Programme of practices	-				
22. Programme of laboratories	Accessing, opening, reading, revising, understanding, analysing, developing (if it is relevant) and filling (in case of need) of documents about maintenance process procedures in printed and electronic formats.				
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	The student a) knowledge (t) 1. knows and understands the system, processes, procedures, methods and their conditions for applications including the corresponding documentations of aircraft maintenance and repair. b) skills (k) 1. can understand, apply, use and develop (in case of interest) processes, procedures and methods of aircraft maintenance including the relevant documentations. c) attitude (a) 1. aims to complete the studies at the highest level, under the shortest time, by providing the knowledge and capacity at the best to obtain knowledge for deep and independent professional work. 2. cooperates with professors and mates during the studies. 3. continuously increases the knowledge independently by having information from the external literature to complete the studies given by the lectures. d) autonomy and responsibility (o) 1. takes responsibility for guiding mates by the quality of the work and by keeping ethic norms. 2. takes responsibility for applying the knowledge in line with the studied conditions, limitations and constraints. 3. can friendly accept the well-established constructive criticism and can utilize that in future.				

4. can accept the form of the cooperation; he/she can work alone or in a team member depends on the actual situation.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test 1	1. ZH 1.	1. 50%	1. t1,k1,a1-3,o1-4
2. Midterm test 2	2. ZH 2.	1. 50%	2. t1,k1,a1-3,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

successful (min. 50%) completion of the midterm tests

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The participation in laboratory practices is compulsory. The replacement and last possibility for completing the task is according to the Code of Studies.

27. Grading rules

Excellent 88-100%
 Good 75-87%
 Satisfactory 63-74%
 Pass 50-62%
 Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, materials and documentations in printed or electronic version.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Environmental awarness in aviation				
2. Subject name in Hungarian	Környezetvédelem a légiközlekedésben			3. Programme	BSc_MSc
4. Subject code	BMEKORHBsM8002-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	9 hours	Homework	0 hours
Reading written materials	27 hours	Midterm preparation	26 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Rohács Dániel associate professor	15. Email address	rohacs.daniel@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Dr. Rohács Dániel, Dr. Utku Kale				
18. Indicative prerequisites	---				
19. Purpose					
The objective of this course is to introduce the connection between aviation and environment.					
20. Programme of lectures					
The structure of aviation. The main activities and roles of each actor. The most important externalities. Measurement and determination methods. Tools and methods for mitigating and managing externalities. Case studies.					
21. Programme of practices					
-					
22. Programme of laboratories					
-					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. knows and understands the environmental role of air transport.					
2. knows the most important externalities, their measurement and management methods.					
b) skills (k)					
1. based on the knowledge, can more easily and effectively reconcile air transport with environmental needs.					
c) attitude (a)					
1. is curious, receptive.					
d) autonomy and responsibility (o)					
1. is able to independently develop further in various specialized areas of the studied field.					
24. Midterm assessments					
Name	Code	Share in final grade	Evaluated learning outcomes		
1. midterm test	1. ZH	1. 100%	1. t1-2,k1,a1,o1		
25. Exams					

Name	Code	Share in final grade	Evaluated learning outcomes
26. Criteria to obtain a signature / midterm grade			27. Grading rules
successful (min. 50%) completion of the midterm test			Excellent 88-100%
28. Attendance and participation requirements			Good 75-87%
according to the rules of CoS			Satisfactory 63-74%
29. Retake and delayed completion			Pass 50-62%
Retake exam possible according to the general rules of BME.			Fail 0-49%
30. Consultation			
at a time and in a form agreed with the teacher			
31. Learning materials			
Supplementary materials published within the scope of the subject			
Articles			
32. Start of validity for the subject description			
September 1st, 2025			



1. Subject name	Introduction to Computational Fluid Dynamics (CFD)				
2. Subject name in Hungarian	Bevezetés a Numerikus Áramlástanba (CFD)			3. Programme	BSc
4. Subject code	BMEKORHBsM8005-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	0 practice	1 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	20 hours	Homework	20 hours
Reading written materials	22 hours	Midterm preparation	0 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Veress Árpád associate professor	15. Email address	veress.arpad@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Dr. Veress Árpád, Faltin Zsolt				
18. Indicative prerequisites	---				
19. Purpose					
Introduction to Computational Fluid Dynamics (CFD) by means of theory and guided practices.					
20. Programme of lectures					
<p>Presentation of industrial examples, Approximation principles and applicability criteria, Flow modelling based on continuum mechanics, The Navier-Stokes system of equations, The subject, relevance, advantages and applications of CFD (Computational Fluid Dynamics), Turbulence and possibilities of its consideration (DNS, LES, RANS), Reynolds and Favre averaged Navier-Stokes equation system, Reynolds stress and eddy viscosity models, Turbulence models, k-omega and SST turbulence models, Possibilities of near-wall flow modelling: Logarithmic wall law and small Reynolds number models, Inlet boundary conditions for turbulence, Discretization techniques (finite difference, finite volume and finite element methods, advantages, disadvantages), Solving the discretized system of equations using finite volume method, Main steps of CFD task; model building, meshing (mesh metrics), specifying material properties, defining boundary conditions, convergence and visualization of results.</p>					
21. Programme of practices					
-					
22. Programme of laboratories					
Development of CFX sample cases with tutorial assistance: flow modelling around a profile, centrifugal compressor analysis, numerical flow simulation of particle selection, open surface flow modelling, gas turbine combustion chamber process analysis, turb					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. knows the theoretical foundations of numerical flow modeling, in particular the Navier–Stokes equations, turbulence modeling approaches (DNS, LES, RANS), and discretization techniques (FDM, FVM, FEM).					
2. understands the workflow of CFD simulation, including model building, meshing, defining boundary conditions, and evaluating results.					
3. is familiar with industrial applications such as compressors, gas turbines, and free-surface flows, and their specific numerical modeling characteristics.					
b) skills (k)					
1. is able to design CFD models, perform simulations, and interpret the results professionally.					
2. is able to apply and compare different turbulence models and assess the consistency of simulation outcomes.					
3. is able to independently use modern simulation software (e.g., ANSYS CFX) to solve industrial problems.					
c) attitude (a)					
1. is open to applying modern simulation methods and tools and strives for a deep understanding of their scientific background.					
2. is committed to precise, rule-based engineering work and thorough documentation.					
3. cooperates responsibly in laboratory environments and supports collaborative learning and professional development.					

d) autonomy and responsibility (o)

1. is capable of independently analyzing engineering problems using numerical methods and drawing conclusions based on simulation results.
2. takes responsibility for modeling decisions, especially in the context of industrially relevant simulation tasks.
3. applies systems thinking in approaching complex flow problems, with awareness of current technological trends and application contexts.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework	1. HF	1. 100%	1. t1-3,k1-3,a1-3,o1-3

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

successful completion of the homework

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Second retake or delayed completion for the midterm requirement.

27. Grading rules

Excellent 80-100%

Good 70-79%

Satisfactory 60-69%

Pass 50-59%

Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture slides, literature (in english)

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Introduction to Matlab programming				
2. Subject name in Hungarian	Bevezetés a Matlab programozásba			3. Programme	BSc_MSc
4. Subject code	BMEKOKJBsM8019-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	0 lecture	0 practice	2 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	0 hours	Homework	0 hours
Reading written materials	28 hours	Midterm preparation	34 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Control for Transport and Vehicle Systems				
14. Subject coordinator and its position	Dr. Szabó Ádám research fellow	15. Email address	szabo.adam@kjk.bme.hu		
16. ...organisational unit	Department of Control for Transport and Vehicle Systems				
17. Instructor(s)	Dr. Szabó Ádám, Lindenmaier László				
18. Indicative prerequisites	---				

19. Purpose

The subject aims the learning of the Matlab programming language and environment. This tool aim to support the students in the implementation tasks required by other courses. The goal on one hand is the introduction of the syntax of the two languages: Typ

20. Programme of lectures

-

21. Programme of practices

-

22. Programme of laboratories

In the laboratory practice, the goal is to learn the independent use of the syntactic and algorithmic design skills. In doing so, students learn the programming of languages through prepared examples in its development environment.

The topic of the course

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows the basic syntax and structure of the programming environment,
2. knows how the types, operators, and basic instructions work,
3. is familiar with the process control principles and syntax of structured programs, branches, sequences, cycles,
4. knows the complex data structures, their use,
5. knows the basic algorithm design paradigms.

b) skills (k)

1. can write simple standalone programs in the program language concerned;
2. can implement informally or formally specified algorithms,
3. can program source code interpretation, error correction,
4. is able to test and optimize ready-made programs and modules.

c) attitude (a)

1. is interested in modern it solutions,
2. is capable of algorithmic thinking that can be applied in other areas.

d) autonomy and responsibility (o)

1. in addition to known environments, is able to acquire other unknown program languages and development tools in autodidact,
2. is capable of designing and implementing software modules alone, responsibly,

3. is able to consult in a team in algorithmic and programming tasks, to make independent decisions.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test	1. ZH	1. 100%	1. t1-5,k1-4,a1-2,o1-3

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Obtaining the semester grade requires a satisfactory performance on the midterm test

28. Attendance and participation requirements

According to the rules of CoS

29. Retake and delayed completion

The midterm test can be retaken in accordance with university regulations.

30. Consultation

Students may request consultation opportunities with the lecturer and instructors by prior arrangement

31. Learning materials

Lecture Notes, Matlab help, Matlab academy

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 88–100%
 Good 75–87%
 Satisfactory 63–74%
 Pass 50–62%
 Fail 0–49%



1. Subject name		Modern automotive products and development methods				
2. Subject name in Hungarian		Korszerű autópári termékek és fejlesztési módszerek		3. Programme BSc_MSc		
4. Subject code		BMEKOKJBsM8007-00	5. Restrictions		-	
6. Credits		3	7. Evaluation type		m	
9. Weekly contact hours		2 lecture	0 practice	0 laboratory	8. Nature contact lessons	
10. Language		HU EN				
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals						
12. Working hours for fulfilling the requirements of the subject					90 hours	
Contact hours		28 hours	Preparation for lessons		28 hours	Homework 0 hours
Reading written materials		0 hours	Midterm preparation		34 hours	Exam preparation 0 hours
13. Organisational unit in charge		Department of Control for Transportation and Vehicle Systems				
14. Subject coordinator and its position		Dr. Bartha Tamás associate professor		15. Email address bartha.tamas@kjk.bme.hu		
16. ...organisational unit		Department of Control for Transportation and Vehicle Systems				
17. Instructor(s)		Dr. Bartha Tamás				
18. Indicative prerequisites		---				

19. Purpose

The aim of the course is to familiarize students with the structure and operation of modern automotive electronic systems, as well as the tools and methodologies used in their development. The course emphasizes the understanding of driver assistance systems.

20. Programme of lectures

The aim of the course is to introduce students to modern automotive electronics products, the tools used in their development and the methodologies applied. Students will be introduced to the most important automotive electronic systems, electrical and electromechanical auxiliaries, sensor principles, information and other relevant high reliability electronic devices for assisting driving. They will learn about advanced product development processes, methods of developing safety-critical automotive systems, related roles and expectations.

Topics: Automotive product cybersecurity, Model-based Systems Engineering in the Automotive Industry, Electric car, eMobility, Automated Driving, Electric Power Steering system, Low power electric motor applications in vehicles, Video Based Driver Assistance Systems, Ultrasound-based driver and parking maneuver assistance systems, Radar based driver assistance systems, MEMS (miniature sensing devices) in the car, EMC Focused Hardware Design for Car Multimedia Applications, Project Management

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows the main driver support, assistance and comfort vehicle systems
2. knows and understands the basic processes involved in the development of modern automotive systems
3. knows and understands the main sensing principles and limitations
4. knows and understands the sensing and intervention mechanisms of driver assistance systems
5. knows tools and methodologies used in automotive development
6. understands the aspects and risks considered in automotive development
7. understands the purpose and tools, knowledge and soft skills required to manage projects

b) skills (k)

1. is able to understand and evaluate the main trends and development directions in the automotive industry
2. is able to distinguish between vehicle systems applying different principles in the same field and to select the most appropriate one for a given project
3. is able to apply the principles of best practice in the automotive industry as identified in the subject

4. is able to apply project management methods in practice

c) attitude (a)

1. is open and receptive to learning about and communicating developments and innovations in the field

2. analytical analyses the knowledge acquired, searches for connections, thinks in systems

d) autonomy and responsibility (o)

1. takes the initiative in the professional work

2. independently selects and applies solution methods

3. makes decisions carefully, taking into account risks and advantages and disadvantages, and assuming responsibility

4. takes decisions in compliance with safety, environmental, economic and engineering standards

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. attitude and autonomy (lecture active attendance)	1. ATT&AUT(EA)		
2. attitude and autonomy (1. midterm test)	2. ATT&AUT(1.ZH)	1. 15%	1. a1-2,o1-o4
3. attitude and autonomy (2. midterm test)	3. ATT&AUT(2.ZH)	2. 7,5%	2. a1-2,o1-o4
4. knowledge and skills (1. midterm test)	4. ATT&AUT(1.ZH)	3. 7,5%	3. a1-2,o1-4
5. knowledge and skills (2. midterm test)	5. TUD&KEP(2.ZH)	4. 35%	4. t1-7,k1-4
		5. 35%	5. t1-7,k1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Obtaining the semester grade requires a satisfactory performance on the midterm tests

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Both midterm exams will be offered a make-up opportunity during the semester or in the make-up period, according to the regulations of the TVSZ.

27. Grading rules

Excellent 88–100%

Good 75–87%

Satisfactory 63–74%

Pass 50–62%

Fail 0–49%

30. Consultation

Students may request consultation opportunities with the lecturer and instructors by prior arrangement

31. Learning materials

"Modern automotive products and their development methods" - a learning guide compiled by the staff of the Robert Bosch Engineering Centre in Budapest (in Hungarian only)

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Passenger transportation systems					
2. Subject name in Hungarian	Személyközlekedési rendszerek			3. Programme	BSc_MSc	
4. Subject code	BMEKOKKMSK1004-00	5. Restrictions		-		
6. Credits	5	7. Evaluation type	e		8. Nature	contact lessons
9. Weekly contact hours	2 lecture	2 practice	0 laboratory		10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals						
12. Working hours for fulfilling the requirements of the subject					150 hours	
Contact hours	56 hours	Preparation for lessons	15 hours	Homework	34 hours	
Reading written materials	20 hours	Midterm preparation	15 hours	Exam preparation	10 hours	
13. Organisational unit in charge	Department of Transport Technology and Economics					
14. Subject coordinator and its position	Dr. Csiszár Csaba professor	15. Email address	csiszar.csaba@kjk.bme.hu			
16. ...organisational unit	Department of Transport Technology and Economics					
17. Instructor(s)	Dr. Csiszár Csaba, Dr. Csonka Bálint, Dr. Földes Dávid					
18. Indicative prerequisites	---					

19. Purpose

To learn and master the methods of analysis, evaluation, modeling, and planning of the passenger transport system and its subsystems, with particular attention to new (transitional) modes of transport and the interconnection and substitutability of modes.

20. Programme of lectures

Characterization of passenger transport demand
 Characterization of passenger transport supply
 Reconciliation of supply and demand in passenger transport
 Quality of passenger transportation services, measures
 Car-sharing systems
 Planning of traffic calming and parking
 Planning of public transport services
 Planning of pedestrian and bicycle traffic
 Ride-sharing systems, chauffeur services
 Taxi service, „Amusement transportation”

21. Programme of practices

Learning and mastering measurement, analysis, and design procedures at a skill level. Learning about case studies with the help of guest speakers. Independent literature research and topic processing supported by consultations; giving student presentation

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. Has comprehensive knowledge of global social and economic processes. (T2)
2. Knows and understands the properties and application areas of solutions applied in the field of transport and transportation; the methodology and tools of their design and research. (T3,T7)
3. Knows and understands the information and communication technologies related to the field of transport and transportation. (T5)
4. Knows the widely applicable problem-solving techniques necessary for research or scientific work. (T8)

b) skills (k)

1. Able to process and systematize information collected during the implementation of transport and transportation systems and processes, analyze, draw conclusions and explore relationships, and further develop information systems. (K4,K10)

2. Able to apply integrated knowledge of transport and transportation processes, vehicles implementing processes, process theory, and related fields of informatics. (K6)
3. Able to creatively handle problems in the field of transport and to flexibly solve complex tasks using innovative ideas. (K7,K14)
4. Able to conduct research and to conduct publication activities and negotiations in their field of expertise in their native language and at least one foreign language. (K5,K13)

c) attitude (a)

1. Open and receptive to learning about and accepting professional, technological development and innovation in the field of transport and transportation, and authentically conveying it. (A1,A2)
2. Strives to contribute to the development of new methods and tools related to transport and transportation, to have a broad perspective and to connect multiple modes. (A4,A9,A10)
3. Strives to carry out his/her work based on a systems and process-oriented mindset, in a complex approach, taking into account sustainability and economic aspects. (A6,A7)

d) autonomy and responsibility (o)

1. They are responsible for sustainability, health protection and environmental awareness, and take these aspects into account in their decisions. (O3,O4)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm	1. ZH_1	1. 12,5 %	1. t1, t2, k2, a1, a2, a3
2. midterm	2. ZH_2	2. 12,5 %	2. t1, t2, k2, a1, a2, a3
3. home assignment_1	3. HF_1	3. 10 %	3. t1, t2, t3, t4, k1, k3, k4, a1, a2, a3, o1
4. home assignment_2	4. HF_2	4. 5 %	4. t1, t2, t3, t4, k1, k3, k4, a1, a2, a3, o1
5. home assignment_3	5. HF_3	5. 5 %	5. t1, t2, t3, t4, k1, k3, k4, a1, a2, a3, o1
6. home assignment_3_presentation of results	6. HF_3_B	6. 5 %	6. k4, a1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 50 %	1. t1,t2,k2,a1,a2,a3

26. Criteria to obtain a signature / midterm grade

mid-semester 'signature' is obtained if all the midterms are passed, and the assignments are submitted and accepted, and attendance on guest lectures is completed.

28. Attendance and participation requirements

According to the rules of CoS. Attendance on guest lectures is mandatory.

29. Retake and delayed completion

Up to one midterm test can be retaken in the delayed completion week.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

ppt slides, Csaba Csiszár – Bálint Csonka – Dávid Földes (2019): Innovative Passenger Transportation Systems (book)

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 88-100%



Good 75-87%

Satisfactory 63-74%

Pass 50-62%

Fail 0-49%



1. Subject name	Reinforcement learning in vehicle control				
2. Subject name in Hungarian	Megerősítéssel tanulás alkalmazása a járműirányításban	3. Programme	BSc_MSc		
4. Subject code	BMEKOKJBsM8011-00	5. Restrictions	-		
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals	 				
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	14 hours	Homework	34 hours
Reading written materials	14 hours	Midterm preparation	0 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Control for Transportation and Vehicle Systems				
14. Subject coordinator and its position	Dr. Bécsi Tamás associate professor	15. Email address	becsi.tamas@kjk.bme.hu		
16. ...organisational unit	Department of Control for Transportation and Vehicle Systems				
17. Instructor(s)	Dr. Bécsi Tamás				
18. Indicative prerequisites	---				

19. Purpose

The course aims to give students practical knowledge in the fundamentals of reinforcement and deep learning, with a focus on modern algorithms. Students will learn to implement and optimize RL methods in simulation environments using Python.

20. Programme of lectures

During the lectures, students will learn the basics of the Python programming language and fundamental concepts of Deep Learning, including neural networks, the backpropagation algorithm, batch learning, hyperparameter optimization, and the workings of optimizers. Following this, students will study and implement basic Reinforcement Learning (RL) algorithms, initially without function approximators and then with their use (Q-Learning, Deep Q-Network, Double Deep Q-Network, Policy Gradient, Actor-Critic solutions). After gaining a comprehensive understanding of how these algorithms work, students will use pre-implemented environments provided by OpenAI Gym to practice training the algorithms and optimizing their parameters. The course concludes with an introduction to complex algorithms that are currently considered state-of-the-art in the field.

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. understands the basics of git version control.
2. understands the use of the python programming language and complementary machine learning frameworks.
3. understands the fundamentals, equations, and principles of reinforcement learning and machine learning.
4. can distinguish between various reinforcement learning algorithms.
5. understands the principles and procedures related to rl applications.
6. knows and comprehends basic model development techniques.
7. understands the limitations and application opportunities of agents necessary for learning.

b) skills (k)

1. can apply different rl algorithms.
2. can utilize git as a version control tool for project development.
3. can apply integrated knowledge to implement and train new agents.
4. can employ object-oriented development in personal projects.
5. can define and create evaluation algorithms for personal projects.

c) attitude (a)

1. is open and receptive to developments and innovations in the field, and able to communicate them.
2. demonstrates a strong sense of professional dedication.
3. strives for a systems-thinking approach to comprehensively address processes.

d) autonomy and responsibility (o)

1. proactively chooses and applies solutions in professional work.
2. makes decisions with care and takes responsibility for them.
3. considers environmental, safety, economic, and engineering ethical regulations in decision-making.
4. is capable of independently planning and executing a project to address a specific problem using reinforcement learning.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Project work	1. P	1. 100%	1. t1-7,k1-5,a1-3,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Obtaining the semester grade requires the acceptance of project work

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

We offer a free make-up presentation opportunity, and a second opportunity during the make-up week for a fee. The requirements are the same as for the first opportunity.

27. Grading rules

Excellent 88–100%
 Good 75–87%
 Satisfactory 63–74%
 Pass 50–62%
 Fail 0–49%

30. Consultation

Students may request consultation opportunities with the lecturer and instructors by prior arrangement

31. Learning materials

[01] Sutton, Richard S., and Andrew G. Barto. Reinforcement learning: An introduction. MIT press, 2018.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name		Road safety, legislative environment, human factors				
2. Subject name in Hungarian	Közlekedésbiztonság, jogi környezet, emberi tényezők	3. Programme	BSc			
4. Subject code	BMEKOGJBsM8005-00	5. Restrictions	-			
6. Credits	3	7. Evaluation type	m		8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN	
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals						
12. Working hours for fulfilling the requirements of the subject					90 hours	
Contact hours	28 hours	Preparation for lessons	22 hours	Homework	0 hours	
Reading written materials	0 hours	Midterm preparation	40 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Automotive Technologies					
14. Subject coordinator and its position	Dr. Török Árpád senior research fellow	15. Email address	torok.arpad@kjk.bme.hu			
16. ...organisational unit	Department of Automotive Technologies					
17. Instructor(s)	Dr. Török Árpád					
18. Indicative prerequisites	---					

19. Purpose

The aim of this course is to provide a comprehensive knowledge of road safety, with particular emphasis on the legal environment, technical risks and accident factors.

20. Programme of lectures

Legal knowledge: Constitutional law, civil substantive and procedural law, criminal law, criminal procedure, traffic offences, basic issues of compensation.

Human factors in transport: personality traits, behaviour patterns, health protection, age-related problems, weather effects, seasons, specific issues relating to flora and fauna, wildlife damage.

Injuries to the human body, physiological characteristics, classification of injuries, investigation of accidents in the light of personal injury, blood alcohol tests, examples of medical accident analysis work.

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. Knows the legal framework necessary to understand the legal environment of road safety;
2. Knows the basic components of the legislative and enforcement process;
3. Knows the basic purpose and tools of transport law;
4. Knows online and printed tools and applications for the application of traffic law;

b) skills (k)

1. Is able to interpret the relevant legislation;
2. Is able to apply and use relevant transport legislation;

c) attitude (a)

1. strives to the best of their abilities to complete their studies to the highest possible standard, acquiring in-depth knowledge capable of independent work;
2. cooperates with the teacher and fellow students in the development of knowledge;
3. continuously develops its knowledge through independent learning to supplement the material taught in the classroom;
4. is open to the use of information technology and computer tools (word processing software, mathematical software, image editing software, etc.), but also tries to use the classical tools (paper, ruler, pencil, hand calculator, editing, etc.);

5. strives to learn and routinely use the tools needed to solve problems

6. strives for accurate, error-free and precise problem solving.

d) autonomy and responsibility (o)

1. has a responsibility to set an example to the peers by the quality of its work and by respecting ethical standards;

2. applies the knowledge acquired in the course of the subject with responsibility, taking into account the limits of its validity;

3. is open to well-founded critical comments;

4. accepts the framework of cooperation and is able to work independently or as part of a team, depending on the situation.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test	1. ZH1	1. 50%	1. t1-t4,k1-k2,a1-6,o1-4
2. Midterm test	2. ZH2	2. 50%	2. t1-t4,k1-k2,a1-6,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Successful completion of both midterm tests

28. Attendance and participation requirements

According to CoS.

29. Retake and delayed completion

In the delayed completion week, it is possible to retake both midterm tests

30. Consultation

After the lectures and in specified time slots previously agreed appointment.

31. Learning materials

lecture notes

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

0%-49%: fail

50%-61%: pass

62-74%: satisfactory

75%-87%: good

88%-100%: excellent



1. Subject name	Selected topics from the advanced material sciences					
2. Subject name in Hungarian	Válogatott fejezetek a modern anyagtudományból	3. Programme	BSc_MSc			
4. Subject code	BMEKOGJBsM8007-00	5. Restrictions	-			
6. Credits	4	7. Evaluation type	m		8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory		10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals						
12. Working hours for fulfilling the requirements of the subject	120 hours					
Contact hours	28 hours	Preparation for lessons	5 hours	Homework	22 hours	
Reading written materials	50 hours	Midterm preparation	15 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Automotive Technologies					
14. Subject coordinator and its position	Dr. Bán Krisztián associate professor	15. Email address	ban.krisztian@kjk.bme.hu			
16. ...organisational unit	Department of Automotive Technologies					
17. Instructor(s)	Dr. Bán Krisztián, Dr. Hlinka József, Dr. Vehovszky Balázs, Bereczki Alexandra, Dr. Markovits Tamás					
18. Indicative prerequisites	---					
19. Purpose	We recommend this course for students who are pursuing their studies at the bachelor's or master's level or are doing PhD work in a special research field and have a strong interest in material sciences and technology. The aim of the subject is to gain a					
20. Programme of lectures	<p>The topics of the lectures follow the results of the latest R&Ds of material technology in the vehicle industry, therefore the topics of the lectures partially may vary but with a connection of the following issues:</p> <ol style="list-style-type: none"> 1. Properties and production technologies of non-equilibrium alloys (e.g. effect of the non-equilibrium phase transformations on the properties of additive manufactured alloys). 2. Materials science background and consequences of special manufacturing processes (e.g. the effect of additive manufacturing on material properties). 3. From the nucleation process to the developed macro-scale properties of materials (the importance of nanostructured materials in applications). The lecture discusses the exceptional properties derived from the nanostructured phase environment. 4. Hysteresis phenomena and their outcomes in technical materials (mechanical, magnetic and storage applications, hydrogen storage). 5. Application of machine learning to predict the results of materials technology processes. 6. Role of interfaces and phase boundary in material processes (wetting, oxidation and reduction processes, formation and decomposition of hydride phases in storage materials, surface passivation and activation, etc.) 7. Nondestructive and special material testing and their scientific background. 8. Materials science on the duty of sustainable development and environmental protection. 					
21. Programme of practices	-					
22. Programme of laboratories	-					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	<p>The student</p> <p>a) knowledge (t)</p> <ol style="list-style-type: none"> 1. Gets deeper knowledge in the field of material science and technology, to reach a deeper understanding of the phenomena and their background in material processes. <p>b) skills (k)</p> <ol style="list-style-type: none"> 1. Is able to process publications in the field of material science and technology in the English language, and can interpret and explain appropriately the methods, results and concepts of it. <p>c) attitude (a)</p>					

1. Strives to develop their level of understanding, and find relationships among different fields of science.

d) autonomy and responsibility (o)

1. strives to work independently and to process the selected article completely and without distortion.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Midterm test	1. ZH	1. 30%	1. t1,a1
2. Student assignment	2. HF	2. 70%	2. k1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Students take a midterm exam during the semester. In addition, students carry out a professional article processing written in English on a personal topic as agreed with the professor, prepare a summary slideshow, and present it at the end of the semester

28. Attendance and participation requirements

According to TVSZ

29. Retake and delayed completion

Midterm test retake is two times and supplementary presentation is one time allowed during the semester at a time agreed in advance.

30. Consultation

We provide an opportunity for consultation on student assignments based on individual appointment arrangements.

31. Learning materials

1. Non-equilibrium Processing of Materials 49-85 (chapt. 4). ed. Suryanarayana C., (Pergamon , Materials Series Series editor R.W. Cahn, 1999)
2. Luborsky F.E., Amorphous Metallic Alloys (Butterworths Monographs in Materials) 1984
4. Y. Fukai The Metal-Hy

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

- 0-<50%: failed (1),
 50-<62%: satisfactory (2),
 62-<75%: fair (3),
 75-<87%: good (4),
 87-100%: excellent (5).



1. Subject name	Smart city				
2. Subject name in Hungarian	Intelligens városok - Smart city			3. Programme	BSc
4. Subject code	BMEKOKKMSK2A01-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	4 hours	Homework	20 hours
Reading written materials	26 hours	Midterm preparation	12 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Transport Technology and Economics				
14. Subject coordinator and its position	Dr. Esztergár-Kiss Domokos senior research fellow	15. Email address	esztergar-kiss.domokos@kjk.bme.hu		
16. ...organisational unit	Department of Transport Technology and Economics				
17. Instructor(s)	Dr. Esztergár-Kiss Domokos, Dr. Tóth János				
18. Indicative prerequisites	---				
19. Purpose					
The knowledge of the basics, models, functions, and operation of intelligent cities.					
20. Programme of lectures					
Paradigm shift in urban citizen life. Smart city introduction, evaluation and ranking methods. City planning aspects, methods and strategies. Introduction to land use functions and models. Shared spaces, public space transformation. Utilization of information received from social media and mobility patterns. Big data and Internet of Things solutions. Smart Grids and its applications. Top international and Hungarian best practices.					
21. Programme of practices					
-					
22. Programme of laboratories					
-					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. is familiar with the Smart City concept,					
2. identifies urban planning models,					
3. describe the types of social media,					
4. identify methods of mobility patterns,					
5. collect data types of Big Data (T10),					
6. understand the Internet of Things model and its properties.					
b) skills (k)					
1. able to define Smart City features,					
2. calculates with the assessment methodologies,					
3. knows the land use models,					
4. uses the road planning principles,					
5. uses the Big Data approaches,					
6. distinguishes between Smart Grid elements.					
c) attitude (a)					
1. provide maximalized abilities,					
2. extends the knowledge by their own ,					
3. strives for precise task solving.					

d) autonomy and responsibility (o)

1. responsibly applies the knowledge acquired during the course,
1. accepts the framework of cooperation,
3. can conduct work individually or in a team.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework, 2. first midterm test, 3. second midterm test.	1. HF, 2. ZH1, 2. ZH2	1. 33% 2. 33% 3. 33%	1. a1,a2,a3,o1 2. t1,t2,t3,t4,t5,t6,k1,k3,k4,k5,k6 3. k2,k4,k5

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

submission of the home assignment on time, and successful (min. 50%) completion of each midterm test

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

midterm test second correction for those who were not present on one of the tests, delayed deadline for homework

27. Grading rules

Excellent 85-100%
Good 70-84%
Satisfactory 60-69%
Pass 50-59%
Fail 0-49%

30. Consultation

After the class, in previously agreed times, and per e-mail.

31. Learning materials

Presentation slides and electronic lecture notes

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Strategic policy instruments in transportation					
2. Subject name in Hungarian	Stratégiai szabályozási eszközök a közlekedésben			3. Programme	BSc_MSc	
4. Subject code	BMEKOKKMSK2C03-00	5. Restrictions		-		
6. Credits	6	7. Evaluation type	e		8. Nature	contact lessons
9. Weekly contact hours	2 lecture	1 practice	1 laboratory	10. Language	HU EN	
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals						
12. Working hours for fulfilling the requirements of the subject					180 hours	
Contact hours	56 hours	Preparation for lessons	8 hours	Homework	32 hours	
Reading written materials	34 hours	Midterm preparation	30 hours	Exam preparation	20 hours	
13. Organisational unit in charge	Department of Transport Technology and Economics					
14. Subject coordinator and its position	Dr. Mészáros Ferenc associate professor		15. Email address	meszaros.ferenc@kjk.bme.hu		
16. ...organisational unit	Department of Transport Technology and Economics					
17. Instructor(s)	Dr. Mészáros Ferenc					
18. Indicative prerequisites	---					
19. Purpose						
Within the framework of the course, students will learn the techniques and steps of transport policy and strategy making, as well as the transport policy objectives and instruments used in each field.						
20. Programme of lectures						
The need for transport policy and strategy, identification of the relevant market areas, the regulatory process. The environmental, economic and social aspects of sustainable mobility and the mainstreaming of horizontality in transport policy. European mobility strategy and its measures, infrastructure reform and regulation. Policy achievements in urban transport and freight, challenges of traffic and mobility management. Policy achievements in interoperable, interconnected and automated transport. Policy achievements in greening transport and the automotive industry.						
21. Programme of practices						
Tools and techniques for policy preparation, evaluation and decision-making.						
22. Programme of laboratories						
Financial and economic modelling of policy decisions.						
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)						
The student						
a) knowledge (t)						
1. understand the process of transport policy and strategy making and the technical, legal, financial, economic, social and institutional framework and related R&D and innovation directions (T10)						
b) skills (k)						
1. be able to identify the main problems of the transport system, select the transport policy instruments to address them, evaluate their results and impacts, and identify the needs for the development of transport policy instruments						
c) attitude (a)						
1. strives for completeness in the acquisition of knowledge, cooperates with the instructor and fellow students, is empathetic and tolerant towards members of his/her team						
2. is open to new and innovative ideas and research, is self-critical in the tasks entrusted to him/her, and is fully committed to sustainability						
d) autonomy and responsibility (o)						

1. ensures that, in addition to narrow professional aspects, sustainability aspects are also taken into account in the use of his/her knowledge, is able to self-check and correct errors independently, while taking into account the professional opinions of others
2. can make responsible decisions in the field of transport engineering management in response to open questions, and can formulate independent proposals to resolve the challenges identified

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH1	1. 17,5%	1. t1,k1
2. midterm test	2. ZH2	2. 17,5%	2. t1,k1
3. holistic transport policy individual assignment	3. HF	3. 15%	3. k1,a1,a2,o1,o2
4. specific transport policy individual assignment	4. SF	4. 15%	4. k1,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 35%	1. t1,k1,a1,a2,o1,o2

26. Criteria to obtain a signature / midterm grade

successful completion (min. 50%) of each of the two midterm test and the submission and presentation of the two individual assignments by the deadline

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

second retake or delayed completion is only from one midterm requirement

27. Grading rules

Excellent 88-100%

Good 75-87%

Satisfactory 63-74%

Pass 50-62%

Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher



31. Learning materials

Peter Stopher, John Stanley (2014) Introduction to Transport Policy: A Public Policy View. Edward Elgar Publishing
presentation slides

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Sustainable aviation				
2. Subject name in Hungarian	Fenntartható repülés			3. Programme	BSc_MSc
4. Subject code	BMEKORHBsM8006-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	2 lecture	0 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals	 				
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	22 hours	Homework	29 hours
Reading written materials	11 hours	Midterm preparation	0 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Aeronautics and Naval Architecture				
14. Subject coordinator and its position	Dr. Rohács Dániel associate professor	15. Email address	rohacs.daniel@kjk.bme.hu		
16. ...organisational unit	Department of Aeronautics and Naval Architecture				
17. Instructor(s)	Gál István				
18. Indicative prerequisites	---				

19. Purpose

Understanding the fundamental aspects of sustainable and green aviation, reviewing the basic regulatory environment, environmental impacts, potential technological solutions, alternative propulsion systems, procedures, and related airport and ATM area con

20. Programme of lectures

Week 1: Introduction to sustainable aviation

- Definition and importance of sustainability in aviation
- Environmental impacts of aviation (carbon dioxide emissions, noise pollution, etc.)

Week 2: Regulatory frameworks

- Regulatory and measurement bases, rules and regulations determining sustainability and environmental protection

Week 3-4: Basic environmental impacts

- The contribution of aviation to global CO₂ emissions
- The formation of greenhouse gases and contrails
- Definition and measurement of pollutant emissions
- Other environmental impacts

Weeks 5-6: Aviation Noise

- Basic Noise Sources
- Noise Measurement Methods
- Noise Reduction Methodologies

Week 7: Sustainable Propulsion Systems

- Types of SAF (Biofuels, Synthetic Fuels, Hydrogen)
- Fundamentals of Hydrogen and Electric Propulsion
- Battery-Electric Aircraft and Hybrid-Electric Propulsion
- Case Studies on SAF Implementation (Airlines and Manufacturers)

Week 8-9 Week 1: Airport and airline sustainability strategies and operational measures

- Green airport initiatives (energy-efficient infrastructure, sustainable operations)
- Carbon offset programs and net zero targets
- Case studies on sustainable airlines and airports

Week 10: Urban air mobility (UAM) and sustainable aviation

- eVTOLs and electric air taxis
- Integrating UAM into existing airspace
- Sustainable benefits and challenges of UAM

Week 11: Future trends

- New technologies and R&D in sustainable aviation

Weeks 12-14: Student case studies

- Student presentations on sustainability case studies

21. Programme of practices

-

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. knows the topics of the subject. The student knows the relevant literature and knows where to find more detailed information for each field of study to complete his/her task.

b) skills (k)

1. is able to independently prepare documentation related to the areas covered by the subject matter

2. is able to recognize the changes that are relevant to the topics and are necessary in order to achieve the expected goal.

3. is able to think, plan, control, evaluate and make decisions in complex systems and processes, and to carefully consider the effects on the case under study and the impact of his/her activities on other systems.

c) attitude (a)

1. strives to complete his studies at the highest possible level, in the shortest possible time, by providing the maximum of his knowledge and abilities, acquiring in-depth knowledge capable of independent creation.

2. cooperates with the instructor and fellow students in expanding his knowledge.

3. expands his knowledge through continuous independent acquisition of knowledge, supplementing what has been taught in the course.

d) autonomy and responsibility (o)

1. completes the assignments independently.

2. feels responsible for setting an example to the peers with the quality of the work and adherence to ethical standards.

3. applies the knowledge acquired during the course responsibly, taking into account the limitations of its validity.

4. is open to well-founded critical comments and uses them constructively in the future.

5. accepts the framework of cooperation and is able to perform his/her work independently or as part of a team, depending on the situation.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework	1. HF	1. 100%	1. t1,k1-3,a1-3,o1-5

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

submission and presentation of task on time

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Late completion of summative assessments is allowed for a second time in the late completion period upon payment of a special charge.

27. Grading rules

Excellent 88-100%

Good 75-87%

Satisfactory 63-74%

Pass 50-62%

Fail 0-49%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, materials and documentations in printed and/or electronic version given by the lecturer.

32. Start of validity for the subject description

September 1st, 2025



1. Subject name Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 1.

2. Subject name in Hungarian	Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 1.	3. Programme	BSc_MSc
4. Subject code	BMEKOKKBsM8001-00	5. Restrictions	-
6. Credits	3	7. Evaluation type	m
8. Nature	contact lessons	10. Language	EN
9. Weekly contact hours	1 lecture	1 practice	0 laboratory
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals			
12. Working hours for fulfilling the requirements of the subject			90 hours
Contact hours	28 hours	Preparation for lessons	20 hours
Homework			27 hours
Reading written materials	15 hours	Midterm preparation	0 hours
Exam preparation			0 hours
13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Mészáros Ferenc associate professor	15. Email address	meszaros.ferenc@kjk.bme.hu
16. ...organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Jürgen Steinberger		

18. Indicative prerequisites
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19. Purpose

Technological developments in the truck industry have accelerated significantly in recent years, with a particular focus on automation and connected vehicle systems. Today, the automotive industry requires not only precise engineering knowledge, but also

20. Programme of lectures

The truck industry has been the steady, slow changing backbone of the logistic industry for decades. 70% of the goods shipped on land are transported by trucks. Technologies, market players and business models has changed and developed slowly, gradually, and evolutionary. With 20 times the weight and 5 times the lifetime of a passenger car, the requirements for the reliability and safety of a truck have defined industry standards, worldwide.

However, over the last 5 years the speed of change with respect to legal requirements, market consolidation, business models and technology changes has factually exploded. Emerging countries like India, Brazil and China have defined a sequence of legislative rules for new safety standards requiring ESP and new ADAS (Advanced Driver Assistance Systems). European legislation is focusing on emission reduction, functional safety requirements as well as cyber security standards. A former fragmented market with numerous small regional truck manufacturer is consolidating to a few global and regional players, driving purchasing power and technical standardization. At the same time, driver shortage and continuously increasing costs for trucks and infrastructure demand automated solutions. In consequence, new safety standards, Connectivity and Highly Automated Driving solutions as well as E-Mobility and emission reduction systems are going to be developed within the next 5 to 7 years, each region setting a different focus and timeline.

The challenges could not be greater. Due to the possibility of setting technical and business standards, time to market becomes crucial. Concurrently, the focus on talents has shifted from the classical mechanical expertise towards electrical, software and system engineering. To manage the challenges, new organizational and management approaches need to be implemented.

The highlighted topics to be discussed are the business, ecological and social factors, the legal framework conditions, as well as technical management, structural and organizational change needs. The lectures of the semester are organized into 4 blocks, each of which is 3 x 1:30 long, with 2 x 10-minute breaks between them. Another 2 x 1:30 sessions are reserved for the exam and one retake option.

21. Programme of practices

2x case studies to be elaborated as a teamwork:

- (1) Analyse the disruption of HAD and E-mobility for a European and a Chinese Truck manufacturer, define the counterstrategy and draw a worldwide picture of the truck industry in 10 years
- (2) Feasibility Study

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)

The student

a) knowledge (t)

1. focuses on and explain the technology changes and challenges in detail, while giving the students the necessary background information to understand the legal, business and market drivers.

b) skills (k)

1. to complete the picture, gets acquainted with new organizational and technical management approaches to face the upcoming challenges.

c) attitude (a)

1. in addition to the technical competence, is able to understand and analyze problems based on business, market, and legal aspects, as they actually appear in real life.

d) autonomy and responsibility (o)

1. can make responsible decisions independently and prepare decision-making materials considering technical, business, market and legal aspects.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Case study report (team work)	1. CSR1	1. 50%	1. t1,k1,a1,o1
2. Case study report (team work)	2. CSR2	2. 50%	2. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

The midterm grade is primarily based on the student's activity and the submitted case study. Grading: Students must form teams of 5. Each team receives a maximum of 5 points per person to distribute among its members: 1-5 per person. The group members dec

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The case study work can be retaken once.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 81-100%
 Good 61-80%
 Satisfactory 41-60%
 Pass 40%
 Fail 0-39%



1. Subject name	Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 2.				
2. Subject name in Hungarian	Synergy of Engineering and Business: The Disruptive Transformation of the Truck Industry as a case study 2.	3. Programme	BSc_MSc		
4. Subject code	BMEKOKKBsM8002-00	5. Restrictions	-		
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	1 practice	0 laboratory	10. Language	EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	20 hours	Homework	27 hours
Reading written materials	15 hours	Midterm preparation	0 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Transport Technology and Economics				
14. Subject coordinator and its position	Dr. Mészáros Ferenc associate professor	15. Email address	meszaros.ferenc@kjk.bme.hu		
16. ...organisational unit	Department of Transport Technology and Economics				
17. Instructor(s)	Dr. Jürgen Steinberger				
18. Indicative prerequisites	---				
19. Purpose					
Technological developments in the truck industry have accelerated significantly in recent years, with a particular focus on automation and connected vehicle systems. Today, the automotive industry requires not only precise engineering knowledge, but also					
20. Programme of lectures					
The truck industry has been the steady, slow changing backbone of the logistic industry for decades. 70% of the goods shipped on land are transported by trucks. However, over the last 5 years the speed of change with respect to legal requirements, market consolidation, business models and technology changes has factually exploded. The subject reviews – based on the legislative, business and market factors – the technical changes and challenges. Main chapters of the lecture are: - Worldwide standardization of active safety systems (braking-, steering- and ADAS systems). - Business rational of ADAS systems, technical approach and industrial approach and strategic considerations consequently. - Connectivity: areas and market model, interaction with HAD, ADAS and Chassis Control Systems. - E-mobility: Market drivers and regional penetration scenarios, technology changes and consequences on the truck. - Functional Safety: redundancy and diagnostic requirements for different ASIL levels, technical concepts / implementation examples: sensor / actuator checking; plausibility checks; cost-optimized redundancy solutions - Cybersecurity: market needs and consequences, technical concepts. The lectures of the semester are organized into 4 blocks, each of which is 3 x 1:30 long, with 2 x 10-minute breaks between them.					
21. Programme of practices					
2x case studies to be elaborated as a teamwork.					
22. Programme of laboratories					
-					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. focuses on and explain the technology changes and challenges in detail, while giving the students the necessary background information to understand the legal, business and market drivers.					
b) skills (k)					
1. to complete the picture, gets acquainted with new organizational and technical management approaches to face the upcoming challenges.					

c) attitude (a)

1. in addition to the technical competence, is able to understand and analyze problems based on business, market, and legal aspects, as they actually appear in real life.

d) autonomy and responsibility (o)

1. can make responsible decisions independently and prepare decision-making materials considering technical, business, market and legal aspects.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Case study report (team work)	1. CSR1	1. 50%	1. t1,k1,a1,o1
2. Case study report (team work)	2. CSR2	2. 50%	2. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

The midterm grade is primarily based on the student's activity and the submitted case study. Grading: Students must form teams of 5. Each team receives a maximum of 5 points per person to distribute among its members: 1-5 per person. The group members dec

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The case study work can be retaken once.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 81-100%
 Good 61-80%
 Satisfactory 41-60%
 Pass 40%
 Fail 0-39%



1. Subject name	Transport Infrastructure and Regional Development				
2. Subject name in Hungarian	Transport Infrastructure and Regional Development			3. Programme	BSc_MSc
4. Subject code	BMEKOKKBsM8003-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	1 practice	0 laboratory	10. Language	EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	15 hours	Homework	27 hours
Reading written materials	20 hours	Midterm preparation	0 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Transport Technology and Economics				
14. Subject coordinator and its position	Dr. Mészáros Ferenc associate professor		15. Email address	meszaros.ferenc@kjk.bme.hu	
16. ...organisational unit	Department of Transport Technology and Economics				
17. Instructor(s)	Dr. Mészáros Ferenc				
18. Indicative prerequisites	---				
19. Purpose					
The course aims to develop theoretical and empirical background to understand the nature of transport infrastructure and its implication on regional economic development.					
20. Programme of lectures					
<p>Transport infrastructure and development are linked, although the link between them is not straightforward. The lectures explore and analyse this link. Regional development and its measurement is scrutinized as is the monetarisation of infrastructure charging and calculation of costs. The course engages the disciplines of economics, regional planning, environmental science, geography, and sociology in investigating the externalities of transportation.</p> <p>Definition of regional development. Indicators of sustainable regional development and green economics. Pricing transport use: charges, elasticities, time saving and road pricing. Describing relationship between transport improvements and economic activity. Traffic and transport infrastructure in condition of suppressed demand. Traffic demand management and reallocation of road space. Transport externalities: congestion on the road network, air pollution and greenhouse gas emission, noise annoyance, spatial inequalities and urban sprawl, social inequalities. Financing transport infrastructures. European policy on transport infrastructure and regional development.</p>					
21. Programme of practices					
The practice aims to provide a practical and contemporary, but yet critical introduction to the subject. It involves studying real and contemporary examples.					
22. Programme of laboratories					
-					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. knows the definitions and interrelations of transport infrastructure and regional developments, gets know the sustainability goals and indicators.					
b) skills (k)					
1. is able to identify and calculate/evaluate the wider impacts of transport infrastructure investments on the regional development.					
c) attitude (a)					
1. strives for completeness in the acquisition of knowledge, co-operates with the teacher and the other students, is open towards new and innovative ideas, researches and uses information technology and computing tools for its work.					
d) autonomy and responsibility (o)					

1. in addition to the narrow professional aspects, also takes into account social and economic aspects in the utilization of its knowledge, asks for the professional opinions of others, makes responsible decisions in the selection of the most efficient transport investments, and takes care of the challenges responsibly.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Case study report (individual work)	1. CSR	1. 100%	1. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Preparation, work out, and presentation of an individual case study report about a transportation development project, highlighting the regional economic, environmental, and social effects.

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The case study work can be retaken once.

27. Grading rules

Excellent 81-100%
 Good 61-80%
 Satisfactory 41-60%
 Pass 40%
 Fail 0-39%

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

1. Caralampo Focas (2006) Transport Infrastructure and Regional Development. Course material, BME Department of Transport Economics, Budapest
2. Eddy Van de Voorde, Thierry Vanelslander (2010) Applied Transport Economics, De Boeck
3. André de Palma , Robi

32. Start of validity for the subject description

September 1st, 2025



1. Subject name	Transport infrastructure management				
2. Subject name in Hungarian	Közlekedési infrastruktúra menedzsment			3. Programme	BSc_MSc
4. Subject code	BMEKOKKMSK2C01-00	5. Restrictions		-	
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	1 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	4 hours	Homework	12 hours
Reading written materials	34 hours	Midterm preparation	12 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Transport Technology and Economics				
14. Subject coordinator and its position	Dr. Mészáros Ferenc associate professor		15. Email address	meszaros.ferenc@kjk.bme.hu	
16. ...organisational unit	Department of Transport Technology and Economics				
17. Instructor(s)	Dr. Mészáros Ferenc				
18. Indicative prerequisites	---				
19. Purpose					
Introduction of rules and practice of transport infrastructure development and management.					
20. Programme of lectures					
Transport infrastructure and corridor policy of the EU and Hungary, network development strategies and transport policy. Infrastructure operation and maintenance strategies, adaptation to climate change. Types of operation contracts, risk management techniques.					
21. Programme of practices					
Techniques for asset valuation and registration of transport infrastructure. Asset management methods in practice. Risk assessment and management. Case studies related to transport infrastructure management.					
22. Programme of laboratories					
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)					
The student					
a) knowledge (t)					
1. is familiar with the EU and Hungary's infrastructure and corridor policy (T2,T9)					
2. understands the methods used to evaluate and manage infrastructure efficiently (T3,T8,T10)					
3. identify the climate challenges of transport infrastructure (T2)					
b) skills (k)					
1. select and use effective tools for transport infrastructure management (K4,K10,K11)					
2. analyse and evaluate the results and impacts of transport infrastructure management (K2,K3,K9)					
c) attitude (a)					
1. strives for completeness in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant towards members of his/her team (A9,A10)					
2. is open to new and innovative ideas and research, is self-critical of the tasks assigned to him/her, and takes full responsibility for sustainability (A1,A2,A6)					
d) autonomy and responsibility (o)					
1. in addition to narrow professional criteria, ensures sustainability in the use of his/her knowledge, is able to self-monitor and correct errors independently, while taking into account the professional opinion of others (O3,O4)					
2. makes responsible decisions in the field of transport infrastructure management in response to open questions and formulates independent proposals to solve identified challenges (O2)					
24. Midterm assessments					

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH	1. 85%	1. t1, t2, t3, k1,k2,o2
2. risk assessment task	2. F	2. 15%	2. k2,a1,a2,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

submission and presentation of task on time and successful (min. 50%) completion of the midterm test

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

second retake or delayed completion is only from one midterm requirement

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

presentation slides

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

Excellent 88-100%
 Good 75-87%
 Satisfactory 63-74%
 Pass 50-62%
 Fail 0-49%



1. Subject name	Vehicle maintenance				
2. Subject name in Hungarian	Járműfenntartás	3. Programme	BSc_MSc		
4. Subject code	BMEKOGJBsM8009-00	5. Restrictions	-		
6. Credits	3	7. Evaluation type	m	8. Nature	contact lessons
9. Weekly contact hours	1 lecture	1 practice	0 laboratory	10. Language	HU EN
11. SDG Learning outcomes' contribution to the EU/UN sustainable development goals					
12. Working hours for fulfilling the requirements of the subject					90 hours
Contact hours	28 hours	Preparation for lessons	7 hours	Homework	0 hours
Reading written materials	25 hours	Midterm preparation	30 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Automotive Technologies				
14. Subject coordinator and its position	Dr. Bán Krisztián associate professor	15. Email address	ban.krisztian@kjk.bme.hu		
16. ...organisational unit	Department of Automotive Technologies				
17. Instructor(s)	Dr. Bán Krisztián, Dr. Pál Zoltán, Dr. Markovits Tamás, Dr. Hlinka József, Dr. Dömötör Ferenc, Dr. Varga Ferenc László				
18. Indicative prerequisites	---				
19. Purpose	Providing additional, application-oriented knowledge in the field of vehicle maintenance technologies, systems and diagnostic methods, in addition to the content of the basic courses.				
20. Programme of lectures	During the lectures, we present modern technologies and methods of vehicle maintenance through practical examples and case studies. This complements the knowledge of the basic course with several practical application examples. The topics of the lectures may be modified in accordance with the latest trends, but they cover the following topics: post-production, renovation and repair technologies of typical vehicle parts, vehicle maintenance systems, modern diagnostic methods, and specific technologies of modern drives.				
21. Programme of practices	Presentation and analysis of case studies in the field of vehicle maintenance and repair in classrooms and external sites of a transport service provider.				
22. Programme of laboratories	-				
23. Learning outcomes (lower case) and their link to the training programme's learning outcomes (upper case)	<p>The student</p> <p>a) knowledge (t)</p> <ol style="list-style-type: none"> 1. Knows the technologies for the after-production, renewal and repair of the most important vehicle components. 2. Knows the maintenance systems and their characteristics. 3. Knows the most important diagnostic methods. <p>b) skills (k)</p> <ol style="list-style-type: none"> 1. Is able to suggest a technology for the after-production, renewal or repair of common vehicle parts. 2. Is able to suggest a method for fault detection and diagnosis in the event of a fault phenomenon or condition assessment. 3. Is able to suggest a maintenance strategy for a vehicle operating system. <p>c) attitude (a)</p> <ol style="list-style-type: none"> 1. Strives to expand and deepen their knowledge. 2. Accepts and considers professional ethics principles binding on itself. 3. Is open and willing to cooperate. <p>d) autonomy and responsibility (o)</p> <ol style="list-style-type: none"> 1. Feels responsible for performing the work with the best results while adhering to ethical standards. 2. Is responsible for supervising the operation of the system entrusted to him/her. 				

3. Applies the professional knowledge within the given validity limits.

4. Knows its authority and performs the work independently within this, but always in cooperation with the colleagues and managers.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH1	1. 50%	1. t1-t3,k1-k3,a1-3,o1-4
2. midterm test	2. ZH2	2. 50%	2. t1-t3,k1-k3,a1-3,o1-4

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

26. Criteria to obtain a signature / midterm grade

Passing the midterm tests

28. Attendance and participation requirements

According to TVSZ

29. Retake and delayed completion

The midterm tests can be retaken twice.

30. Consultation

On request, at a separately agreed time.

31. Learning materials

Course bulletins available in moodle.

32. Start of validity for the subject description

September 1st, 2025

27. Grading rules

0-<50%: fail (1),
 50-<62%: pass (2),
 62-<75%: satisfactory (3),
 75-<87%: good (4),
 87-100%: excellent (5).