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

Transportation Engineering Master Programme
Recommended curriculum and subject descriptions

Valid from September 2025

Code:
6-MK_közös_2025

Recommended curriculum of the Transportation Engineering Master Programme

Start in February:

	1./spring	2./autumn	3./spring	4./autumn
1	Intelligens transportation systems BMEKOKKMSK1003-00 2 0 2 m 5 PK KTKG	Transport operation BMEKOKKMSK2001-00 2 2 0 e 5 PK KTKG	Project management in transportation BMEKOKKMSK3001-00 2 0 0 m 3 PK KTKG	Compulsory elective economics and human science 2 BMEGT% 1 1 0 m 3 CE GTK
2				
3				
4			Major compulsory elective course BMEKO% 1 1 0 m 3 MA	Elective course 1. BME% 2 0 0 m 3 EC
5	Decision making methods BMEKOKKMSK1002-00 3 1 0 m 6 PK KTKG	Transport informatics BMEKOKKMSK2004-00 2 0 2 e 5 PK KTKG	Compulsory elective economics and human science 1 BMEGT% 1 1 0 m 3 CE GTK	Elective course 2. BME% 2 0 0 m 3 EC
6			Specialisation 2 2 1 1 e m 6 SP	Specialisation 3 2 1 1 m m 6 SP
7	Passenger transportation systems BMEKOKKMSK1004-00 2 2 0 e 5 PK KTKG	Traffic flow BMEKOKKMSK2003-00 2 1 0 m 4 PK KTKG		
8		Transport safety M BMEKOKKMSK2002-00 2 1 0 m 4 PK KTKG	Master thesis 1. 0 8 0 m 15 IP	Master thesis 2. 0 8 0 m 15 IP
9	Transport economics M BMEKOKKMSK1001-00 1 1 0 e 4 PK KTKG	Specialisation 1 4 3 1 e e m 12 SP		
10	Transport automation M BMEKOKJMSK1001-00 3 2 0 m 6 PK KJIT			
11	Compulsory elective natural science knowledge BMETE% 3 0 0 m 4 CE TTK		Traineeship BMEKO__MSM4501-00 4weeks 0 0 s 0 CR	

Start in September:

	1./autumn	2./spring	3./autumn	4./spring
1	Transport operation BMEKOKKMSK2001-00 2 2 0 e 5 PK KTKG	Intelligens transportation systems BMEKOKKMSK1003-00 2 0 2 m 5 PK KTKG	Major compulsory elective course BMEKO% 1 1 0 m 3 MA	Project management in transportation BMEKOKKMSK3001-00 2 0 0 m 3 PK KTKG
2				
3				
4			Compulsory elective economics and human science 1 BMEGT% 1 1 0 m 3 CE GTK	Transport automation M BMEKOKJMSK1001-00 3 2 0 m 6 PK KJIT
5	Transport informatics BMEKOKKMSK2004-00 2 0 2 e 5 PK KTKG	Decision making methods BMEKOKKMSK1002-00 3 1 0 m 6 PK KTKG	Elective course 1. BME% 2 0 0 m 3 EC	
6			Specialisation 3 2 1 1 m m 6 SP	Compulsory elective economics and human science 2. BMEGT% 1 1 0 m 3 CE GTK
7	Traffic flow BMEKOKKMSK2003-00 2 1 0 m 4 PK KTKG	Passenger transportation systems BMEKOKKMSK1004-00 2 2 0 e 5 PK KTKG		Elective course 1. BME% 2 0 0 m 3 EC
8				
9	Transport safety M BMEKOKKMSK2002-00 2 1 0 m 4 PK KTKG	Transport economics M BMEKOKKMSK1001-00 1 1 0 e 4 PK KTKG	Master thesis 1. BMEKO__MSK3551-00 0 8 0 m 15 IP	Master thesis 2. BMEKO__MSK4551-00 0 8 0 m 15 IP
10				
11	Specialisation 1 4 3 1 e e m 12 SP	Compulsory elective natural science knowledge 3 0 0 m 4 CE TTK		
12		Specialisation 2 2 1 1 e m 6 SP		
13		Traineeship BMEKO__MSM4501-00 4weeks 0 0 s 0 CR		

BK	basic knowledge
PK / IP	professional knowledge / independent project
MA	major compulsory elective course
CE	compulsory elective economics and human science (BMEGT%) or natural science (BMETE%) course
EC	elective course
SP	specialisation
MI	minor compulsory elective course
CR	criteria requirement
	term for student mobility

Specialisations

Air traffic management specialisation

Safety in air traffic control BMEKOKJMSK2E02-00 1 1 0 f 3 SP KJIT	Communications, Navigation and Surveillance (CNS) 2 BMEKORHMSK3E01-00 1 1 0 v 3 SP KTKG	Air Traffic Management case study BMEKORHMSK4E01-00 0 2 0 f 3 SP RHT
Air Traffic Control BMEKORHMSK2E01-00 2 0 2 f 6 SP RHT	Air Traffic Management (ATM) BMEKORHMSK3E02-00 1 0 1 f 3 SP RHT	Meteorology BMEKORHMSK4E02-00 2 0 0 f 3 SP RHT
Communications, Navigation and Surveillance (CNS) 1. BMEKOKJMSK2E01-00 1 1 0 f 3 SP KJIT		

Transport automation specialisation

Modeling and control of vehicular traffic systems BMEKOKJMSK2B01-00 2 2 0 e 6 SP KJIT	Planning of transport automation systems BMEKOKJMSK3B01-00 2 0 2 e 6 SP KJIT	Signal processing in transport BMEKOKJMSK4B01-00 2 2 0 m 6 SP KJIT
Information connection of the vehicle and the track BMEKOKJMSK2B02-00 2 0 0 m 3 SP KJIT		
Transport automation project BMEKOKJMSK2B03-00 0 2 0 m 3 SP KJIT		

Transport engineering management specialisation

Strategic policy instruments in transportation BMEKOKKMSK2C03-00 2 1 1 e 6 SP KTKG	Financial techniques in transportation BMEKOKKMSK3C01-00 2 0 2 e 6 SP KTKG	Management of transport and logistic services BMEKOKKMSK4C01-00 <> 2 2 0 m 6 SP KTKG
Transport infrastructure management BMEKOKKMSK2C01-00 <> 1 1 0 m 3 SP KTKG		
Human resource management in transportation BMEKOKKMSK2C02-00 <> 1 0 1 m 3 SP KTKG		

NB: it is possible to include the subject groups indicated ("<>") in any order within Specialisation 1 and Specialisation 3 blocks.

Transport systems specialisation

Traffic modelling BMEKOKKMSK2A03-00 1 0 3 e 6 SP KTKG	City logistics BMEKOALMSK3A01-00 2 2 0 e 6 SP ALRT	Environmental effects of transport BMEKOKKMSK4A01-00 <> 2 2 0 m 6 SP KTKG
Electromobility BMEKOKKMSK2A02-00 <> 1 1 0 m 3 SP KTKG		
Smart city BMEKOKKMSK2A01-00 <> 2 0 0 m 3 SP KTKG		

NB: it is possible to include the subject groups indicated ("<>") in any order within Specialisation 1 and Specialisation 3 blocks.

Freight forwarding specialisation

Freight forwarding management 1. BMEKOKKMSM2D01-00 2 0 2 e 6 SP KTKG	Freight forwarding marketing BMEKOKKMSM3D02-00 1 0 1 m 3 SP KTKG	Supply chain operation control BMEKOALMSK4D02-00 <> 2 0 0 m 3 SP ALRT
	Trade, financial and accounting techniques BMEKOKKMSM3D01-00 1 0 1 m 3 SP KTKG	Packaging technology BMEKOALMSK4D01-00 <> 0 1 1 m 3 SP ALRT
Freight forwarding management 2. BMEKOKKMSM2D02-00 <> 2 0 2 e 6 SP KTKG		

NB: it is possible to include the subject groups indicated ("<>") in any order within Specialisation 1 and Specialisation 3 blocks.

Curriculum Supplement
(extracted from the study programme)

The Curriculum Supplement (curriculum appendix) contains **the system of subject prerequisites**, the rules for the selecting specializations, the description of the conditions for the **preparation of the Master thesis and the final examination**, as well as the order of the final examination.

1) The subject prerequisite system expresses the connections between the subjects. The specific subject prerequisites are included in the subject datasheets. This study programme has a so called **indicative prerequisite system**, that means – except in few cases at subjects from other faculties – there are only recommended prerequisites, with the following amendments:

The *recommended core prerequisite* points out a strong correlation with the learning outcomes of the previous subject, so that without meeting the preprequisite, registration for the subject is possible but professionally contraindicated. The *recommended coherent prerequisite* refers to the link between the learning outcomes of the subjects concerned, i.e. it is recommended that the subject is taken after or in parallel with the previous subject. The *recommended complementary prerequisite* reflects a looser link between the subjects, the learning outcomes of the subject can be achieved with some additional time.

2) *The rules for selection of specialisation, and the general conditions of registering for the specialisation subjects:*

There are no general rules for the selection of specialisation and for registering for the specialisation subjects.

3) *Enrollment rules for the Master thesis subjects in all specializations:*

The prerequisite for enrollment in the Master thesis I. course is the collection of a minimum of 56 credits.

The prerequisite for enrollment in the Master thesis II. course are the collection of a minimum of 84 credits and the completion of the four-week traineeship. The Master thesis I. course can be enrolled simultaneously as coherent requisite, in which case the above cumulative acquired credits must be achieved by completing another subjects according to the recommended curriculum.

4) *Term designated for student mobility:*

A student may participate in student mobility in the term designated for this purpose in the recommended curriculum, provided that the conditions laid down in the Code of Studies are met, and the subjects completed in the framework of the mobility are recognised as being the subjects due for the semester of the recommended curriculum which the student would have been entitled to take.

5) *Compulsory elective courses, recommended elective courses*

As part of the training programme, students must complete one (= 3 credits in total) major compulsory elective subjects, 6 credits in total from compulsory elective subjects in economic and human sciences (from the Faculty of Economic and Social Sciences), 4 credits in total from compulsory elective subjects in natural sciences (from the Faculty of Natural Sciences), and 6 credits in total elective subjects. The Faculty offers at least eight major compulsory elective subjects in the framework of the training programme. The student may choose the subjects at its discretion from among those announced in the current semester. The compulsory elective subjects in economics and human sciences, the major compulsory elective subjects and the elective subjects set out in the curriculum and announced in the current term are available in the study system. The current lists of major compulsory elective subjects and of recommended elective subjects are available on the Faculty website.

6) *Criteria for taking the final examination:*

Completion of all subjects included in the recommended curriculum, including elective subjects (all together at least 120 credits), submitting the Master thesis, and fulfillment of all criterion requirements in the curriculum (four weeks of traineeship).

7) *Final examination order:*

The final examination in front of the Final Examination Board consists of defending the Master thesis and passing oral final examinations from three subjects (or subject groups). The final examination subjects (or subject groups) are assigned by the Department responsible for the specialisation. The subjects must be selected partly from the professional subjects, and from the specialisation subjects, so that each subject has a minimum credit value of 3 and the knowledge of the three subjects (or subject groups) is at least 15 credits in total.

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. Term / role	the term and the role (k – compulsory; kv - compulsory elective; sp – specialisation; szv – elective) of subject in the recommended curriculum
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 oppportunities 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 decription	start of vailidy for the information laid down by the subject decription

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Air Traffic Control**				
2. Subject name in Hungarian	Air Traffic Control			**3. Programme**	K
4. Subject code	**BMEKORHMSK2E01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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**	44 hours	**Homework**	0 hours
Reading written materials	36 hours	**Midterm preparation**	44 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, Dr. Rohács Dániel		
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

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22. Programme of laboratories

Demonstration of the lecture topics through site visit.

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

The student

a) knowledge (t)

1. knows and understands air traffic control (T10)
2. understands the elements, processes and support systems of airspace and air traffic control (T10)
3. is familiar with the controller selection requirements, workload and human factors and their measurement (T10)

b) skills (k)

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

c) attitude (a)

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

d) autonomy and responsibility (o)

1. is be 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-t3,k1,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

pass the midterm test with at least 50% of the marks

27. Grading rules

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

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Repeated replacement of the midterm test is available.

30. Consultation

at a time and in a form agreed with the lecturers

31. Learning materials

Lecture slides, electronic course material

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Air Traffic Management (ATM)**				
2. Subject name in Hungarian	Air Traffic Management (ATM)			**3. Programme**	K
4. Subject code	**BMEKORHMSK3E02-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**0 practice**	**1 laboratory**	**10. Language**	**English**
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**	18 hours	**Homework**	0 hours
Reading written materials	20 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. 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, Dr. Rohács Dániel		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The student will acquire knowledge about the tasks and structure of ANSPs. Within this, the systems and methods required to provide ATM services and sub-services.

20. Programme of lectures

ANSP DEFINITION - The role of air traffic services. Their structure and operation. The main services.

ATM DEFINITION - History of the development of air traffic management. The need for air traffic management. Air traffic management in the air transport system.

BASIC UNITS - Air traffic management. International regulations governing traffic. Air Traffic Flow Management. Air Traffic Control. Air Space Management.

TODAY'S SYSTEMS - History of traffic growth. Major traffic nodes and directions. Structure and evolution of traffic.

FUTURE GOALS AND DOCUMENTS - Traffic statistics and forecasts. Single European Sky programme. SESAR developments. Clean Sky projects. FligthPath 2050.

DEVELOPED AND ADVANCED SYSTEMS - Separation and collision avoidance systems. Augmented reality tools. Remote Tower developments. Launch and slot management. Workload and stress measurement techniques.

21. Programme of practices

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22. Programme of laboratories

Demonstration of the lecture topics through site visit.

23. Learning outcomes (lower case) and their link to the traning 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 (T10)
2. knowledge of the system of traffic management and sub-processes, related methods and technologies and their capabilities (T10)
3. gain knowledge of the main areas of current research and specific research (T10)

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, meets deadlines

d) autonomy and responsibility (o)

1. is be 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-t3,k1,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

pass the midterm test with at least 50% of the marks

27. Grading rules

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

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Repeated replacement of the midterm test is available.

30. Consultation

at a time and in a form agreed with the lecturers

31. Learning materials

Lecture slides, electronic course material

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**ATM case study**				
2. Subject name in Hungarian	ATM case study			**3. Programme**	K
4. Subject code	**BMEKORHMSK4E01-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**0 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	31 hours
Reading written materials	31 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, Dr. Rohács Dániel		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Learn about the areas of the ATM specification through a practical project of choice.

20. Programme of lectures

-

21. Programme of practices

During the course, students must participate in a project from the ATC projects. Analyzing the tasks to be solved for the project objective.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows and understands the theoretical and practical foundations of the ATM field (T10)
2. understand the sources and methods of further learning in the ATM area (T10)

b) skills (k)

1. is able to summarise and illustrate the activities carried out in the project and use the necessary IT tools
2. is able to use the knowledge acquired in the ATM field

c) attitude (a)

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

d) autonomy and responsibility (o)

1. is be 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. creation of accepted project documentation	1. PD	1. 100%	1. t1,t2,k1,k2,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes

-	-	-	-

26. Criteria to obtain a signature / midterm grade	27. Grading rules
submission of project documetation	Excellent 80-100% Good 70-79% Satisfactory 60-69% Pass 50-59% Fail 0-49%
28. Attendance and participation requirements	
According to the rules of Study and Examination Regulations.	
29. Retake and delayed completion	
Repeated replacement of the project documentation is available.	

30. Consultation
at a time and in a form agreed with the lecturers
31. Learning materials
Supporting material published on the chosen topic
32. Start of validity for the subject decription
September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**City logistics**				
2. Subject name in Hungarian	Városi logisztika			**3. Programme**	K
4. Subject code	**BMEKOALMSK3A01-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	40 hours	**Homework**	46 hours
Reading written materials	14 hours	**Midterm preparation**	0 hours	**Exam preparation**	24 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator and its position	Dr. Sárdi Dávid Lajos senior lecturer	**15. Email address**	sardi.david@kjk.bme.hu
16. …organisational unit	Department of Material Handling and Logistics Systems		
17. Instructor(s)	Dr. Sárdi Dávid Lajos, Bakos András		

18. Indicative prerequisites

19. Purpose

To familiarize students with the operation and control of city logistics systems and related technologies, as well as the application of basic design methodologies.

20. Programme of lectures

Basics of urban freight transport, basic problems. Basics of the gateway concept. Vehicles in city logistics systems. Logistics services and logistics parks, certification practice in Hungary. Development opportunities for urban freight transport. City logistics in Hungary. City logistics developments in Budapest. City logistics systems of the concentrated sets of delivery locations, modeling in urban logistics. Application of urban brownfield areas in city logistics, topological modeling of urban areas. Multi-criteria evaluation of urban zones from a city logistics point of view. Application of cargo bikes and drones in city logistics systems for last-mile freight transport.

21. Programme of practices

Transportation problem and its solution methods. Centre search and its solution methods. Travelling Salesman Problem (TSP) and its solution methods. Vehicle Routing Problem (VRP) and its solution methods. Basics of packaging design. Sizing of city logistics systems, design of transportation connections to logistics sites. Material handling solutions, design of material handling processes. Fieldwork in the Váci utca shopping area.

22. Programme of laboratories

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

The student

a) knowledge (t)

1. knowledge of the basics of city logistics systems (T10)
2. knowledge of freight transport technologies in city logistics (T10)
3. knowledge of city logistics projects (T10)
4. network planning and network evaluation basics, knowledge of typical logistics network models (T10)
5. knowledge of solving typical city logistics planning problems (T10)

b) skills (k)

1. is able to identify and model problems in city logistics systems
2. is able to solve city logistics problems by selecting and applying appropriate solution methods and tools/software

c) attitude (a)

1. strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. first semester task 2. second semester task 3. fieldwork report	1. HF1 2. HF2 3. TM	1. 17,5% 2. 17,5% 3. 15%	1. t1-t5,k1,k2,a1,o1 2. t1-t5,k1,k2,a1,o1 3. t1-t5,k1,k2,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. written and oral exam	1. V	1. 50%	1. t1-t5,k1,k2,a1,o1

26. Criteria to obtain a signature / midterm grade

Participation at the city logistics fieldwork, completion of the semester tasks and the fieldwork report at least 50% level.

27. Grading rules

Excellent 87,5-100%
Good 75-87,5%
Satisfactory 62,5-75%
Pass 50-62,5%
Fail 0-50%

28. Attendance and participation requirements

According to the rules of CoS.

29. Retake and delayed completion

The semester tasks and the fieldwork report once can be resubmitted by the end of delayed completion week.

30. Consultation

At a time and in a form agreed with the teacher.

31. Learning materials

Students can download the electronic learning materials and other aids related to the subject from the e-learning framework used.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Communication, navigation and surveillance (CNS) 1.**				
2. Subject name in Hungarian	Communications, Navigation and Surveillance (CNS) 1.			**3. Programme**	K
4. Subject code	**BMEKOKJMSK2E01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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**	8 hours	**Homework**	8 hours
Reading written materials	26 hours	**Midterm preparation**	20 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. Meyer Dóra senior lecturer	**15. Email address**	meyer.dora@kjk.bme.hu
16. …organisational unit	Department of Control for Transport and Vehicle Systems		
17. Instructor(s)	Mudra István, Dr. Meyer Dóra Zsófia		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to provide students with a fundamental understanding of navigation principles and to familiarize them with the operation, structure, and maintenance of ground-based and satellite navigation systems. Students will develop the ability to perform navigation-related calculations and apply these systems in practical aviation contexts.

20. Programme of lectures

The basics of navigation. Coordinate systems, map types, calculation of navigation elements (eg direction, wind triangle, fuel consumption, flight time, flight speed), route planning. Theoretical background, structure, data traffic, operation and exercises of navigation systems. Ground systems: non-directional beacons (NDBs) / Automatic direction finder (ADF) GLOBAL NAVIGATION NAVIGATION SYSTEMS (GNSS) PRIMER RADAR AIRCRAFT CONTROL. Using Primary Radars. Characteristics of primary radars. Grouping radars according to their field of application. Antennas (PSR). Transmitter equipment. Receiver equipment. Plot extractor and signal processing. Plot combination. Transmission of data. ROAD RADAR (SMR). Aerodrome use of roller radars. SMR radar sensor. SMR display systems. SECONDARY RADAR SSR and MSSR. Use secondary radars. Antenna. SSR Interogator, Transponder. Customer. Plot extractor and signal processing. Combining Plot. THE S MODE. ADS. ADS-B techniques. S mode extended squitter. ADS-C techniques. MULTILATERATION (MLAT).

21. Programme of practices

Design tasks, maintenance tests, operational tests.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. understands the fundamental concepts and principles of navigation, including direction determination, types of maps, and navigation-related calculations (course, wind triangle, fuel consumption, flight time, and speed). (T10)

2. has comprehensive knowledge of the structure, operation, and data communication of ground-based, terrestrial, and global satellite navigation systems (NDB/ADF, DF, VOR, DME, ILS, MLS, GNSS, radars, ADS, MLAT). (T10)

3. is familiar with the maintenance and inspection procedures of navigation systems and their practical applications in aviation. (T10)

b) skills (k)

1. is able to independently perform route planning and navigation calculations (e.g., wind triangle, flight time, fuel consumption).

2. is capable of interpreting the operation of navigation systems, identifying malfunctions, and analyzing system performance characteristics.

3. is able to select and apply appropriate navigation systems (e.g., NDB, VOR, DME, ILS, GNSS) for different flight environments.

c) attitude (a)

1. demonstrates a commitment to accuracy, reliability, and adherence to standards in the application and management of navigation systems.

d) autonomy and responsibility (o)

1. takes responsibility for the correct processing of navigation data and the proper operation of the applied navigation systems, and is capable of making independent decisions related to these tasks.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. homework	1. ZH 2. HF	1. 85% 2. 15%	1. t1,t2,t3,k1,k2,k3 2. t1,t2,t3,k1,k2,k3,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

Passing the midterm test and the homework with at least satisfactory marks.

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Second retake or delayed completion of one of the obligations is possible.

30. Consultation

At a time and in a manner agreed upon with the instructor

31. Learning materials

lecture notes

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Communication, navigation and surveillance (CNS) 2.**				
2. Subject name in Hungarian	Communications, Navigation and Surveillance (CNS) 2.			**3. Programme**	K
4. Subject code	**BMEKORHMSK3E01-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**3**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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**	18 hours	**Homework**	0 hours
Reading written materials	14 hours	**Midterm preparation**	15 hours	**Exam preparation**	15 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, Dr. Rohács Dániel		
18. Indicative prerequisites	BMEKOKJMSK2E01-00 Communications, Navigation and Surveillance (CNS) 1. recommended core, - - -, - - -		

19. Purpose

The student will acquire knowledge of the communication, surveillance and data processing systems used in air traffic, input and output requirements, and operating principles.

20. Programme of lectures

Communication (COM): an introduction to voice communication. Air-ground communications (knowledge of air-ground communication elements on the CWP HMI, purpose and function of each element, future developments, CPDLC). Ground-ground communications (ground-ground communication elements on the CWP HMI, function of the communication centre in use, MFC, ATS Qsig, VoIP, future developments). Data communications (basics of data communications, flight specific networks and protocols, OLDI-FMTP, AFTN-AMHS, PENS). Data Processing (DAT): Introduction to data processing. Introduction to data processing. Introduction to FDP and SDP. SDP basic principles (plot processing, track training (single/multi track). FDP tasks (flight plan data update, code/callsign correlation). FDP (IFPS, route processing, code/callsign comparison, code assignment, track tagging). Different visualisation technologies.

Airspace Surveillance (SUR): Theory and practice of multilateration (LAM, WAM).

21. Programme of practices

Solving practical problems related to the theory presented in the lecture.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. can list CNS communication systems (T10)
2. is able to describe the basic principles of CNS systems (T10)
3. knows the practical application of CNS communication systems (T10)

b) skills (k)

1. can distinguish between air to ground and ground to ground systems
2. can even carry out market research based on their knowledge

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. understand the importance of their work and the consequences of errors

3. develops safety awareness

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH	1. 0%	1. t1-t3,k1,k2,a1,a2,o1-o3

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 100%	1. t1-t3,k1,k2,a1,a2,o1-o3

26. Criteria to obtain a signature / midterm grade

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

27. Grading rules

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

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Repeated replacement of the midterm test is available.

30. Consultation

at a time and in a form agreed with the lecturers

31. Learning materials

Lecture slides, electronic course material

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Decision making methods**				
2. Subject name in Hungarian	Döntéselőkészítő matematikai módszerek			**3. Programme**	K
4. Subject code	**BMEKOKKMSK1002-00**			**5. Term | role**	**1/2 | k**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**3 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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	74 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Sipos Tibor associate professor	**15. Email address**	sipos.tibor@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Sipos Tibor, Dr. Szabó Zsombor		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to provide students with comprehensive knowledge of mathematical modeling techniques, with a special focus on optimization methods applied in transportation. Students will learn the fundamentals of linear programming, including the simplex method and the practical use of primal-dual relationships. The course emphasizes solving typical transportation-related problems such as transportation and assignment models, as well as integer programming tasks. Students will explore network modeling and solution techniques for problems like maximum flow, minimum cost, shortest path, and critical path, and will learn to apply complex network planning methods. Additionally, the course covers the basics of integer programming, the branch-and-bound method, and solution approaches to classic combinatorial problems such as the knapsack problem and the traveling salesman problem.

20. Programme of lectures

Principles of mathematical modeling. Solving linear programming problems using the simplex methods. Application of primal-dual methods in the decision process. Programming methods applied frequently in the transportation: transportation, assignment models, integer programming methods. Network problems and methods: maximum flow, minimum-cost flow problem, shortest path problem, critical path method. Dynamic programming. Principles of nonlinear programming, game theory, stochastic processes. Queuing models and their application in the transportation. Stocking problems. Markov chains and their application in transportation. Forecasting. Simulation. MultiCriteria Analysis.

21. Programme of practices

Solving linear programming and other problems using computers, developing and solving simplified real life case studies.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Understands the mathematical foundations of linear programming problems and their applicability in modeling transport-related issues. (T1,T8)
2. Recognizes the types of network problems and solution methods, such as maximum flow and shortest path algorithms. (T1)
3. Knows the theoretical basis of special optimization models used in transportation (transportation, assignment, integer programming models). (T1,T8)

b) skills (k)

1. Able to solve linear programming problems using the simplex method. (K1)
2. Can model and solve network problems common in transportation. (K1,K2,K4)
3. Able to identify and apply dynamic and integer programming methods in transport contexts. (K2,K4,K11)
4. Participates in research or development tasks related to transport modeling. (K5,K14)

5. Communicates and publishes modeling results using professional language. (K13)

c) attitude (a)

1. Shows interest in applying new mathematical methods and modeling techniques in transportation. (A1)
2. Embraces the ethical and scientific values associated with the discipline. (A2)
3. Strives to apply complex, systems-based thinking in modeling and decision-making situations. (A7)

d) autonomy and responsibility (o)

1. Independently selects and applies the most appropriate mathematical modeling method for a given problem. (O1)
2. Takes responsibility for the correctness and consequences of modeling decisions. (O1)
3. Develops independent proposals for solving complex transport problems using modeling tools. (O1)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. midterm test	1. ZH1 2. ZH2	1. 50% 2. 50%	1. t1,t2,k1,k2,k3,k4,k5,a1,a2,a3,o1,o2,o3 2. t3,k1,k2,k3,k4,k5,a1,a2,a3,o1,o2,o3

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

27. Grading rules

Excellent 85-100%
Good 70-85%
Satisfactory 55-70%
Pass 40-55%
Fail 0-49%

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The midterms can be retaken according to the Code of Studies.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, presentation and further professional materials in electronic form

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Electromobility**				
2. Subject name in Hungarian	Elektromobilitás			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2A02-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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**	6 hours	**Homework**	35 hours
Reading written materials	6 hours	**Midterm preparation**	15 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Csonka Bálint senior research fellow	**15. Email address**	csonka.balint@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Csonka Bálint, Dr. Földes Dávid		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Purpose

Understanding the components, characteristics, functioning, relationships, trends and challenges of the electromobility system. Learn analytical and design methods, procedures and applications for the planning and operation of electromobility services through best practices and the semester-long design assignment.

20. Programme of lectures

Electromobility system; Electrification of urban bus networks; Vehicle and battery technology; Charging infrastructure and charging management; Economic and environmental impacts; Hydrogen-based electromobility.

21. Programme of practices

As part of the practice, students will be given a semester-long design assignment to solve individually or in groups. The results must be presented in 10-15 minutes by the students. The practice and the assignment are based on the following topics: Cluster analysis of bus routes based on operational characteristics; Linear programming in Matlab: objective functions, criteria, algorithms; Energy modelling of bus terminals and design of charging infrastructure; Modelling of bus network and design of trolleybus network; Optimisation of bus services: turn planning, charging management.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Knows and understands the specific methods, technologies, and applications of electromobility systems and solutions for the integration into the transport system (T10)
2. Knows the tools and methods related to linear programming modelling for electric bus services and charging management
3. Knows and understands the methodology and tools for the design and research of electromobility services

b) skills (k)

1. Able to process and organise information collected on electromobility, analyse it, draw conclusions and explore the connections and further develop services
2. Able to solve problems creatively and solve complex problems flexibly in the field of electromobility, based on a systems and process-oriented way of thinking
3. Able to assess the status of electromobility services, to develop an evaluation and a proposal, to develop, plan, organise and manage complex service systems at a high level

c) attitude (a)

1. Open and receptive to technological development and innovation in electromobility, and a credible presenter in the topic.
2. Strives to contribute to the development of new methods related to electromobility.

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.

4. 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.

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

2. Makes responsible decisions in analysis, planning and operation of electromobility services, and formulates independent proposals to solve identified challenges

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. urban bus service electrification assignment	1. ZH 2. HF	1. 50% 2. 50%	1. t1,t2,t3,k1,k3,a1,a3,a4,o1,o2, 2. t1,t2,t3,k1,k2,k3,a1,a2,a3,a4,o2

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

27. Grading rules

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

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 decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Environmental effects of transport**				
2. Subject name in Hungarian	Közlekedés környezeti hatásai			**3. Programme**	K
4. Subject code	**BMEKOKKMSK4A01-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	13 hours	**Homework**	30 hours
Reading written materials	71 hours	**Midterm preparation**	10 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Török Ádám professor	**15. Email address**	torok.adam@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Török Ádám		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to provide students with a comprehensive understanding of the environmental impacts of transportation and the tools and strategies available for developing sustainable transport systems. The course explores the interactions between transportation and the environment, the challenges of sustainability, and the regulatory frameworks, policies, trends, and best practices aimed at mitigating environmental impacts. It covers the role of Environmental Impact Assessments (EIA) in transportation decision-making, the integration of transport and land-use planning, and environmental conflicts in freight transport. Special emphasis is placed on intermodality, sustainable urban mobility, and cost internalization of transport externalities. Students will gain insight into pricing mechanisms such as parking and usage fees, as well as environmentally friendly propulsion technologies, alternative fuels, and energy-efficient vehicles.

20. Programme of lectures

Transport- environment, factors of environmental impact, the problem of sustainability. Mitigation of environmental impacts of transport, regulations, policies, tendencies, practices. Local and international case studies. EIA, decision making, preparation of decisions on the field of transport infrastructure development. Integration of transport and land use policies. Environmental conflicts of freight transport, intermodality and transit policies. Environmental costs of transport, the case of externalities, prices and charges. Urban transport, opportunities of sustainable urban environmental management, integration of environmentally sound mobility forms. Sustainable Urban Mobility Plans. Demand management, parking and road charges. Requirements of fuel efficiency, alternative fuels, energy efficient and environmentally enhanced vehicles.

21. Programme of practices

Internal and external discussions, consulations with experts and representatives of firms, instiurions dealing with transport environmental impact, referring to certain elements of the curricula.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Knows and understands the environmental impact factors of transport, including physical and health effects, and the methods for their mitigation through regulations and technology.
2. Recognizes the three pillars of sustainability (environmental, economic, social) and their transport-related aspects and criteria.
3. Describes the steps of Environmental Impact Assessment (EIA) related to transport infrastructure development and the basics of national and international regulations.
4. Knows the methods and regulatory tools for internalizing and charging for the external costs of transport.
5. Understands the technical and regulatory characteristics of sustainable propulsion systems and alternative fuels.

b) skills (k)

1. Applies the principles of sustainable transport planning when designing or upgrading transport systems, both individually and in teams.
2. Analyzes and evaluates the environmental impacts of transport systems and proposes reduction strategies.
3. Designs and manages the environmentally conscious operation of transport systems, considering the protection of the natural, built, and social environment.
4. Applies and further develops environmental planning and regulatory methods within the transport sector.

c) attitude (a)

1. Strives to reduce the environmental burdens of transport and is open to exploring and applying innovative, sustainable solutions.
2. Accepts and advocates for the principle of prevention in addressing environmental challenges in transport and promotes related communication.
3. Values minimizing environmental impacts in both the development and operation of transport infrastructure.

d) autonomy and responsibility (o)

1. Takes responsibility for enforcing environmental and sustainability principles in transport engineering development, research, and operation.
2. Formulates independent proposals for the implementation and improvement of sustainability-focused transport solutions.
3. Recognizes the long-term environmental consequences of transport decisions and is capable of making responsible decisions accordingly.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. independent research assignment	1. ZH 2. F	1. 50% 2. 50%	1. t1,t2,t3,t4,t5,k2,k4 2. k1,k2,k3,k4,a1,a2,a3,o1,o2,o3

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

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Delayed submission and presentation of assignments and fulfilment of failed or not acceptable written tests, during the delayed completion week

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture notes, presentation and further professional materials in electronic form

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Financial techniques in transportation**				
2. Subject name in Hungarian	Finanszírozási technikák a közlekedésben			**3. Programme**	K
4. Subject code	**BMEKOKKMSK3C01-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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**	15 hours	**Homework**	35 hours
Reading written materials	25 hours	**Midterm preparation**	19 hours	**Exam preparation**	30 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Kővári Botond associate professor	**15. Email address**	kovari.botond@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Kővári Botond		

18. Indicative prerequisites	- - -, - - -, - - -

19. Purpose

Acquiring knowledge about financing investments and their return.

20. Programme of lectures

Concepts of financing: financing goals (development, operation); financing options: budget, private or public-private partnerships (PPP); loan, bond, lease and their characteristics. Significance of the PPP trabsport projects. Project analysis and evaluation methods. Project identification, technical preparation, traffic forecast and modeling. Risk assessment needs. Feasibility studies, cost-benefit analysis, financial, social, legal, regulatory and technical compliance criterias. The identification of project risks. Definition of government, regional and local priorities. The role of the partners in the project financing. Communication tasks. The media's role for accepting the project financing methods by the society. Optimizing fees and tariffs. Financial structures and models. Contracts.

21. Programme of practices

-

22. Programme of laboratories

Computer labs for making modell calculations to illustrate and practice the details of project finance, and for analyzing case studies.

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

The student

a) knowledge (t)

1. knows the main economic and financial processes of projects necessary for the implementation of developments in the field of transport, transportation and logistics (T10)
2. understands the operation of PPP-type investments (T10)
3. knows the purpose and structure of cost-benefit analyses (T10)
4. knows the process of project evaluation and risk analysis (T10)

b) skills (k)

1. evaluates the economic and financial efficiency of projects
2. analyzes the efficiency of investments
3. analyzes the risks arising during the investment

c) attitude (a)

1. strives to the best of his/her abilities to solve complex economic tasks
2. strives to solve complex problems in his/her work, always taking into account multiple aspects

d) autonomy and responsibility (o)

1. is able to solve economic and marketing problems independently or as part of a team to a high standard

2. feels responsible for the results and quality of his work

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. homework paper	1. ZH 2. F1	1. 25% 2. 50%	1. t1,t2,t3,t4,k1,k2,k3,o1 2. t1,t2,t3,t4,k1,k2,k3,a1,a2,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 25%	1. t1,t2,t3,t4,k1,k2,k3,a1,o2

26. Criteria to obtain a signature / midterm grade

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

27. Grading rules

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

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

Suggested books and papers, papers given on the lecture.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Freight forwarding management 1.**				
2. Subject name in Hungarian	Szállítmányozási menedzsment 1.			**3. Programme**	KL
4. Subject code	**BMEKOKKMSM2D01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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. Duleba Szabolcs, Dr. Mészáros Ferenc		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to introduce the freight transport field, to familiarise students with the basic concepts and rules, and to explore the tariff, customs and insurance processes related to the freight transport.

20. Programme of lectures

General knowledge of freight forwarding: evolution, position and market of freight forwarding. Fundamentals. Contract of carriage and forwarding. Special tasks of dangerous goods, perishable goods, live animals, plant products. Forwarding of overweighted and oversized items, weekend traffic restrictions. Customs and customs procedures, application rules. Product protection. Pricing methods in contracting. Forwarding parities. Insurances used in freight forwarding.

21. Programme of practices

-

22. Programme of laboratories

Students process, investigate, and critically evaluate individual case study reports on current freight forwarding topics.

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

The student

a) knowledge (t)

1. know the basic concepts and legal framework of national and international freight transport and freight forwarding (L:T2,T6,T8,T9)
2. recognise the differences in the organisation and performance of general and special transit tasks (K:T10;L:T2,T9)
3. knows the concepts related to tariffs and parities (L:T2,T6,T9)
4. understand terms related to customs and insurance (L:T2,T8,T9)

b) skills (k)

1. apply and implement legislation concerning freight transport and freight forwarding (L:K10)
2. plan and calculate the freight charges to be levied (L:K1,K11,K13)
3. consider and select the parities to be used for the transport operation (L:K4,K7,K13)
4. analyses and calculates the customs duty payable in the system of the consignor/consignee relationship and proposes ways of optimising the associated costs (L:K1,K2,K4,K7,K13)

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 (L:A2,A4,A5,A7,A8,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 (L:A1,A3,A6)

d) autonomy and responsibility (o)

1. in addition to the narrow professional aspects, ensures sustainability aspects in the use of his/her knowledge, is able to self-check and correct errors independently by listening to the professional opinion of others (L:O3,O4)

2. makes responsible decisions in the field of transport management in response to open questions and formulates independent proposals to solve identified challenges (L:O1,O2,O5)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. midterm test 3. case study	1. ZH1 2. ZH2 3. ET	1. 20% 2. 20% 3. 20%	1. t1,t2,k1 2. t3,t4,k2,k3,k4 3. k2,k3,k4,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 40%	1. t1,t2,t3,t4,k1,k2,k3,k4,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 individual case study by the deadline

27. Grading rules

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

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

Bokor, Z. (2013) Freight forwarding (in Hungarian). Course book, BME Dept. of Transport Technology and Economics

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Freight forwarding management 2.**				
2. Subject name in Hungarian	Szállítmányozási menedzsment 2.			**3. Programme**	KL
4. Subject code	**BMEKOKKMSM2D02-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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. Duleba Szabolcs, Dr. Mészáros Ferenc		
18. Indicative prerequisites	BMEKOKKMSM2D01-00 Szállítmányozási menedzsment 1. recommended coherent, - - -, - - -		

19. Purpose

The aim of the course is to provide a sub-sector specific introduction to the freight transport sector, to describe the intermodal transport chains, to introduce the basic concepts and rules of the sub-sector and to explore the charging processes related to sub-sectorial, intermodal, and groupage transport.

20. Programme of lectures

Mode-specific knowledge of freight forwarding. International and domestic conventions / rules, technology and pricing of freight haulage and forwarding on road. International and domestic conventions / rules, technology and pricing of freight haulage and forwarding on rail. International and domestic conventions / rules, technology and tariffs of freight haulage and forwarding for inland waterway transports. International and domestic conventions / rules, technology and pricing of freight haulage and forwarding of maritime transport and shipping. International and domestic conventions / rules, technology and pricing of freight haulage and forwarding for air transports. International and domestic conventions / rules, technology and pricing for combined freight transports. International and domestic conventions / rules, technology, and pricing for groupage freight transports.

21. Programme of practices

-

22. Programme of laboratories

Students process, investigate, and critically evaluate individual case study reports on current freight forwarding topics according to their own expert interests.

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

The student

a) knowledge (t)

1. know the basic concepts and legal framework of national and international freight transport and freight forwarding (L:T2,T6,T8,T9)
2. as a mode of transport, recognises the differences in the organisation and performance of general and special transit tasks (K:T10;L:T2,T9)
3. knows the concepts related to mode-specific tariffs and parities (L:T2,T6,T9)
4. understands terms and operational rules related to the areas of intermodal transport chains and groupage (L:T2,T8,T9)

b) skills (k)

1. apply and implement the legislation concerning the sub-sector-specific freight transport and forwarding tasks (L:K10)
2. plan and calculate the freight charges to be levied according to the mode (L:K1,K11,K13)
3. considers and selects the parcels and modes of transport to be used for the transport operation (L:K4,K7,K13)
4. propose a transport chain design and optimise the related costs (L:K1,K2,K4,K7,K13)

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 (L:A2,A4,A5,A7,A8,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 (L:A1,A3,A6)

d) autonomy and responsibility (o)

1. in addition to the narrow professional aspects, ensures sustainability aspects in the use of his/her knowledge, is able to self-check and correct errors independently by listening to the professional opinion of others (L:O3,O4)

2. makes responsible decisions in the field of transport management in response to open questions and formulates independent proposals to solve identified challenges (L:O1,O2,O5)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. midterm test 3. case study	1. ZH1 2. ZH2 3. ET	1. 20% 2. 20% 3. 20%	1. t1,t2,t3,k1,k2,k3,k4 2. t2,t3,t4,k1,k2,k3,k4 3. k2,k3,k4,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 40%	1. t1,t2,t3,t4,k1,k2,k3,k4,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 individual case study by the deadline

27. Grading rules

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

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

Bokor, Z. (2013) Freight forwarding (in Hungarian). Course book, BME Dept. of Transport Technology and Economics

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Freight forwarding marketing**				
2. Subject name in Hungarian	Szállítmányozási marketing			**3. Programme**	KL
4. Subject code	**BMEKOKKMSM3D02-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**0 practice**	**1 laboratory**	**10. Language**	**English**
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**	25 hours
Reading written materials	12 hours	**Midterm preparation**	15 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Kővári Botond associate professor	**15. Email address**	kovari.botond@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Kővári Botond		

18. Indicative prerequisites	- - -, - - -, - - -

19. Purpose

To familiarize students with market processes and customer habits.

20. Programme of lectures

Marketing definition, specialized areas in transportation. Relation between product-market, price-quality. Sales function and benefit of the company in the view of marketing. Market research methods, consumer market types. Competition and target market analysis. Product life cycle. Analyzing the resources. Service marketing.

21. Programme of practices

-

22. Programme of laboratories

Market and product analysis. Case studies about market position. Calculations about product mix analysis of a company.

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

The student

a) knowledge (t)

1. knows the structure and tasks of the marketing strategy of companies (K:T10;L:T9)
2. knows the methods of product mix analysis (K:T10;L:T9)
3. knows the methods of market analysis (K:T10;L:T9)

b) skills (k)

1. evaluates the functioning of the market (L:K1)
2. evaluates and manages the portfolio of companies (L:K1,K9,K10,K11)

c) attitude (a)

1. strives to the best of his/her abilities to solve complex economic tasks (L:A1,A2,A4,A5,A7)
2. strives to solve complex problems in his/her work, always taking into account multiple aspects (L:A3,A6,A8,A9,A10)

d) autonomy and responsibility (o)

1. is able to solve economic and marketing problems independently or as part of a team to a high standard (L:O1,O2,O5)
2. feels responsible for the results and quality of his work (L:O3,O4)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. homework paper	1. ZH 2. F1	1. 50% 2. 50%	1. t1,t2,t3,k1,k2,o1 2. t1,t2,t3,k1,k2,a1,a2,o2

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 and submission of the homework paper	Excellent 88-100% Good 75-87% Satisfactory 63-74% Pass 50-62% Fail 0-49%
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

Suggested books and papers, papers given on the lecture.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Human resource management in transportation**				
2. Subject name in Hungarian	Közlekedési humán erőforrás menedzsment			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2C02-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**0 practice**	**1 laboratory**	**10. Language**	**English**
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**	20 hours
Reading written materials	12 hours	**Midterm preparation**	20 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Kővári Botond associate professor	**15. Email address**	kovari.botond@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Kővári Botond		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Acquiring knowledge related to human resource development.

20. Programme of lectures

Carrier planning, ability development, time management, recruitment, presentation, negotiation techniques. Special human management knowledge in transport companies: culture, trainings, stress, teamwork, leadership evaluation.

21. Programme of practices

-

22. Programme of laboratories

On labor meetings, students make a homework presentation and discuss each others papers.

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

The student

a) knowledge (t)

1. knows the structure and tasks of the human management strategy of companies (T10)
2. knows the goals of motivation and the process of effective workforce allocation (T10)
3. knows effective communication techniques (T10)

b) skills (k)

1. evaluates the operation of the human management system
2. evaluates and manages the performance of employees

c) attitude (a)

1. strives to the best of his/her abilities to solve complex economic tasks
2. strives to solve complex problems in his/her work, always taking into account multiple aspects

d) autonomy and responsibility (o)

1. is able to solve economic and marketing problems independently or as part of a team to a high standard
2. feels responsible for the results and quality of his work

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. homework paper	1. ZH 2. F1	1. 50% 2. 50%	1. t1,t2,t3,k1,k2,o1 2. t1,t2,t3,k1,k2,a1,a2,o2

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 test and submission of the homework paper

27. Grading rules

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

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

Suggested books and papers, papers given on the lecture.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Information connection of the vehicle and the track**				
2. Subject name in Hungarian	Jármű-pálya információs kapcsolata			**3. Programme**	K
4. Subject code	**BMEKOKJMSK2B02-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**0 laboratory**	**10. Language**	**English**
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**	24 hours
Reading written materials	22 hours	**Midterm preparation**	12 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 Géza associate professor	**15. Email address**	szabo.geza@kjk.bme.hu
16. …organisational unit	Department of Control for Transportation and Vehicle Systems		
17. Instructor(s)	Dr. Szabó Géza		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The course provides an overview of the procedures and methods of information transfer between the vehicle and the track in different transport sectors. In addition, it presents technologies and traffic management methods developed based on information transfer. The course focuses on the needs assessment, specification and selection of appropriate technology for communications in transport systems.

20. Programme of lectures

Specifics of communications; general communication techniques. Wired and broadcast transmissions; characteristics of broadcast transmissions. Steps to specify communication needs; the conditions for fulfilling the specification; choice of available technologies for communication.

21. Programme of practices

-

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. understands and can apply communication techniques; has knowledge of communication theory related to transport and vehicle engineering.

b) skills (k)

1. is able to analyze or specify communication sub-systems in the field of transport and vehicle.

c) attitude (a)

1. participates in solving communication problems in the field of transport or vehicle, to work efficiently and willingly with specialists of other fields (in particular: electrical engineering).

d) autonomy and responsibility (o)

1. is aware of and treats the responsibility associated with the task solution during transport system communication analysis and specification.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH	1. 40%	1. t1,k1,a1,o1
2. midterm test	2. ZH	2. 40%	2. t1,k1,a1,o1
3. individual homework	3. EF	3. 20%	3. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

For the final mark the individual homework and the two midterm test shall be completed.

27. Grading rules

0%-49%: fail; 50%-60%: pass; 61%-70%: satisfactory; 71-80%: good; 81%-100%: excellent

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

One midterm test can be retried and the homework can be delayed submitted at the end of the semester.

30. Consultation

Consultation is possible at a time and in a form agreed with the teacher.

31. Learning materials

Lecture Notes

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Intelligens transportation systems**				
2. Subject name in Hungarian	Intelligens közlekedési rendszerek			**3. Programme**	K
4. Subject code	**BMEKOKKMSK1003-00**			**5. Term | role**	**1/2 | k**
6. Credits	**5**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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**	10 hours	**Homework**	44 hours
Reading written materials	10 hours	**Midterm preparation**	30 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Tóth János associate professor	**15. Email address**	toth.janos@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Tóth János, Dr. Esztergár-Kiss Domokos, Soltész Tamás		

18. Indicative prerequisites	- - -, - - -, - - -

19. Purpose

Understanding the characteristics of intelligent transportation systems, application of GIS. Understanding the MaaS concept.

20. Programme of lectures

Keywords of intelligent transport systems. ITS directive of EU. Classification of ITS systems based on transport modes. Tasks of a mobility management system, the structure of the integrated transport database. Data standards. The NESZIP an NEJP systems. Features of Demand Responsive Transport, area of use, classification of systems. Route planning of DRT, economic features. Hungarian and international best practices.

21. Programme of practices

-

22. Programme of laboratories

Introduction to GIS, QGIS practice, Location based services, Route planning methods, Multimodal journey planners, Mobility as a Service, Transportation databases and data collection systems, Homework presentations.

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

The student

a) knowledge (t)

1. Familiar with types and features of ITS, the relevant terms and standards. (T3,T9)
2. Knows the attributes and advantages of multimodal systems. (T3)
3. Knows the conditions of development demand responsive transport. (T3,T5)

b) skills (k)

1. Ability to apply of GIS in planning of ITS systems. (K3,K7,K14)
2. Able to examine and analyse ITS systems. (K4,K6)

c) attitude (a)

1. Strive to acquire the highest level of system approach (A1,A2,A3,A4,A6,A7,A10)

d) autonomy and responsibility (o)

1. Responsible applies of acquired knowledge in individual or in team work. (O3)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. homework, 2. homework, 3. theoretical midterm test, 4. pracical midterm test.	1. HF1, 2. HF2, 3. ZHe, 4. ZHgy	1. 17% 2. 17% 3. 33% 4. 33%	1. k1,a1 2. k1,a1 3. t1,t2,t3,k2,o3 4. k1,o3

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

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

27. Grading rules

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

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

30. Consultation

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

31. Learning materials

Presentation slides

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Management of transport and logistic services**				
2. Subject name in Hungarian	Közlekedési és logisztikai szolgáltatások menedzselése			**3. Programme**	K
4. Subject code	**BMEKOKKMSK4C01-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	19 hours	**Homework**	35 hours
Reading written materials	35 hours	**Midterm preparation**	35 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Kővári Botond associate professor	**15. Email address**	kovari.botond@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Kővári Botond		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Purpose

Mastering the economic characteristics of the transport and logistics market.

20. Programme of lectures

Features of transport and logistics services markets. Identifying factors that determine the needs for transport and logistic services. Methods for determining demand. Quantification of service quality. Defining and calculating KPI numbers.

21. Programme of practices

Development of a transport or logistics service performance indicator system.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows the specifics of the transport and logistics service markets (T10)
2. understands the methods of determining the demand appearing in the market (T10)
3. knows the theoretical and practical solutions for measuring service quality (T10)
4. knows the steps of developing a service performance indicator system (T10)

b) skills (k)

1. evaluates the most important problems to be solved in the transport and logistics system
2. evaluates and manages the appropriate KPI indicators

c) attitude (a)

1. strives to the best of his/her abilities to solve complex economic tasks
2. strives to solve complex problems in his/her work, always taking into account multiple aspects

d) autonomy and responsibility (o)

1. is able to solve economic and marketing problems independently or as part of a team to a high standard
2. feels responsible for the results and quality of his work

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes

1. midterm test 2. homework paper	1. ZH 2. F1	1. 50% 2. 50%	1. t1,t2,t3,t4,k1,k2,o1 2. t1,t2,t3,t4,k1,k2,a1,a2,o2

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 test and submission of the homework paper

27. Grading rules

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

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

Suggested books and papers, papers given on the lecture.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Meteorology**				
2. Subject name in Hungarian	Meteorology			**3. Programme**	K
4. Subject code	**BMEKORHMSK4E02-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**0 laboratory**	**10. Language**	**English**
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**	0 hours
Reading written materials	36 hours	**Midterm preparation**	22 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Aeronautics and Naval Architecture		
14. Subject coordinator and its position	Jankovics István assistant lecturer	**15. Email address**	jankovics.istvan@kjk.bme.hu
16. …organisational unit	Department of Aeronautics and Naval Architecture		
17. Instructor(s)	Jankovics István		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Students will learn about the meteorological phenomena affecting aviation and their impact on air traffic, as well as the forecasting and information methods and messages used in aviation.

20. Programme of lectures

ATMOSPHERE – Structure of the atmosphere. Properties of atmosphere . The International Standard Atmosphere.
VISIBILITY – Basics, Humidity, Haze, Measurement
CLOUDS, PRECIPITATION – Cloud formation. Convection. Cloud Classification. Precipitation,
WINDS, THUNDERSTORMS, ICING – WINDS. Measurement. Forces. Wind Gradient. Thunderstorms, Supercells, Dangers of thunderstroms.
AIR MASSES AND WEATHER FRONT– Warm front. Cold Front. Occlusion. Stationary front. Convergence and squall lines.
GLOBAL CLIMATOLOGY - Climatology. Jetstream. Low and High pressure areas..
WEATHER REPORTS – Weather infromation. Weather Reports and Forecasts (METAR, TAF and others)

21. Programme of practices

-

22. Programme of laboratories

-

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

The student
a) knowledge (t)
1. Knows the meteorological phenomena affecting air traffic, their impact and threats to air traffic (T10)
2. Is familiar with the weather and forecast information methods used in aviation (T10)
b) skills (k)
1. Is able to assess the impact of a given weather phenomenon on aviation, from a safety, economic, operational, etc. perspective (K2, K3, K6, K9)
2. Is able to to interpret different aeronautical meteorological messages
c) attitude (a)
1. strives for precise, aesthetic, clear and transparent documentation
2. is interested, responsive, meets deadlines
d) autonomy and responsibility (o)
1. is be 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,t2,k1,k2,a1,a2,o1,o2

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

27. Grading rules

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

28. Attendance and participation requirements

According to the rules of Study and Examination Regulations.

29. Retake and delayed completion

Repeated replacement of the midterm test is available.

30. Consultation

at a time and in a form agreed with the lecturers

31. Learning materials

The presentation about the lectures
Literature

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Modeling and control of vehicular traffic systems**				
2. Subject name in Hungarian	Járműforgalmi rendszerek modellezése és irányítása			**3. Programme**	K
4. Subject code	**BMEKOKJMSK2B01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	0 hours	**Homework**	34 hours
Reading written materials	32 hours	**Midterm preparation**	24 hours	**Exam preparation**	34 hours

13. Organisational unit in charge	Department of Control for Transport and Vehicle Systems		
14. Subject coordinator and its position	Dr. Varga István professor	**15. Email address**	varga.istvan@kjk.bme.hu
16. …organisational unit	Department of Control for Transportation and Vehicle Systems		
17. Instructor(s)	Dr. Varga István, Dr. Tettamanti Tamás, Wágner Tamás		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Purpose

The aim of the course is to familiarise students with the design and operation of road traffic management systems, from modeling and measurement to applied control tools/methods.

20. Programme of lectures

Road Traffic Measurements – Smoothing, Filtering, and Prediction

Moving Average, Exponential Smoothing, Recursive Least Squares Estimator, Kalman Filter, Moving Horizon Estimation (MHE), Kriging, Genetic Algorithms (GA)

Macroscopic (Store-and-Forward) Traffic Modeling

Microscopic Traffic Modeling

Mesoscopic Traffic Modeling

Application of Artificial Intelligence (AI) in Road Traffic Automation

21. Programme of practices

Application of Store-and-Forward Traffic Modeling

LQR for Urban Perimeter Control

Fundamental Diagram Fitting

Microscopic Traffic Modeling

Mesoscopic Traffic Modeling

Application of Artificial Intelligence (AI) in Road Traffic Automation

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. understands the structure and operation of traffic control systems, and is familiar with the levels and methods of traffic modeling (T9)

b) skills (k)

1. capable of modeling a traffic network, designing its control, and designing traffic measurement and estimation systems (K11)

c) attitude (a)

1. open to conduct research in traffic management systems (A2)

d) autonomy and responsibility (o)

1. able to independently design traffic management strategies (O3)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. written midterm test	1. ZH	1. 50%	1. t1,k1
2. practice task 1.	2. GYF1	2. 0%	2. t1,k1,a1,o1
3. practice task 2.	3. GYF2	3. 0%	3. t1,k1,a1,o1
4. practice task 3.	4. GYF3	4. 0%	4. t1,k1,a1,o1
5. practice task 4.	5. GYF4	5. 0%	5. t1,k1,a1,o1
6. practice task 5.	6. GYF5	6. 0%	6. t1,k1,a1,o1
7. practice task 6.	7. GYF6	7. 0%	7. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. Vizsga	1. 50%	1. t1,k1,a1,o1

26. Criteria to obtain a signature / midterm grade

Submission of assignments on lessons and successful (min. 50%) completion of the midterm test

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Second retake or delayed completion of the midterm test is possible.

30. Consultation

Consultation is possible at a time and in a form agreed with the teacher.

31. Learning materials

Materials for lectures and tutorials shared on the Moodle site of the course, BME Közlekedésautomatikai Tanszék, Budapest, 2007; Luspay T., Tettamanti T., Varga I.: Forgalomirányítás, Közúti járműforgalom modellezése és irányítása, ISBN 978-963-279-665-9, Typotex Kiadó Budapest, 2011; Tettamanti T., Varga I., Csikós A.: Közúti mérések, Typotex Kiadó, Budapest, 2016

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Packaging technology**				
2. Subject name in Hungarian	Csomagolástechnika			**3. Programme**	K
4. Subject code	**BMEKOALMSK4D01-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**0 lecture**	**1 practice**	**1 laboratory**	**10. Language**	**English**
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**	30 hours
Reading written materials	15 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator and its position	Dr. Kovács Gábor senior lecturer	**15. Email address**	kovacs.gabor@kjk.bme.hu
16. …organisational unit	Department of Material Handling and Logistics Systems		
17. Instructor(s)	Dr. Kovács Gábor, Bakos András		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Purpose

To familiarize students with the basic knowledge of packaging technology related to logistics, which can be used in practice, and with the basics of packaging design.

20. Programme of lectures

-

21. Programme of practices

Solution of the calculation related to the selection of transport packaging that fits a given consumer packaging product, the development of an optimal pallet unit load. The placement of information bearing objects. Preparing for homework.

22. Programme of laboratories

Computer-aided packaging design. 3D packaging design. Unit load creation under laboratory conditions. Vehicle loading plan creation with the aid of softwares.

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

The student

a) knowledge (t)

1. knows the basics of packaging technology and the material used (T10)
2. knows the logistics aspects, requirements and design tools of packaging technology (T10)

b) skills (k)

1. can design and use transport packages and unit loads correctly

c) attitude (a)

1. strives to organize and execute packaging processes precisely during his/her work
2. interested in new things, has a cooperative attitude towards organizing packaging processes

d) autonomy and responsibility (o)

1. independently responsible for operating packaging processes, performing basic organizational and planning tasks
2. aware of the significance of his work and the consequences of mistakes

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. semester task	1. F	1. 100%	1. t1,t2,k1,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

At least 50% performance of the semester task is the condition of the final grade.

27. Grading rules

Excellent 87,5-100%
Good 75-87,5%
Satisfactory 62,5-75%
Pass 50-62,5%
Fail 0-49%

28. Attendance and participation requirements

According to the rules of CoS.

29. Retake and delayed completion

A semester task once can be resubmitted by the end of delayed completion week.

30. Consultation

At a time and in a form agreed with the teacher.

31. Learning materials

Students can download the electronic learning materials and other aids related to the subject from the e-learning framework used.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Passenger transportation systems**				
2. Subject name in Hungarian	Személyközlekedési rendszerek			**3. Programme**	K
4. Subject code	**BMEKOKKMSK1004-00**			**5. Term | role**	**1/2 | k**
6. Credits	**5**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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. To practice the application of the methods through data collection, analysis, evaluation, and planning tasks, taking into account geographical, settlement, and socio-demographic characteristics.

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 presentations. Students are given (home) assignments to be solved independently (and/or in groups). Presentation of the results of the assignments.

22. Programme of laboratories

-

23. Learning outcomes (lower case) and their link to the traning 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.

27. Grading rules

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

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 decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Planning of transport automation systems**				
2. Subject name in Hungarian	Közlekedésautomatikai rendszerek tervezése			**3. Programme**	K
4. Subject code	**BMEKOKJMSK3B01-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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**	25 hours	**Homework**	35 hours
Reading written materials	46 hours	**Midterm preparation**	0 hours	**Exam preparation**	18 hours

13. Organisational unit in charge	Department of Control for Transport 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, Dr. Tettamanti Tamás, Lövétei István Ferenc, Farkas Balázs		

18. Indicative prerequisites	- - -, - - -, - - -

19. Purpose

Presentation of the development, safety aspects and systems integration of traffic control and safety equipment.

20. Programme of lectures

1. Air transport:
Airline side operation of civil air traffic management, software, practice.
Daily maintenance and operation theory of civil aircrafts.
Complex process design knowledge in civil aviation control.
Software for the air traffic control, its input and output data, HMI.
Automation systems at the airport.
The ground handling processes.
Planning of the airside operation.
2. Road transport:
Modelling and controlling the road traffic by MATLAB-SIMULINK.
Microscopic modelling of the road traffic by VISSIM simulator, realization of high level modelling techniques by programming VISSIM-COM-MATLAB.
Application of the QGIS software to perform basic geoinformatics tasks.
Macroscopic modelling of the road traffic by VISUM simulator.
3. Rail transport:
Design steps in the field of interlocking and connected systems. Levels, structures, forms and notation of plans (Tender Plan, Authorozation Plan, Preliminary Plan, Construction Plan, Documents for the Operators, User Guides).
Safety processes and approval procedures during the development and the implementation of interlocking and train controlling systems.

21. Programme of practices

-

22. Programme of laboratories

Individual design tasks.

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

The student
a) knowledge (t)
1. knows the general structure and operation of traffic control systems (T10)
b) skills (k)
1. can break down a project task into elements based on specification,

2. can design a development process,
3. can track and document a development process

c) attitude (a)

1. is open to independently carry out development tasks

d) autonomy and responsibility (o)

1. can make responsible decisions in a development project

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. design task 1. 2. design task 2. 3. design task 3.	1. TF1 2. TF2 3. TF3	1. 15% 2. 15% 3. 15%	1. t1,k1,k2,k3,a1,o1 2. t1,k1,k2,k3,a1,o1 3. t1,k1,k2,k3,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. SZV	1. 55%	1. t1,k1,k2,k3,a1,o1

26. Criteria to obtain a signature / midterm grade

Submission of the completed and documented works. During the verbal exam the work will be presented by the student.

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

the individual design tasks can be handed in until the end of the delayed completion week with a penalty fee

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 decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Project management in transportation**				
2. Subject name in Hungarian	Közlekedési projektirányítás			**3. Programme**	K
4. Subject code	**BMEKOKKMSK3001-00**			**5. Term | role**	**3/4 | k**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**0 laboratory**	**10. Language**	**English**
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**	8 hours	**Homework**	19 hours
Reading written materials	12 hours	**Midterm preparation**	23 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Sipos Tibor associate professor	**15. Email address**	sipos.tibor@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Sipos Tibor		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to familiarize students with the specific characteristics of transport-related projects and to equip them with the fundamental methods and tools of project management in the transportation sector. During the course, students will learn to clearly define project goals, identify stakeholders, and apply the methodology for preparing preliminary feasibility studies. Emphasis is placed on resource planning, cost control and budgeting, time management, and scheduling. Students will also develop the ability to analyze and manage implementation risks, design appropriate project strategies, and handle both internal and external communication effectively.

20. Programme of lectures

Specialities of transport projects. Defining project goals. Identifying stakeholders. Methodology for preparing preliminary feasibility studies. Accounting and defining the necessary resources, budget management, time management, scheduling. Risks analysis and management of implementation . Development of project strategy, external-internal communication.

21. Programme of practices

-

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Understands the specific characteristics of transport projects, including goal definition and stakeholder identification. (T2,T9)
2. Is familiar with the methodology of feasibility study development and resource estimation in transport projects. (T2,T9)
3. Knows the strategic planning approaches in project management, including external and internal communication processes. (T9)

b) skills (k)

1. Able to define transport project objectives and identify relevant stakeholders. (K4,K8,K9)
2. Able to develop complex transport project plans including budgeting and scheduling. (K6,K7,K9,K11)
3. Able to perform risk analysis and propose appropriate mitigation strategies. (K6,K8,K14)
4. Able to manage both internal and external project communications effectively. (K12)

c) attitude (a)

1. Strives to approach project work with a systems-based and process-oriented mindset. (A1,A4,A5,A7)
2. Committed to quality-driven and responsible project management practices. (A2,A5,A10)
3. Values diversity and sustainability throughout the project lifecycle. (A9,A10)

d) autonomy and responsibility (o)

1. Makes decisions independently while consulting other disciplines and assumes full responsibility. (O1,O2)

2. Takes responsibility for the performance of subordinates and processes under their supervision. (O5)
3. Observes sustainability, legal, safety, and ethical standards in all project activities. (O2,O4)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. independent research assignment	1. ZH 2. F	1. 50% 2. 50%	1. t1,t2,t3,k1,k4,a1,a2 2. k2,k3,a3,o1,o2,o3

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

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Midterm test correction possibility for those not present on the test, possibility of delayed deadline for home work.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Presentation slides and electronic course material.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Safety in air traffic control**				
2. Subject name in Hungarian	Safety in air traffic control			**3. Programme**	K
4. Subject code	**BMEKOKJMSK2E02-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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**	0 hours
Reading written materials	40 hours	**Midterm preparation**	18 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. Meyer Dóra senior lecturer	**15. Email address**	meyer.dora@kjk.bme.hu
16. …organisational unit	Department of Control for Transport and Vehicle Systems		
17. Instructor(s)	Mudra István, Dr. Meyer Dóra Zsófia		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to provide students with advanced theoretical and practical knowledge of the regulatory environment of air traffic management and aviation safety management, with particular focus on the application and evaluation of safety assessment models, risk analysis methods, human factors, and software and hardware safety requirements for critical systems.

20. Programme of lectures

Organizational and regulatory environment of Air traffic control. Basic concepts of aviation safety. Safety assesment model (SAM, phase breakdown, tasks for each phase, FHA, PSSA, SSA, process for requesting relevant system requirements, hazard and risk analysis, system specification, system architecture definition, testing, commissioning, monitoring, verification and validation of the change process, certification, licensing, documentation). Flight safety criteria: system requirements, safety requirements, safety certification. Security Analysis Methodologies for Air Traffic Control Security Verification: Hazard Analysis Methodologies. Risk analysis. Consequences of faulty operation - determination of severity. Risk classification. Human factors of aviation safety. Safety requirements for software used in air traffic control. Hardware redundancies used in air traffic control. Event reporting systems. Event Investigation Process. Operational areas highlighted in terms of aviation safety.

21. Programme of practices

The practical sessions are designed to solve problems related to the theoretical areas of knowledge.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows the aviation safety strategy policies and methods;
2. knows the principles and procedures of hazard and risk analysis of aviation safety;
3. knows the EUROCONTROL SAM process and tools;
4. knows the legal background of aviation related incident investigation and the incident investigation process;
5. knows the incident reporting processes, systems, surfaces;
6. knows the ATM SMS with legal background;
7. knows the ICAO defined safety promotion activities;
8. knows the ISQMS

b) skills (k)

1. is capable of analyzing, specifying, developing safety management systems, subsystems in the field of air traffic control

c) attitude (a)

1. is interested in modern aviation safety solutions;

2. capable of thinking in support of algorithmic safety hazard and risk analysis, which can be applied in other high security areas;
3. participates in solving aviation safety problems in the field of air traffic control, works efficiently and willingly to work with specialists in other fields

d) autonomy and responsibility (o)

1. is also able to individually apply the knowledge acquired here to other systems unknown to it

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 1 2. midterm test 2 3. midterm test 3	1. ZH1 2. ZH2 3. ZH3	1. 1/3 2. 1/3 3. 1/3	1. t1,t2,k1,a1,a2,a3,o1 2. t3,t4,t5,k1,a1,a2,a3,o1 3. t6,t7,t8,k1,a1,a2,a3,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

Three midterm exams, all must be sufficient.

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Second retake or delayed completion of two of the midterm tests is possible.

30. Consultation

At a time and in a manner agreed upon with the instructor

31. Learning materials

lecture notes

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Signal processing in transport**				
2. Subject name in Hungarian	Jelfeldolgozás a közlekedésben			**3. Programme**	K
4. Subject code	**BMEKOKJMSK4B01-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	12 hours	**Homework**	17 hours
Reading written materials	63 hours	**Midterm preparation**	12 hours	**Exam preparation**	20 hours

13. Organisational unit in charge	Department of Control for Transport and Vehicle Systems		
14. Subject coordinator and its position	Dr. Szabó Géza associate professor	**15. Email address**	szabo.geza@kjk.bme.hu
16. …organisational unit	Department of Control for Transportation and Vehicle Systems		
17. Instructor(s)	Dr. Szabó Géza		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to learn about the practical use of microprocessors and microcontrollers in the field of transportation.

20. Programme of lectures

Characteristics of micropocessors, internal architectures, operation modes. Linear and interruption controlled functionning. Characteristics of microcontrollers, the MCS-51 architecture. Internal registers, instruction set. Realization of the serial communication by microcontroller: RS-232, RS-485, fail-safe RS-485, CAN. Data protection, secure data transfer. A/D and D/A converters. Filtering of digital signals. Digital Signal Processors (DSPs). Software development processes, safety-related software development. Safety relted HW and SW systems. Samples in transportation applications.

21. Programme of practices

In practices, every student programs an own microprocessor type Intel-8051, on a computer based developping environment. In the first half of the semester (weeks 1-7) the ASM, in the seond half of the semester (weeks 8-14) the C is the used programming language.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows the basics of building embedded systems, knows the basic serial communication techniques, knows the basic principles of A / D and D / A conversion, knows basic signal processing algorithms.

b) skills (k)

1. is capable of programming embedded systems, to design data collection systems.

c) attitude (a)

1. is interested in modern IT solutions.

d) autonomy and responsibility (o)

1. is able to apply the knowledge acquired here to other similar, yet unknown systems.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test	1. ZH	1. 9%	1. t1,k1,a1,o1
2. midterm test	2. ZH	2. 9%	2. t1,k1,a1,o1
3. individual homework	3. EF	3. 15%	3. t1,k1,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. SZV	1. 67%	1. t1,k1,a1,o1

26. Criteria to obtain a signature / midterm grade	27. Grading rules
In the study period two midterm tests and one homework, all of them are the prerequisites of the signature, and consequently of the final exam.	0%-49%: fail; 50%-60%: pass; 61%-70%: satisfactory; 71-80%: good; 81%-100%: excellent
28. Attendance and participation requirements	
according to the rules of CoS	
29. Retake and delayed completion	
Both midterm test and the homework can be retried once.	
30. Consultation	
Consultation is possible at a time and in a form agreed with the teacher.	
31. Learning materials	
Lecture notes	
32. Start of validity for the subject decription	
September 1st, 2025	

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Smart city**				
2. Subject name in Hungarian	Intelligens városok - Smart city			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2A01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**0 laboratory**	**10. Language**	**English**
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 traning 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 concuct 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

27. Grading rules

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

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

30. Consultation

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

31. Learning materials

Presentation slides and electronic lectrue notes

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Strategic policy instruments in transportation**				
2. Subject name in Hungarian	Stratégiai szabályozási eszközök a közlekedésben			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2C03-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**1 practice**	**1 laboratory**	**10. Language**	**English**
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 traning 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 decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Supply chain operation control**				
2. Subject name in Hungarian	Ellátási lánc irányítás			**3. Programme**	K
4. Subject code	**BMEKOALMSK4D02-00**			**5. Term | role**	**4/3 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**0 laboratory**	**10. Language**	**English**
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**	5 hours	**Homework**	0 hours
Reading written materials	37 hours	**Midterm preparation**	20 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator and its position	Dr. Bóna Krisztián associate professor	**15. Email address**	bona.krisztian@kjk.bme.hu
16. …organisational unit	Department of Material Handling and Logistics Systems		
17. Instructor(s)	Dr. Bóna Krisztián, Dr. Sárdi Dávid, Bertalan Marcell		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Describing the structure and operation of the value (supply) chain and its characteristics. Presenting the operational background of companies integrated in the value chain. Solutions for the management and control of the enterprise value chain operation, presenting of the methodological background of the applied tools.

20. Programme of lectures

The structure and actors of supply chains and value chains and networks. Material supply (procurement), production, distribution (sales) and waste management systems. Functions of enterprise operations management, the S&OP process. Outputs of value creating systems, components of products and services. The BOM list and the technological sequence, determination of material requirements. Assortment analysis, classification procedures. Analysis and planning procedures for the demand process. Typical purchasing and production strategies to meet external and internal needs. Selection of suppliers, supplier relationship management. Types of disposition procedures, inventory management, MRP procedures. Concepts and objectives of production planning and management, methodological background of strategic and tactical planning. Basics of production scheduling, objectives, simpler production scheduling solutions.

21. Programme of practices

-

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows the concept, structure, actors and processes of the value (supply) chain (T10)
2. knows the systems of procurement, production, sales and waste management, the challenges of managing the company's operations (T10)
3. can analyse the outputs and types of materials handled (T10)
4. knows the procedures used to determine material requirements (T10)
5. understands the challenges of demand planning and knows the procedures to be applied (T10)
6. knows the methods used to manage and control inventories (T10)
7. knows the methods used to manage and control production (T10)

b) skills (k)

1. is able to identify the tasks, problems and challenges in the management of corporate operations
2. applies the analytical procedures learned in the assortment analisys in the categorisation of outputs and materials
3. is able to apply the BOM management tools and interpret data for material requirements planning

4. can apply material requirements planning procedures
5. is able to use the methodological background learned in planning and analysing the demand
6. is able to analyse inventory systems and processes, to improve processes and to apply the methods learned in operational management

c) attitude (a)

1. seeks to be comprehensive in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant
2. is receptive and proactive in carrying out the tasks assigned to them, self-critical of the tasks assigned to them
3. interested in new things, receptive to new knowledge
4. tries to carry out tasks correctly, accurately and precisely
5. thinks in variations, strives to achieve results of appropriate quality in the shortest possible lead time

d) autonomy and responsibility (o)

1. is aware of the importance of their work and the consequences of mistakes
2. complies with environmental and social requirements in their chosen professional field
3. formulates independent proposals to address the challenges identified
4. is able to self-ckeck and correct errors independently by listening to the professional opinions of others
5. is able to take responsibility for their opinions and actions and to form theirown opinions
6. is critical of their own work and that of others

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. first midterm test 2. second midterm test	1. ZH1 2. ZH2	1. 50% 2. 50%	1. t1-t7,k1-k6,a1-a5,o1-o6 2. t1-t7,k1-k6,a1-a5,o1-o6

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

The student has achieved minimum 30% for each of the two midterm tests and minimum 50% for the total points of two midterm tests.

27. Grading rules

Excellent 87,5-100%
Good 75-87,5%
Satisfactory 62,5-75%
Pass 50-62,5%
Fail 0-49%

28. Attendance and participation requirements

According to the rules of CoS.

29. Retake and delayed completion

The midterm tests can be retaken once.

30. Consultation

At a time and in a form agreed with the teacher.

31. Learning materials

Students can download the electronic learning materials and other aids related to the subject from the e-learning framework used.

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Trade, financial and accounting techniques**				
2. Subject name in Hungarian	Kereskedelmi, pénzügyi és számviteli technikák			**3. Programme**	KL
4. Subject code	**BMEKOKKMSM3D01-00**			**5. Term | role**	**3/2 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**0 practice**	**1 laboratory**	**10. Language**	**English**
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**	8 hours	**Homework**	0 hours
Reading written materials	24 hours	**Midterm preparation**	30 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

To provide the most basic trade, financial and accounting skills necessary for the performance of the duties of professional managers and supervisors in the freight forwarding and trade sector.

20. Programme of lectures

The aspects of foreign trade transportation: foreign economic theories, regulatory framework, structure, elements, creation and implementation of the foreign trade contract. Foreign trade payment methods, the role of the forwarder. Banking operations, assets, securities required for carrying out transport services. Role and function of the stock markets. Elements of the accounting system of transport companies, basic rules. Accounting rules, operations. Types and elements of reports.

21. Programme of practices

-

22. Programme of laboratories

Solving financing and accounding tasks of freight forwarding on computer.

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

The student

a) knowledge (t)

1. knows the rules of internal and external trade concerning transport (K:T10;L:T9)
2. identify the macro-financial framework affecting businesses (K:T10;L:T9)
3. understand basic accounting rules (K:T10;L:T9)

b) skills (k)

1. the ability to choose between different commercial solutions (L:K11)
2. can evaluate the opportunities offered by financial operations (L:K9,K10)
3. be familiar with the corporate accounting system (L:K9,K10)

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 (L:A2,A4,A5,A7,A8,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 (L:A1,A3,A6)

d) autonomy and responsibility (o)

1. in addition to the narrow professional aspects, ensures sustainability aspects in the use of his/her knowledge, is able to self-check and correct errors independently by listening to the professional opinion of others (L:O3,O4)
2. makes responsible decisions in the field of transport management in response to open questions and formulates independent proposals to solve identified challenges (L:O1,O2,O5)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. midterm test	1. ZH1 2. ZH2	1. 50% 2. 50%	1. t1,t2,k1,k2,a1,a2,o1,o2 2. t2,t3,k2,k3,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

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

27. Grading rules

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

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

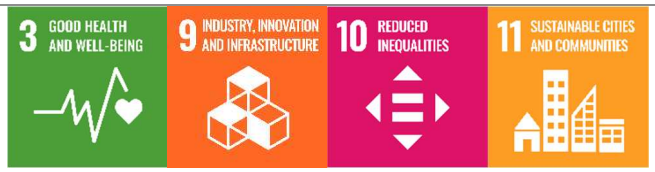
Bokor, Z.; Mészáros, F.; Batta, G. (2016) Introduction to Finance (in Hungarian). Course book, BME Dept. of Transport Technology and Economics
Bokor, Z.; Csarejs, A. (2016) Introduction to Accounting (in Hungarian). Course book, BME Dept. of Transport Technology and Economics
Bokor, Z. (2010) Introduction to Foreign Trade (in Hungarian). Course book, BME Dept. of Transport Technology and Economics

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Traffic flow**				
2. Subject name in Hungarian	Közlekedési áramlatok			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2003-00**			**5. Term | role**	**2/1 | k**
6. Credits	**4**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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	42 hours	**Preparation for lessons**	12 hours	**Homework**	27 hours
Reading written materials	25 hours	**Midterm preparation**	14 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Kisgyörgy Lajos associate professor	**15. Email address**	kisgyorgy.lajos@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Kisgyörgy Lajos, Kózel Miklós, Soltész Tamás		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Understanding methodologies suitable for the qualification, quantitative description and optimization of transport processes; mastering their practical application and adaptation to specific transportation problems.

20. Programme of lectures

Stochastic parameters of road traffic flow and their relations. Characteristics and states of road traffic. Characteristics of intersections, signalized networks and their evaulation.

Transport application of operations research methods and artificial intelligence (AI). Description of general queuing procedures.

Evaulation of travel chains in urban transport. Correlation between public transport flow parameters. Characteristics of pedestiran flows, measurement techniques.

21. Programme of practices

Indroducing measurements and data analysis methods according to individual and group excercises.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Knows the characteristics, states and relations of pedestrian, road and public transport flows (T3)
2. Knows the coordination and evaluation methods of traffic flows in signalized intersections (T3, T6, T7)
3. Knows methods for the evaluation of travel chains in urban transport (T7)
4. Knows optimalization methods can be applied in transport and the basics of queueing theory (T6, T7)

b) skills (k)

1. Able to apply and elaborate methods for the qualification and improvement of traffic flow through various transport modes (K2, K4, K6, K7, K14)
2. Able to elaborate traffic survey methods to describe pedestrian, road and public transport flows (K2, K4, K7, K14)
3. Able to evaluate procedures, describe them numerically and design service facilities with the aim of queueing theory (K2, K4)

c) attitude (a)

1. Applies the indices and qualification systems for the evaluation of transport systems which describe traffic flow progress the best (A1, A2, A4, A7)
2. Applies adequate optimalization methods in the planning of transport systems' improvement (A2, A4, A7)
3. Aims to apply/elaborate methods for the qualification of transport systems which describe the examined system well, the required data can be understood easily and recorded with limited resources (A1, A6, A7, A10)

d) autonomy and responsibility (o)

1. Able to elaborate technical problems on high standards alone or as a group member, as well (O2)
2. Feels responsibility for the result and standard of their work; aims to describe reality as closely and accurately as possible when describing transport systems; aims to achieve optimal operation during the improvement of transport systems (O2)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. four optional home assignments from nine options (with obligatory minimum total points) 2. midterm test 1 3. midterm test 2 4. midterm test 3	1. HF 2. ZH1 3. ZH2 4. ZH3	1. 66,7% 2. 11,1% 3. 11,1% 4. 11,1%	1. t1-t4,k1-k3,a1-a3,o1,o2 2. t1-t4,k1-k3,a1-a3,o1,o2 3. t1-t4,k1-k3,a1-a3,o1,o2 4. t1-t4,k1-k3,a1-a3,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

Reaching the minimum points of assignments and holding presentations of them, successful completion of each of the three midterm tests.

27. Grading rules

Excellent 87,5-100%
Good 75-87%
Satisfactory 62,5-74,5%
Pass 50-62%
Fail 0-49%

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

home assignments can be completed with delay till the end of the retake period;

any midterm test retake can be repeated, but the 3 tests can be retaken maximum 3 times in total

30. Consultation

either on in-class consultations or at a time and form agreed with the lecturers

31. Learning materials

Slides and collection of formulas in electronic form, videos, publications

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Traffic modelling**				
2. Subject name in Hungarian	Forgalmi modellezés			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2A03-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**0 practice**	**3 laboratory**	**10. Language**	**English**
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**	30 hours	**Homework**	30 hours
Reading written materials	24 hours	**Midterm preparation**	20 hours	**Exam preparation**	20 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Tóth János associate professor	**15. Email address**	toth.janos@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Tóth János, Aba Attila		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Learn and apply the basics of traffic micro and macro modelling through practice.

20. Programme of lectures

Basics of transport modelling. Process of transport network planning and application in VISUM szoftver. Traffic assignment models and their parameters. Network model, demand modell, impact model. Methods of traffic assignment in private and public transport. The theory of applied softwares. Microscopic modelling with VISSIM software.

21. Programme of practices

-

22. Programme of laboratories

In the framework of team work a VISSIM and VISUM modelling tasks are prepared.

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

The student

a) knowledge (t)

1. Knows the basics of micro- and macro-modelling. (T10)
2. Knows the main functions of the VISSIM and VISUM software. (T10)

b) skills (k)

1. Is able to use the software and apply modeling methodologies.

c) attitude (a)

1. Strives to use modeling procedures routinely.

d) autonomy and responsibility (o)

1. Uses the software independently and responsibly.

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. Progress consultation (in class) 2. Homework presentation (macroscopic modelling) 3. Homework presentation (microscopic modelling)	1. K 2. HF1 3. HF2	1. 10% 2. 25% 3. 25%	1. a1,o1 2. t1,t2,k1 3. t1,t2,k1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. written exam	1. V	1. 40%	1. t1,t2,k1,a1,o1

26. Criteria to obtain a signature / midterm grade	27. Grading rules
submission and presentation of home assigments	Excellent 89-100% Good 77-88% Satisfactory 65-76% Pass 42-65% Fail 0-41%
28. Attendance and participation requirements	
according to the rules of CoS	
29. Retake and delayed completion	
the home assignement can be delayed completed till end of delayed completion period	
30. Consultation	
during in-class consultations	
31. Learning materials	
de Dios Ortúzar, Juan, and Luis G. Willumsen. Modelling transport. John wiley & sons, 2024. Hollander, Yaron. Transport Modelling for a Complete Beginner. Ctthink! 2016 PTV VISSIM, VISUM User manuals	
32. Start of validity for the subject decription	
September 1st, 2025	

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport automation M**				
2. Subject name in Hungarian	Közlekedési automatika M			**3. Programme**	K
4. Subject code	**BMEKOKJMSK1001-00**			**5. Term | role**	**1/2 | k**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**3 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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	70 hours	**Preparation for lessons**	8 hours	**Homework**	28 hours
Reading written materials	56 hours	**Midterm preparation**	18 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. 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, Lövétei István Ferenc, Farkas Balázs		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to familiarise students with the philosophy of safety-critical control systems in transport, the methods of defining safety requirements and the methods of verifying the safety achieved.

20. Programme of lectures

Basic safety concepts. Development of safety systems (system requirements, hazard and risk analysis, system specification, system architecture definition, module breakdown, module development, implementation, testing; system integration, verification and validation of the complete system; certification, licensing).

Life cycle models. Safety life cycle. Development models. Failure management. Human factors in safety. Safety analysis. Safety management. Failure management of safety critical systems. Fault detection and fault location time.

Safety criteria: system requirements, safety requirements, safety case.

Hazard analysis: failure mode and effect analysis, hazard and operability analysis, event tree analysis, fault tree analysis, hazard analysis in the development life cycle.

Risk analysis. Consequences of failure - severity. Probability of failure - frequency.

Risk classification. Safety Integrity Levels.

Risk graph, risk score matrix, ISO 26262 risk analysis method.

Safety critical software. Safety critical software programming methods. Data protection. Program protection. RAM protection. Fault protection.

Safety critical hardware.

Hardware redundancies. Safety strategies.

Safe life, Fail safe and Fault-tolerant systems. Real and quasi fail-safe systems.

Cybersecurity (security of cyber physical systems).

Formal methods and their application in safety critical systems.

21. Programme of practices

In practical lessons the students learn to apply different methods of hazard analysis and risk assessment (FMEA, FTA, HTA, HAZOP).

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. is familiar with the concepts and mathematical apparatus related to safety, risk and risk analysis (T4),
2. is familiar with safety-critical systems development methodologies and safety architectures (T4),

3. is familiar with the process of building Petri net-based formal models, the meaning of temporal logics and their application in model checking (T5).

b) skills (k)

1. capable of performing safety analysis based on a given specification (K2, K4, K6, K10, K11),
2. capable of performing risk analysis of engineering systems (K2, K4, K6, K10, K11),
3. capable of building a formal model of an engineering system and of model checking (K2, K4, K6, K11, K14).

c) attitude (a)

1. has an interest in safety and risk issues in vehicle and transport systems (A1, A2, A3, A7).

d) autonomy and responsibility (o)

1. is capable of collaborating in a team in algorithm development and modelling tasks and of making independent decisions, during decisions respects the ethics and the sustainability (O4).

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 1	1. ZH1	1. 20%	1. t1,t2,t3,k1,k2,k3,a1,o1
2. midterm test 2	2. ZH2	2. 20%	2. t1,t2,t3,k1,k2,k3,a1,o1
3. midterm test 3	3. ZH3	3. 20%	3. t1,t2,t3,k1,k2,k3,a1,o1
4. hazard analysis assignment	4. HF1	4. 20%	4. t1,t2,k1,k2,a1,o1
5. formal modelling assignment	5. HF2	5. 20%	5. t3,k3,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade

submission and presentation of the assignments on time, and successful (min. 50%) completion of the midterm tests

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

tests can be repeated/retaken once in the semester, assignments can be handed in until the end of the make-up week with a penalty fee

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

presentation slides, background material, textbook

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport automation project**				
2. Subject name in Hungarian	Közlekedésautomatizálási projektfeladat			**3. Programme**	K
4. Subject code	**BMEKOKJMSK2B03-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**0 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	8 hours	**Homework**	44 hours
Reading written materials	10 hours	**Midterm preparation**	0 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. 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, Dr. Tettamanti Tamás, Lövétei István Ferenc, Farkas Balázs		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Development an independent project task related to the design of transport automation systems.

20. Programme of lectures

-

21. Programme of practices

During the course, students are given an individual design task to solve independently and demonstrate the results at the end of the semester. The topics related to the design task are elaborated.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. knows the objectives and tasks of traffic automation project assignments (T10)
2. knows the general formulation and structure of the project assignments in the field of transport automation (T10)

b) skills (k)

1. can break down a project task into elements based on specification,
2. can design a development process,
3. can track and document a development process

c) attitude (a)

1. is open to independently carry out development tasks

d) autonomy and responsibility (o)

1. can make responsible decisions in a development project

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. individual project assignment 2. presentation of individual project assignment	1. F 2. P	1. 85% 2. 15%	1. t1,t2,k1,k2,k3,a1,o1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
-	-	-	-

26. Criteria to obtain a signature / midterm grade	27. Grading rules
The completed and documented work will be presented by the student at the end of the semester.	Excellent 88-100% Good 75-87% Satisfactory 63-74% Pass 50-62% Fail 0-49%
28. Attendance and participation requirements	
according to the rules of CoS	
29. Retake and delayed completion	
the individual project assignment can be handed and presented in until the end of the delayed completion week with a penalty fee	
30. Consultation	
at a time and in a form agreed with the teacher	
31. Learning materials	
presentation slides, background material	
32. Start of validity for the subject decription	
September 1st, 2025	

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport economics M**				
2. Subject name in Hungarian	Közlekedésgazdaságtan M			**3. Programme**	K
4. Subject code	**BMEKOKKMSK1001-00**			**5. Term | role**	**1/2 | k**
6. Credits	**4**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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**	6 hours	**Homework**	20 hours
Reading written materials	26 hours	**Midterm preparation**	20 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

Understanding the wider economic context of the transport system and its sub-sectors.

20. Programme of lectures

The emergence and evolution of modern transport systems. The transport strategy planning process. Transport policy in the European Union and Hungary. Efficiency assessment methods and their applications in transport. Interrelationships between economic, environmental and social sustainability objectives of transport and their modelling possibilities. Economic principles of sustainable mobility, price reform. Evaluation and pricing of the external impacts of transport, using road transport and public transport as examples. Specific economic and social issues of urban transport: information economics, parking management, transport development and land use interrelations.

21. Programme of practices

Elaboration of sub-tasks related to cost-benefit analysis (CBA) (traffic forecasting, elasticity calculation, efficiency assessment) and presentation, individual consultation to prepare a seminar report consisting of sub-tasks.

22. Programme of laboratories

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

The student

a) knowledge (t)

1. identify tools for evaluating the effectiveness of transport improvements (T3,T7)
2. identify the main objectives of transport policy and strategy and the means of implementation (T2,T9)
3. selects economic criteria for evaluating sustainable transport solutions, knows the basic tools of pricing and tariff policy, groups economic aspects of transport information exploitation (T8)

b) skills (k)

1. analyse and evaluate the main problems of the transport system (K4)
2. select and apply the most effective assessment methods for sustainability (K2,K10)
3. propose and communicate the most effective transport planning option (K9,K11,K13)

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 (A2,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,A4,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 his/her chosen field of competence on economic issues and formulates independent proposals to solve the challenges identified (O2)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test (self-learning) 2. midterm test (lectures) 3. cost-benefit analysis task 4. classroom activity	1. ZH1 2. ZH2 3. F 4. A	1. 17,5% 2. 17,5% 3. 20% 4. 10%	1. t1,t2,k1,k2 2. t3,k2 3. a2,o1,o2 4. a1

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam	1. V	1. 35%	1. t1,t2,t3,k1,k2,k3,a2,o1,o2

26. Criteria to obtain a signature / midterm grade

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

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The midterm tests retake can be repeated, the homework can be delayed completed till end of delayed completion period.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Eddy Van de Voorde, Thierry Vanelslander (2010) Applied Transport Economics, De Boeck
André de Palma , Robin Lindsey , Emile Quinet , Roger Vickerman (2011) A Handbook Of Transport Economics, Edward Elgar
presentation slides

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport informatics**				
2. Subject name in Hungarian	Közlekedési informatika			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2004-00**			**5. Term | role**	**2/1 | k**
6. Credits	**5**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**0 practice**	**2 laboratory**	**10. Language**	**English**
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

Learning and mastering the methods of analysis, evaluation, modeling and planning of transport and information systems through innovative mobility services; learning about the structure and operation of transport organizations; learning about the characteristics of transport data collection and databases, and mastering their application in planning tasks

20. Programme of lectures

Development of transportation system, mobility service and information system
Basic concepts in transportation informatics
(structure of transportation system, control loop)
Structural model of transportation information systems
Characteristics and categorization of transportation organizations
Operational models of transportation organizations; resilience
Analysis of transportation information systems
Transportation system based on autonomous vehicles
Planning of mobility services based on autonomous vehicles
Operation of mobility services based on autonomous vehicles
Impacts of AVs, business model of Shared Autonomous Vehicle (SAV) based mobility service

21. Programme of practices

-

22. Programme of laboratories

Basic knowledge of system and service design, examples, case studies. During the independent development of a chosen innovative transport system and service concept, mastering analysis, evaluation, modeling and design methods. Presentation of one's own results. Learning and mastering the characteristics of the most important transport databases, learning and mastering data visualization techniques. Learning the basics and relationships of data science. Learning the characteristics of transport organizations and current IT developments with the help of sub-sector guest speakers.

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

The student

a) knowledge (t)

1. Knows and understands the properties and application areas of solutions used in the field of transport and transportation; the methodology and tools of their design and research. (T3,T7)
2. Knows and understands the use of information and communication technologies related to the field of transport and transportation. (T5)

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. (K3,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 solve problems in the field of transport and to flexibly solve complex tasks using innovative ideas. (K7,K14)

4. Able to conduct publication activities and negotiations in their field of expertise in their native language and at least one foreign language. (K13)

c) attitude (a)

1. Open and receptive to learning about and accepting professional, technological development and innovation in the field of transportation, and authentically conveying it. (A1,A2)

2. Strives to contribute to the development of new methods and tools related to transport and transportation. (A3,A4)

3. Strives to carry out his/her work based on a systems and process-oriented way of thinking, in a complex approach. (A7)

d) autonomy and responsibility (o)

1. Makes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental protection), independently and with full responsibility. (O2)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. midterm test 3. mobility system and service development home assignment 4. mobility system and service development home assignment - presentation of results	1. ZH_1 2. ZH_2 3. HF 4. HF_B	1. 17,5% 2. 17,5% 3. 10% 4. 5%	1. t1,t2,k2,a1,a3 2. t1,t2,k2,a1,a3 3. t1,t2,k1,k3,a1,a2,a3,o1 4. k4

25. Exams

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

26. Criteria to obtain a signature / midterm grade

‘signature’ is obtained if all the midterm tests are passed, and the assignment is submitted and accepted, and attendance on guest lectures is completed.

27. Grading rules

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

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 decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport infrastructure management**				
2. Subject name in Hungarian	Közlekedési infrastruktúra menedzsment			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2C01-00**			**5. Term | role**	**2/1 | sp**
6. Credits	**3**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**1 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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 traning 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 2. risk assessment task	1. ZH 2. F	1. 85% 2. 15%	1. t1, t2, t3, k1,k2,o2 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

27. Grading rules

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

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

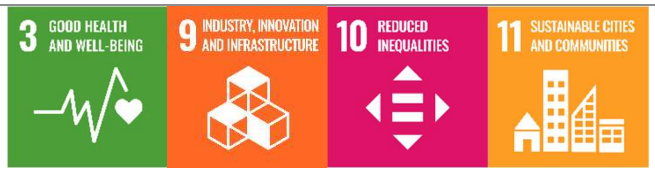
presentation slides

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport operation**				
2. Subject name in Hungarian	Közlekedés üzemtan			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2001-00**			**5. Term | role**	**2/1 | k**
6. Credits	**5**	**7. Evaluation type**	**e**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**2 practice**	**0 laboratory**	**10. Language**	**English**
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**	12 hours	**Homework**	27 hours
Reading written materials	29 hours	**Midterm preparation**	6 hours	**Exam preparation**	20 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Mándoki Péter associate professor	**15. Email address**	mandoki.peter@kjk.bme.hu
16. …organisational unit	Department of Railway Vehicles and Vehicle System Analysis		
17. Instructor(s)	Dr. Mándoki Péter, Kózel Miklós, Soltész Tamás, Aba Attila, Dr. Lakatos András		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

Mastering a passenger oriented design approach that fully addresses intermodality and leverages teamwork opportunities

20. Programme of lectures

Process of planning transport establishment using methodological guides. Structure and Chapters of Feasibility Study and Preliminary Feasibility Study. Fit to the policy, evaluation of projects. Development of project variants, evaluation of variables and variations. Planning principles for bus stations, railway stations, airports. The concept of intermodality, the design and function of intermodal nodes. Establishing transfer connections. Principles and aspects of universal design.

21. Programme of practices

International and domestic, positive and negative examples of intermodal nodes. Consultation related to the design task.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1.the student knows and understands the characteristics, fields of application and planning techniques of each transport sub-sector (T3,T4,T5,T7,T9)

b) skills (k)

1. ability to deal with creative problems in the field of transport and flexible solutions to complex tasks (K7)
2. knows the planning process of an intermodal node, taking into account its operational aspects (K2,K3,K4,K6,K8,K9,K10,K11)
3. able to work in a group, sharing tasks and managing them over time (K12,K14)

c) attitude (a)

1. engages in professional and ethical values related to the technical field (A1,A2,A4,A6,A10)
2. works based on a system-oriented and process-oriented mindset, in a team-work (A6,A7,A8)

d) autonomy and responsibility (o)

1. makes decisions carefully, in consultation with representatives of other fields of expertise, with full responsibility (O2,O4)
2. in the case of team work, also works with a well-defined responsibility (O1,O5)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. In class excercise (ILL+ÜT) 2. In class excercise (DET)	1. ILL+ÜT 2. DET	1. 0% 2. 0%	1. k3,a1,o1,o2 2. t1,k1,k2,k3,a1,a2,o1,o2

3. midterm test 4. In class excercise (UT) 5. In class excercise (FF) 6. Feasibility study (MT)	3. 1. ZH 4. ÚT 5. FF 6. MT	3. 10% 4. 0% 5. 0% 6. 15%	3. t1,k2 4. t1,k1,k2,a1,a2,o1,o2 5. t1,k1,k2,k3,a1,a2,o1,o2 6. t1,k1,k2,k3,a1,a2,o1,o2

25. Exams

Name	Code	Share in final grade	Evaluated learning outcomes
1. oral exam, presenting the designed infrastructure 2. oral exam, defending the designed infrastructure	1. V1 2. V2	1. 30% 2. 45%	1. t1,k1,k2,k3,a1,a2,o1,o2 2. t1,k1,k2,k3,a1,a2,o1,o2

26. Criteria to obtain a signature / midterm grade

the presentation and completing the midterm test

27. Grading rules

excellent 85-100%
good 70-84%
satisfactory 55-69%
pass 40-54%
faile 0-39%

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

The unsuccessful test can be replaced two times during the delayed completion week. It is also possible to complete or supplement the design tasks until the end of the delayed completion week.

30. Consultation

either on in-class workshops or at a time and form agreed with the lecturers

31. Learning materials

the presentation slides
the methodological guide
the planning manuals

32. Start of validity for the subject decription

September 1st, 2025

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Transport safety M**				
2. Subject name in Hungarian	Közlekedésbiztonság M			**3. Programme**	K
4. Subject code	**BMEKOKKMSK2002-00**			**5. Term | role**	**2/1 | k**
6. Credits	**4**	**7. Evaluation type**	**m**	**8. Nature**	**contact lessons**
9. Weekly contact hours	**2 lecture**	**1 practice**	**0 laboratory**	**10. Language**	**English**
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	42 hours	**Preparation for lessons**	13 hours	**Homework**	32 hours
Reading written materials	13 hours	**Midterm preparation**	20 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator and its position	Dr. Sipos Tibor associate professor	**15. Email address**	sipos.tibor@kjk.bme.hu
16. …organisational unit	Department of Transport Technology and Economics		
17. Instructor(s)	Dr. Sipos Tibor, Dr. Szabó Zsombor		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Purpose

The aim of the course is to provide students with comprehensive knowledge of road traffic safety, including the key influencing factors and accident prevention strategies. The course introduces traffic safety indicators and analyzes their trends in Hungary and EU member states. It examines the characteristics of the main actors in road transport—human behavior, vehicles, infrastructure, and regulation—and their impacts on traffic safety. The course also reviews relevant legislation, the principles of designing safe infrastructure, and the use of passive and active safety technologies in vehicles. It addresses the human factors in traffic safety, including driver behavior and modern approaches to driver education. Special attention is given to the unique aspects of pedestrian and bicycle transport.

20. Programme of lectures

The road safety indicators. Development of road safety indicators in Europe and in Hungary. Characteristics of the traffic actors (human, infrastructure, vehicles and regulation), their impact on road safety. Review of the traffic regulation. Features of secure infrastructure. Features of passive and active vehicle safety systems. Human factors of traffic safety, traffic behaviour. Advanced methods of driver training, best practices. Characteristics of pedestrian and cycling traffic.

21. Programme of practices

Statistical analysis of the road accidents by Statistical Centre Office's database. Case studies of road accidents by forensic methods. Measurement of the vehicle's blind spot. Study of driver fitness testing methods. Assignment: study on road safety, written summary and presentation, in a group of 2-3 people.

22. Programme of laboratories

-

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

The student

a) knowledge (t)

1. Understands key traffic safety indicators and their development in Hungary and EU member states. (T2,T3,T7)
2. Has knowledge of the impact of road users (human, vehicle, infrastructure, regulation) on traffic safety. (T3,T7,T9)
3. Knows the legal framework relevant to traffic safety in both national and EU contexts. (T2,T3,T9)
4. Understands the functions and applications of passive and active vehicle safety systems. (T3,T7)

b) skills (k)

1. Able to collect, process, and interpret traffic safety data. (K3,K4,K6)
2. Capable of identifying and evaluating safety-related interdependencies in a systemic context. (K4,K6,K7)
3. Able to apply modern methods creatively to solve traffic safety problems. (K6,K7,K14)
4. Capable of effectively communicating safety-related information in both Hungarian and foreign languages. (K3,K13,K14)

c) attitude (a)

1. Open to innovations and developments in the field of traffic safety. (A1,A3,A6)

2. Embraces the professional and ethical values related to traffic safety; shows strong professional commitment. (A2,A4,A10)
3. Strives to enforce sustainability, environmental awareness, and health protection in traffic safety. (A6,A10,A7)
4. Applies systems thinking and a complex approach in professional activities. (A7,A3,A9)

d) autonomy and responsibility (o)

1. Makes well-considered and independent decisions in traffic safety in cooperation with other fields. (O2,O3,O4)
2. Accepts responsibility for the environmental and social consequences of traffic safety actions. (O2,O3,O4)

24. Midterm assessments

Name	Code	Share in final grade	Evaluated learning outcomes
1. midterm test 2. independent research assignment	1. ZH 2. F	1. 50% 2. 50%	1. t1,t2,t3,t4,k1,a2,a4 2. k2,k3,k4,a1,a3,o1,o2

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

27. Grading rules

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

28. Attendance and participation requirements

according to the rules of CoS

29. Retake and delayed completion

Midterm exam can be retaken until the end of delayed completion period. The study paper cannot be delayed submitted and presented.

30. Consultation

at a time and in a form agreed with the teacher

31. Learning materials

Lecture slides

32. Start of validity for the subject decription

September 1st, 2025