BSc training programme	transportation.bme.hu 1/100 oldal Version: 08			ersion: 08 May, 2025		
BUDAPEST UNIVERS	SITY OF TECHNOLO	GY AND ECONOMICS	hicle Engineerir	ng Subj	ect datasheet	
1. Subject name	Air transp	ort information	cs			
2 in Hungarian	Légi informatika			3. Programme code	k	
4. Subject code				5. Term role	4 sp	
6. Credits	3	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	1 lecture	0 practice	2 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE FOR THE G				
12. Working hours for fulfil	lling the requirem	ents of the subject			90 hours	
Contact hours	42 hours	Preparation for seminars	12 hours	Homework	0 hours	
Reading written materials	30 hours	Midterm test preparation	6 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tr	ansport Technology and	d Economics			
14. Subject coordinator	Dr. Csonka Bálin	t	15. Email address	csonka.balint@kjk.bm	e.hu	
16department	Department of Tr	Department of Transport Technology and Economics				
17. Lecturers	Hegyi Patrik, Kor	ompay Márton, Dr. Cso	nka Bálint			
18. Indicative prerequisites	, , 					
19. Aim of the subject						
Understanding the operation control processes.	, role and evolution	of advanced informatic	on systems in aviation	in support of airport, airl	ne and air traffic	
20. Thematics of lectures						
Information technology systems in air transport and their characteristics. Airport information systems. The phases, actors and characteristics of the basic air transport process from an IT perspective. Innovation in air transport, passenger-side solutions. Smart Airport. Classification of airline IT systems and their identification with the components of the technological process. Specific requirements for airline IT systems, IT systems for operations management. Modern elements and developments in airline information technology. The purpose and function of air traffic services, types of aeronautical information. Air traffic control tasks, main systems and their operating principles. Processing of air traffic control data and flight plans. Automated coordination, control tools and alerts in air traffic control. Technology and roles in tower control. Directions for future developments.						
22. Thematics of laboratori	ies					
In laboratory and/or industry	site visit sessions, s on real systems	students will learn abou	it IT systems in opera	tion. Solving computatior	nal problems related	
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)						
The student						
 a) knowledge (t) 1. Recognise the main IT sys 2. Identify airport, airline and 3. Know the structure and fund 4. Describe the main system 5. Collect modern information 6. Describe the structure and b) skills (k) 1. Apply systematic data coll 2. Analyse the operation and 3. Use basic aviation information 	stems and actors in air traffic information nctions of airport in s of air traffic contron n technology solution d requirements of a ection and analysis structure of system ation systems	a air transport on systems formation systems ol and the principles of t ons and innovations in a irline systems s processes appropriate ns	their operation air traffic ly			

c) attitude (a)

1. Performs work responsibly, self-critically and constructively

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2. Is open to new knowledge and chooses between different options

d) autonomy and responsibility (o)

1. Make independent decisions and take responsibility for the performance of tasks

2. Observe and comply with professional standards

3. Check and, if necessary, correct his/her own work

4. Make creative suggestions for improvement

5. Participate autonomously in professional processes in cooperation with others

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. Midterm test	1. ZH	1. 100%	1. t1,t2,t3,t4,t5,k2,a1,o1,o3
25. Exam assessments			

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance				
Successful (min. 50%) completion of the midterm test	Excellent: 88-100%				
28. Attendance and participation requirements	Good: 75-87%				
According to CoS	Satisfactory: 63-74%				
29. Late completion opportunities			Pass: 50-62% Fail: 0-49%		
The midterm can only be retaken once					
30. Consultation opportunities					
At a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

1/100 oldal Version: 08 May, 2025 BSc training programme transportation.bme.hu BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Air transport management 1. Subject name 2. ... in Hungarian Légiközlekedési menedzsment 3. Programme code k 4. Subject code 5. Term role 6 | sp with contact 6. Credits 4 7. Evaluation type m 8. Form hours 9. Weekly contact hours 2 lecture 0 laboratory 10. Language English 1 practice 11. SDG Learning outcomes' [KEPEK:4,8,9,12 contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 120 hours **Preparation for Contact hours** 42 hours 10 hours Homework 40 hours seminars **Midterm test Reading written** 18 hours 0 hours 10 hours Exam preparation materials preparation 13. Organisational unit in Department of Transport Technology and Economics charge 15. Email 14. Subject coordinator Dr. Kővári Botond kovari.botond@kjk.bme.hu address 16. ...department Department of Transport Technology and Economics **17. Lecturers** Dr. Kővári Botond - - -, **18. Indicative** - - -, prerequisites - - -19. Aim of the subject To familiarize students with the actors of air transport, their main operations, and the processes, with particular attention to economic aspects. 20. Thematics of lectures Situation of the air transport market, regulation of air transport, international organizations, external effects of air transportation, role of Hungary in air transportation, roles of Hungarian regional airports, performances of air transportation, marketing activities of airlines, strategy of airlines, human resources tasks, goods forwarding by air transportation. 21. Thematics of practices Calculations according to revenue and human management. 22. Thematics of laboratories 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. knows the basic operations of airlines and market characteristics 2. can evaluate the habits of air passengers and the marketing activities of airlines 3. knows the connections between airports and the air market 4. knows the social aspects of air transport b) skills (k) 1. is able to analyze the air transport market 2. is able to manage the operational tasks of air flights 3. is able to apply economic relationships in the aviation industry 4. is able to manage air cargo and passenger transport 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

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Name		Code	Share in final grade	Assessed learning outcomes
1. midterm test		1. ZH	1. 50%	1. t1,t2,t3,t4,k1,k2,k3,k4,o1
2. homework paper		2. F1	2. 50%	2. t1,t3,k1,k2,k3,a1,a2,o2
25. Exam assessments				
Name		Code	Share in final grade	Assessed learning outcomes
-		-	-	-
26. Conditions for obtaining signature / midterm grade				27. Final grade in percentage of performance
successful (min. 50%) completion of the midterm test and submission of the homework paper				Excellent 88-100%
28. Attendance and participation	requirements			Good 75-87%
according to the rules of CoS				Satisfactory 63-74%
29. Late completion opportunities	i de la companya de l			Fass 50-62 % Fail 0-49%
Second retake or delayed completion	n is only from one midt	term requiren	nent.	
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BSc training programme	transport	ation.bme.hu	1/100 olda	l Ve	ersion: 08 May, 2025
BUDAPEST UNIVER	sity of technolog	er and economics gineering and Veh	icle Engineerin	g	ect datasheet
1. Subject name	Airspaces	and aerodror	nes		
2 in Hungarian	Légterek és repülő	óterek		3. Programme code	k
4. Subject code				5. Term role	4 sp
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	1 lecture	2 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 8	DECENT WORK AND ECONOMIC GROWTH INDUSTRY, INNOV AND INFRASTRUC	ATION 17 PARTNERSHIPS FOR THE GOALS		
12. Working hours for fulfi	lling the requireme	nts of the subject			120 hours
Contact hours	56 hours	Preparation for seminars	10 hours	Homework	5 hours
Reading written materials	27 hours	Midterm test preparation	22 hours	Exam preparation	0 hours
13. Organisational unit in charge Department of Transport Technology and Economics					
14. Subject coordinator	Mudra István		15. Email address	mudra.istvan@kjk.bme	e.hu
16department	Department of Transport Technology and Economics				
17. Lecturers	Mudra István				
18. Indicative prerequisites	Transport tracks (strong), , 				
19. Aim of the subject					
Understanding the main cha	racteristics of aviatic	n network elements (air	ports and airspaces)		
20. Thematics of lectures			·····		
Relationship between air traffic and airspace. Airspace classification, air traffic services systems. Airports: domestic, international, continental hubs. Airport infrastructure: runway, taxiway and apron systems. Traffic adaptations. Airport as basis, terminals, ground handling service, functions. Airside and landside differences. Approach categories, runway categories, airport services. Aviation safety principles, especially runway safety issues, environmental protection characteristics, expectations. Airport Operation: Traffic Management Methods, Aircraft and Ground Vehicles movements. Special services: firefighting, wildlife protection, snow removal, apron management.					
21. Thematics of practices	i				
During the practical sessions elaboration of individually dis	s students will get kn stributed subtasks	owledge on some partic	ular parts and areas	of the airport. Consultat	ion and continuous
22. Thematics of laborator	ies				
Professional visit at airport					
23. Subject learning outco	mes (lowercase let	ters) and their connect	ion to programme	level learning outcome	s (capital letters)
The student a) knowledge (t) 1. get acquainted with the back 2. get acquainted with internant b) skills (k) 1. is able to differentiate between the service	asic classes of airspa ational rules, standa ween the services th	ace, their management, rds, recommendations, at can be provided in dif	the types and feature practices related to t ferent airspace class	es of the services provide he design and operation ses and to determine the	ed within them of airports applicable rules for
			.		

2. Is able to compile, characterize and examine the basic design aspects of the airport.

3. be able to determine the services to be provided on an airport based on its characteristics.

c) attitude (a)

1. applies the required quantitative and qualitative characteristics and related indicators when assessing or analyzing airspace or airports jointly or separately

2. takes into account the aviation safety principles in the aeronautical constituents and applies the design and implementation practices as they have learned.

d) autonomy and responsibility (o)

1. able to apply or solve design or operational aspects at a basic but high technical level, working alone or in a team.

2. responsibility for the high-level evaluation of the safety-based principles and practices learned and for the realization of tasks

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24. Midterm assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
1. midterm test	1. ZH	1. 80%	1. t1,t2,a1	
2. homework paper	2. F1	2. 20%	2. k1,k2,k3,a2,o1,o2	
25. Exam assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
-	-	-	-	
26. Conditions for obtaining signature /	27. Final grade in percentage of performance			
successful (min. 50%) completion of the mi paper	Excellent 88-100%			
28. Attendance and participation require	ments		Good 75-87% Satisfactory 63-74%	
according to the rules of CoS				
29. Late completion opportunities			Fail 0-49%	
Second retake or delayed completion is onl				
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BSc training programme	transpor	tation.bme.hu	1/100 old	lal V	ersion: 08 May, 2025
BUDAPEST UNIVERS	SITY OF TECHNOLOG	gy and есономісs i <mark>gineering and Vel</mark>	nicle Engineerir	ng Sub	ject datasheet
1. Subject name	Artificial i	ntelligence			
2 in Hungarian	Mesterséges intel	lligencia		3. Programme code	ikl
4. Subject code		0		5. Term role	4 k
6. Credits	3	7. Evaluation type	m	8. Form	with contact
9. Weekly contact hours	1 lecture	0 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	INDUSTRY, INNOVATION AND INFRASTRUCTURE		·	
12. Working hours for fulfi	lling the requireme	ents of the subject			90 hours
Contact hours	28 hours	Preparation for seminars	20 hours	Homework	0 hours
Reading written materials	20 hours	Midterm test preparation	22 hours	Exam preparation	0 hours
13. Organisational unit in	Department of Co	ontrol for Transport and V	Vehicle Systems		
14. Subject coordinator	Dr. Bécsi Tamás		15. Email	becsi.tamas@kjk.bme	.hu
16department	Department of Co	ontrol for Transport and V	Vehicle Systems		
17. Lecturers	Dr. Bécsi Tamás	I	, ,		
18. Indicative prerequisites	, , 				
19. Aim of the subject					
The aim of the course is to fa artificial intelligence. Special and social impacts. Students	amiliarize students v attention is paid to analyze and interp	with the basic principles, the ethical dimension of ret the practical role, be	technological backs the use of AI, inclus nefits and dilemmas	ground and application po ding issues of data protect of AI through real or real	ossibilities of tion, responsibility istic case studies.
20. Thematics of lectures					
The lecture provides an introduction to the history, concepts, basic operating mechanisms of AI, and the basic principles of machine learning. The course material covers various structures of artificial intelligence: rule-based systems, decision trees, classical machine learning models, and then provides a deeper insight into modern deep learning architectures. Students will become familiar with, among others, convolutional neural networks; generative adversarial networks, etc. The comparison of different learning methods – supervised, unsupervised, and reinforcement – is also emphasized. A prominent topic is the presentation of the operation, teaching, and practical application of large language models (LLMs). Students will learn how these models work, what they are capable of, what risks they may pose, and how they can be used consciously in different fields. The course also addresses the ethical and social aspects of AI: transparency, accountability, data protection, algorithmic biases, and the sustainable and equitable use of artificial intelligence. At the end of the course, students will analyze AI solutions from industry, education, healthcare, and the public sector through real or simulated case studies.					
21. Thematics of practices					
- 22 Thematics of laborator					
The aim of the lab activities associated with the course is to give students hands-on experience in developing artificial intelligence-based models. The tasks are carried out in an AI-assisted way, where AI is used as a tool to support model building, coding and debugging. During the exercises, students will be introduced to different learning methods and AI application domains, fostering the development of reflective, problem-solving thinking.					
23. Subject learning outco	mes (lowercase let	tters) and their connec	tion to programme	e level learning outcome	es (capital letters)
The student					
 a) knowledge (t) 1. Knows the basic concepts communication and application 2. Is aware of the basic prince b) skills (k) 1. Is able to process structure 	of machine learnin on software in AI sy piples of the operation ed data, use and de	g, the functioning of the /stems. (K:T17;J:T17,T on of artificial intelligence	"Internet of Things" 21;L:T21) e and its ethical and e applications, and e	(IoT), and the role of con data protection aspects.	nputer (K:T16;L:T20) te and manage
digital content. (K:K4,K28,K2 2. Is able to communicate. c	29,K30,K31;J:K4,K3 ollaborate and intera	36,K37,K38;L:K4,K31,K3 act effectively using digi	32,K33) tal technologies. (K:	K12,K31;J:K12,K39:L:K1	2,K34)
3. Able to design, operate ar	nd test IT systems b	pased on models. (K:K11	,K34;J:K11,K42;L:K	(11,K37)	· · ·

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c) attitude (a)					
1. Accepts the professional and ethical digital rights and democracy. (J,K,L:A1	responsibility associa ,A2)	ited with th	e use of artificial inte	lligence and actively	represents the values of
 Continuously develops his/her AI-related knowledge with a reflective, self-critical attitude, is open to changes and technological self- education. (J,K,L:A3,A12) 					
3. Has a positive attitude towards comp considers possible alternatives. (J,K,L:	blex problems related t A4,A6,A10,A13)	to artificial	intelligence, strives f	or effective, responsi	ble solutions and
d) autonomy and responsibility (o)					
1. Able to take initiative and make deci intelligence. (J,K,L:O1,O2,O4)	sions independently, fi	rom intern	al motivation, in the c	lesign, evaluation or a	application of artificial
2. Has a critical and responsible attitud autonomous manner. (J,K,L:O5,O6)	e towards information	related to	AI, formulates his/he	r judgments in a well	founded and
24. Midterm assessments					
Name	Co	ode	Share in final grade	Assessed learnin	ig outcomes
1. midterm test 1	1.	ZH1	1. 50%	1. t1,t2,k2,a3,o1,o	2
2. midterm test 2	2.	ZH2	2. 50%	2. t1,t2,k1,k3,a1,a	2,01,02
25. Exam assessments					
Name	Co	ode	Share in final grade	Assessed learnin	ig outcomes
-	-		-	-	
26. Conditions for obtaining signatu	re / midterm grade		1	27. Final grade in performance	percentage of
To obtain the semester grade, the com reach at least 50%	bined average of Midte	erm 1 and	Midterm 2 must	Excellent 99, 1000	
28. Attendance and participation rec	uirements			Good 75-87%)
according to the rules of CoS				Satisfactory 63-74	%
29. Late completion opportunities				Pass 50-62%	
Only one of the mid-semester requirements can be made up through repeated replacement.			Fail 0-49%		
30. Consultation opportunities				1	
at a time and in a form agreed with the	teacher				
31. Validity of the subject datasheet	starts from:				
01 September, 2025					

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BUDAPEST UNIVERS	SITY OF TECHNOLOG	бу AND ECONOMICS gineering and Veh	iicle Engineerin	g Subj	ect datasheet	
1. Subject name	Basic theo	ories of engine	eering			
2 in Hungarian	Mérnöki alapisme	retek		3. Programme code	jkl	
4. Subject code				5. Term role	1 k	
6. Credits	7	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	2 practice	2 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 8	DECENT WORK AND ECONOMIC GROWTH	ATION 12 RESPONSIBLE CONSUMPTION AND PRODUCTION			
12. Working hours for fulfil	ling the requireme	ents of the subject			210 hours	
Contact hours	84 hours	Preparation for seminars	30 hours	Homework	0 hours	
Reading written materials	46 hours	Midterm test preparation	50 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Ae	ronautics and Naval Arcl	hitecture			
14. Subject coordinator	Dr. Veress Árpád		15. Email address	veress.arpad@kjk.bme	e.hu	
16department	Department of Ae	Department of Aeronautics and Naval Architecture				
17. Lecturers	Dr. Szabó Géza, I	Dr. Béda Péter, Forberge	er Árpád, Dr. Veress	Árpád		
18. Indicative prerequisites	, , 					
19. Aim of the subject						
The aim of the subject is to be the engineering way of thinkin Introduction to Vector Algebre equations. Hydrostatics, Pas Examination of drives, their r 20. Thematics of lectures	The aim of the subject is to bring the physical knowledge previously acquired at different educational places to the same level. Learning the engineering way of thinking, problem- and task-solving skills. Carrying out and evaluating simpler measurements. Electronics. Introduction to Vector Algebra. Curve fitting to measurement data. Interactive tasks using MATLAB. Writing dynamics and Newtonian equations. Hydrostatics, Pascal and Archimedes' law. Basic thermodynamic concepts, investigation of cycles, states of ideal gas. Examination of drives, their role in vehicle engineering practice.					
Basics of Statics and Streng Processes in Vehicles. Basic	th of Materials. Basi s of Thermal Proce	ics of Kinematics — Kine sses in Vehicles. Basics	etics. Basics of Mech of Electronics. Basic	anical Machines. Basics cs of Measurement Tech	of Fluid Flow nology / Metrology.	
21. Thematics of practices						
Exercises are completed after	er each correspondi	ng chapter by means of	solving calculation ta	isks.		
22. Thematics of laboratori	es					
Writing balance equations, in interactive tasks using MATL	iteractive tasks rela AB.	ted to rigid bodies and m	aterial points, applic	ation of lossy Bernoulli e	equation with	
23. Subject learning outcom	nes (lowercase let	tters) and their connect	tion to programme	level learning outcome	es (capital letters)	
The student a) knowledge (t) 1. knows the basic physical rules of thermal and fluid dynamics, statiscs, streight of structures, vehicle dynamics, electronics (J,K,L:T2,T3,T6,T7) b) skills (k) 1. is able to reproduce, adapt and interpret the knowledge about thermal and fluid dynamics, statiscs, streight of structures, vehicle thermalian electronics in a meaning follower (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)						
2. is able to communicate the (J,K,L,:K10,K13,K14,K17;J:K	e ideas and plans a (36,K45;K:K28,K37;	bout basic theories of en ;L:K31,K40)	gineering clearly and	d visually to others		
1. strives for completeness in	the acquisition of l	knowledge, cooperates v	vith the instructor and	d fellow students is emr	athetic and tolerant	
towards members of the tear 2, is receptive and proactive	n (J,K,L:A1-A4,A6,A	A7,A10-A13) of the tasks assigned to	itself, self-critical tov	vards the assigned tasks	s (J.K.L:A1-	
A4,A6,A7,A10-A13)	bility (o)				· ····	
1. comply with and enforce e errors independently, while li	nvironmental and s stening to the profe	ocial standards in their c ssional opinions of other	hosen field of work, a s (J,K,L:O2-O6)	and are able to self-mon	itor and correct	

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2. makes responsible decisions in solving tasks in the ch identified (J,K,L:O2-O6)	osen field of a	activity, formulating in	dependent proposals to solve the challenges	
24. Midterm assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
1. midterm test	1. ZH1	1. 50%	1. t1,k1,k2,a1,a2,o1,o2	
2. midterm test	2. ZH2	2. 50%	2. t1,k1,k2,a1,a2,o1,o2	
25. Exam assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
-	-	-	-	
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance			
successful (min. 50%) completion of the midterm tests			Excellent 80-100% Good 70-79%	
28. Attendance and participation requirements				
according to the rules of CoS			Satisfactory 60-69%	
29. Late completion opportunities			Pass 50-59%	
Second retake or delayed completion is only from one midterm requirement. Fail 0-49%				
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BSc training programme	me transportation.bme.hu 1/100 oldal			al Ve	rsion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Basics of	engineering n	nechanics		
2 in Hungarian	Műszaki mechani	ka alapjai		3. Programme code	kl
4. Subject code				5. Term role	2 k
6. Credits	5	7. Evaluation type	е	8. Form	with contact hours
9. Weekly contact hours	2 lecture	2 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 8	DECENT WORK AND ECONOMIC GROWTH COMMIC GROWT	ation Sture		
12. Working hours for fulfil	lling the requireme	ents of the subject			150 hours
Contact hours	56 hours	Preparation for seminars	14 hours	Homework	0 hours
Reading written materials	10 hours	Midterm test preparation	40 hours	Exam preparation	30 hours
13. Organisational unit in charge	Department of Ra	ilway Vehicles and Vehic	cle System Analysis		
14. Subject coordinator	Dr. Béda Péter		15. Email address	beda.peter@kjk.bme.h	u
16department	Department of Ra	ilway Vehicles and Vehic	cle System Analysis		
17. Lecturers	Dr. Béda Péter, D	r. Forberger Árpád, Hor∖	∕áth Ádám, Görögh ⁻	Tamás	
18. Indicative prerequisites	18. Indicative prerequisites				
19. Aim of the subject					
The aim of the course is to e	xplain basic mecha	nical knowledge used in	the current field.		
20. Thematics of lectures					
20. Thematics of fectures Basic Concepts and Principles - Rigid body, force, system of forces Degrees of freedom, constraints, possible displacements - The d'Alembert-Lagrange principle – an analytical approach to equilibrium and motion Statics - Systems of forces – reduction, classification, conditions for equilibrium - Constraints and fundamental equations of statics - Static analysis of simple structures - Breiding of Materials - Concepts and states of stress and strain - Design of axially loaded members (tension/compression) - Bending of beams, buckling (stability of members) - Torsion – analysis of circular cross-section shafts - Design considerations and criteria Kinematics and Dynamics<					
Solving practical problems re	elated to the theorv	presented in the lecture.			
22. Thematics of laboratori	ies				
-					

23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)

The student

a) knowledge (t)

He/She knows the basic mechanical principles, relationships and procedures necessary for practicing the field. (K,L:T2,T3,T4,T7;K:T10) b) skills (k)

He/She is able to apply the basic mechanical relationships necessary for the field of expertise in his/her engineering projects. (K,L:K10,K13,K17,K18;K:K28,K37;L:K31,K40)

c) attitude (a)

04.000.00

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 receptive and proactive in the performance of the tasks assigned to him/her, self-critical of the tasks assigned to him/her (K,L:A4) d) autonomy and responsibility (o)

1. Comply with standards in their chosen field of work, and are able to self-monitor and correct errors independently, while listening to the professional opinions of others (K,L:O3,O4)

Code	Share in final grade	Assessed learning outcomes		ing outcomes	
1. ZH	1. 50%	1. t1,k1			
Code	Share in final grade	Assesse	d learn	ing outcomes	
1. V	1. 50%	1. t1,k1,a1,a2,o1			
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance		
successful completion of the midterm test (min. 50%)				e	
		0-49 ((1)	Tall	
		60-69	(Z) (3)	pass satisfactory	
29. Late completion opportunities					
The midterm test can be replaced with the replacement places written in the delayed completion week.			(5)	excellent	
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					
	Code 1. ZH Code 1. V Ie	Code Share in final grade 1. ZH 1. 50% Code Share in final grade 1. V 1. 50%	Code Share in final grade Assesse 1. ZH 1. 50% 1. t1,k1 Code Share in final grade Assesse 1. V 1. 50% 1. t1,k1,a Image: Stare in final grade 0-49 0-49 50-59 60-69 70-84 0laces written in the delayed 85-	Code Share in final grade Assessed learn 1. ZH 1. 50% 1. t1,k1 Code Share in final grade Assessed learn 1. V 1. 50% 1. t1,k1,a1,a2,o ² Ie 0-49 (1) 0-49 (1) 50-59 (2) 60-69 (3) 70-84 (4) 85- (5)	

BUDAPEST UNIVERS	ITY OF TECHNOLOG	ч алд есоломісs <mark>gineering and Ve</mark> ł	iicle Engineerin	g Subj	ect datasheet	
1. Subject name Basics of transportation engineering						
2 in Hungarian	Közlekedésmérnöl	ki alapismeretek		3. Programme code	k	
4. Subject code				5. Term role	1 k	
6. Credits	7	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	3 lecture	2 practice	0 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 8	DECENT WORK AND ECONOMIC GROWTH CONTACT OF AND INFEASTRUC	ATTON 11 SUSTAINABLE CITIES 1	3 action		
12. Working hours for fulfil	ling the requireme	nts of the subject			210 hours	
Contact hours	70 hours	Preparation for seminars	10 hours	Homework	35 hours	
Reading written materials	30 hours	Midterm test preparation	65 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tra	nsport Technology and	Economics			
14. Subject coordinator	Dr. Lakatos András	s Rudolf	15. Email address	lakatos.andras@kjk.bm	ie.hu	
16department	Department of Tra	nsport Technology and	Economics			
17. Lecturers	Dr. Boldizsár Adrie	enn, Dr. Lakatos András	, Dr. Mándoki Péter,	Dr. Sipos Tibor, Dr. Tóth	János	
18. Indicative						
19. Aim of the subject			aviation planning or		d basis secondaria	
and geographical relationship their professional developme	or transportation engines of transportation and transportation and transportation a	as a stochastic system. and to the development	eristics, planning, op To impart basic univ of their university an	eration, development, an ersity-civic knowledge tha d professional community	at will contribute to y life.	
20. Thematics of lectures						
Placement of transport engineering training in the system of disciplines, in university education. Historical foundations and development of the transport system. Transport system properties and system relationships. Transport policy principles. The planning process of the transport system. Characterization and operation of transport modes. Passenger and freight transport systems. Fundamentals of transport technology, role and tasks of transport modes. Environmental impacts, sustainability. Quality of service of transport systems, evaluation methods of systems. Integrated domestic and EU transport systems. The system of relations between transport, economy, society and the natural environment. Spatial organization of the economy, its units, geographical explanation of the spatial development of transport processes. The complex system of international production and trade. Characteristics of transport modes, the international network of transport corridors, main intercontinental transport routes and nodes. Application possibilities of spatial information systems						
21. Thematics of practices						
Activities that support studies and community life in the transportation profession. Overview of student tasks, deadlines, and administrative tasks. Discussion of theoretical material parts with practical and GIS integrated approach in small group sessions, presentation and evaluation of individual homeworks.						
22. Thematics of laboratories						
-						
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)						
 The student a) knowledge (t) 1. Knows the transport system properties and system relationships, basic principles of transport policy. (T2,T14) 2. Knows the transport system planning process. (T1,T5,T14) 3. Knows the basics of transport technology, the roles and tasks of transport modes. (T2,T14) 4. Knows the most important natural and economic geographical factors influencing transport processes and the explanatory models. (T2,T14) 5. Knows the international network of transport corridors, the main intercontinental transport routes and nodes that form the complex 						
system of international production and trade. (T14) 6. Knows the characteristics of various positioning and geographic information systems. (T14)						

1/100 oldal

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7. Knows the operational structure and processes of the University. (T2)

BSc training programme

b) skills (k)

1. Able to characterize different transport modes. (K4,K9,K19,K21,K24,K25,K26)

2. Able to determine the quality of service of transport systems. (K3,K4,K9,K16,K19,K21,K24,K25,K26)

3. Based on individual qualifications, the student is able to review the spatial operation of transport and logistics systems in their global context. (K3,K4,K9,K19,K21,K25,K26)

4. Able to apply the advantages provided by modern positioning and geographic information systems.

(K4,K5,K16,K19,K21,K24,K25,K26)

5. Able to review student administrative and management processes and deadlines at a complex system level. (K4,K5,K9,K21,K29)

6. Able to recognise the opportunities and advantages of professional community life. (K1,K5,K9,K21,K29)

c) attitude (a)

1. Thinks environmentally conscious, taking into account the environmental impacts of transport and the sustainability of the system. (A1,A13,A17)

2. In the practical application of knowledge, strives to explore the complex spatial relationships of transport processes. (A15,A17)

3. Strives for team work and cooperation in an institutionalized manner. (A1,A2,A7,A8,A9,A13,A15,A17)

d) autonomy and responsibility (o)

1. Can independently carrying out administrative and administration-related university-civic processes. (02,04,05)

2. Can evaluating transport systems in a complex and independent manner. (02,04,05,015)

3. Independently or as part of a team, can prioritizing the aspects of sustainable operation. (O2,O4,O5,O15)

4. Feels responsible for the results and quality of his/her work when planning transport developments and managing practical activities. (02,04,05,015)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
 1. midterm test 2. 2. midterm test 3. homework assignment 	1. ZH1 2. ZH2 3. HF	1. 40% 2. 40% 2. 20%	1. t1,t2,t3,t4,t5,t6,k1,k2,k3,k4,k5,k6,a1,a2,a3 ,o1,o2,o3,o4 2. t1,t2,t3,t4,t5,t6,k1,k2,k3,k4,k5,k6,a1,a2,a3 ,o1,o2,o3,o4 3. t4,t5,k3,k4,a1,a2,o3,o4

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes			
-	-	-	-			
26. Conditions for obtaining signature / midterm grad	de		27. Final grade in percentage of performance			
Participation in lectures and courses - as detailed in the the homework at an acceptable level must be completed task) and the two tests must be taken at a minimum level	Excellent 87,5-100% Good 75-87% Satisfactory 62,5-74,5%					
28. Attendance and participation requirements						
according to the rules of CoS						
29. Late completion opportunities			Fail 0-49%			
Till the end of repeat period, there are 2 retake options re be improved 1 time until the last day of repeat period.						
30. Consultation opportunities						
at a time and in a form agreed with the teacher						
31. Validity of the subject datasheet starts from:						

01 September, 2025

BUDAPEST UNIVER Faculty of Trai	sity of technold	ogy and economics ngineering and Ve	hicle Engineeri	ng Sub	ject datasheet		
1. Subject name	Control a	nd communic	ation syste	ms of aviation			
2 in Hungarian	Légiközlekedési	Légiközlekedési irányító és kommunikációs rendszerek 3. Programme o					
4. Subject code				5. Term role	5 sp		
6. Credits	6	7. Evaluation type	е	8. Form	with contact		
9. Weekly contact hours	2 lecture	1 practice	2 laboratory	10. Language	English		
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	3 GOOD HEALTH AND WELL-BEING	7 AFFORDABLE AND CLEAN ENERGY 3 DECENT WOR ECONOMIC G	K AND ROWTH 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	11 SUSTAINABLE CITIES			
12. Working hours for fulfi	lling the requiren	ents of the subject		1	180 hours		
Contact hours	70 hours	Preparation for seminars	15 hours	Homework	0 hours		
Reading written materials	40 hours	Midterm test preparation	25 hours	Exam preparation	30 hours		
13. Organisational unit in charge	Department of C	ontrol for Transport and	Vehicle Systems				
14. Subject coordinator	Dr. Meyer Dóra		15. Email address	meyer.dora@kjk.bme.	.hu		
16department	Department of C	ontrol for Transportation	and Vehicle Systen	าร			
17. Lecturers	Mudra István, D	r. Meyer Dóra					
18. Indicative prerequisites	, , 						
The aim of the course is to provide basic knowledge about the development of air traffic control and communication systems, their basic concepts, technical systems, procedures, and domestic and international organizations. 20. Thematics of lectures The topic covers the following topics: Foundation topics, definitions, communication skills. Formation and development of civil aviation. Civil aviation situation. (Airspace, air traffic control method). Automated air traffic control. Air traffic control centers, process control. LF / MF band radio direction finding systems. VHF band direction measuring system. UHF band distance measuring system. Instrument landing systems. RADAR principle. Primary pulse locator operating principle. Flight speed (GS) measurement. Radar identification of aircraft. Air Traffic Collision Avoidance System. Air Traffic Management (ATM). Airspace organization. Flow management. Human resources issues. Air Traffic Services (ATS). Flight Information Service (FIS). Flight advisory service. Alerting service. Safety. Ground systems. On - board systems. Regulation. Satellite based positioning systems in civil aviation. Structure of satellite systems. Principle and practice of position determination. Operation and use of a GPS in flight. GLONASS system features. introduction of the EGNOS-GALILEO system. Accuracy of satellite systems. WAAS system for flight purposes. Search and rescue in civil aviation, principle, practice, equipment. Operation of an international search and rescue service. MATIAS: Magyar(Hungarian) Automated and Integrated Air Traffic System: organization, tasks, installation, equipment. Combined representation system in MATIAS ATM. Trends in the change of world aviation. Globalization processes. Change in service performance. Development of the most important air passenger lines internationally. Low-cost companies. Increase airspace capacity. Introduction of RVSM flights (reduced isolation). Optimize flow control.							
21. Inematics of practices Practical implementation of lectures							
22. Thematics of laboratories							
Modelling environment of lectures.							
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)							
 The student a) knowledge (t) 1. Knowledge of the basic modeling and control methods applied in the field of air traffic management. b) skills (k) 2. The student understands the modeling approach and the control method used for a given air traffic management problem. c) attitude (a) 3. The student is interested in the systems and applied tools of air traffic management. d) autonomy and responsibility (o) 4. The student is able to independently resolve a basic control problem in the field of air traffic management. 							
L	•	•		-			

BSc training programme	transportation.bme.hu 2/100 oldal		l Version: 08 May, 2025		
24. Midterm assessments					
Name		Code	Share in final grade	Assessed learning outcomes	
 written midterm exam four practice assignment 		1. ZH 2. GYF	1. 35% 2. 15%	1. t1,k1,a1,o1	
25. Exam assessments					
Name		Code	Share in final grade	Assessed learning outcomes	
1. oral exam		1. V	1. 50%	1. t1,k1,a1,o1	
26. Conditions for obtaining signate	27. Final grade in percentage of performance				
submission of assignments on time or the midterm test	Excellent 88-100%				
28. Attendance and participation re-	quirements			Good 75-87% Satisfactory 63-74%	
according to the rules of CoS					
29. Late completion opportunities		Pass 50-62% Fail 0-49%			
Second retake or delayed completion of the midterm test is possible.					
30. Consultation opportunities					
Consultation is possible at a time and in a form agreed with the teacher.					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BSc training programme	transport	ation.bme.hu	1/100 old	al V	ersion: 08 May, 2025	
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name	Control er	ngineering				
2 in Hungarian	Irányítástechnika			3. Programme code	jkl	
4. Subject code				5. Term role	4 k	
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	3 GOOD HEALTH AND WELL-BEING 	AFFORDABLE AND CLEAN ENERGY 8 ECCNOMIC GRO ECONOMIC GRO Image: Conomic Gro Image: Conomic Gro	AND 9 INDUSTRY, INNOVATION WITH 9 AND INFRASTRUCTURE			
12. Working hours for fulfi	lling the requireme	nts of the subject			120 hours	
Contact hours	42 hours	Preparation for seminars	14 hours	Homework	0 hours	
Reading written materials	32 hours	Midterm test preparation	32 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Co	ntrol for Transport and V	ehicle Systems			
14. Subject coordinator	Dr. Tettamanti Tai	más	15. Email address	tettamanti.tamas@kjk.	.bme.hu	
16department	Department of Co	ntrol for Transportation a	and Vehicle Systems	8		
17. Lecturers	Dr. Tettamanti Tai	más, Dr. Varga Balázs, \	Vágner Tamás, Orn	nándi Tamás		
18. Indicative prerequisites	18. Indicative prerequisites Mathematics A1a (weak), Electrotechnics - Electronics (weak),					
19. Aim of the subject						
The Control Engineering cou This includes the basics of s domain control (basic transfe feedback structure, pole plac to interpret, apply and design 20 Thematics of lectures	urse covers the fund ystem theory (mode er functions, series o cement, LQ control, n industrial control s	amentals of classical and ling, identification, time-o compensation, PID contro discrete-time modeling, olutions in automotive er	d modern control en domain and frequen ol, filters), state-spa Kalman filtering). St ngineering, transpor	gineering for linear, time cy-domain analysis, stab ce theory based modelin udents who complete the t engineering and logistic	-invariant systems. ility), frequency- g and control (state e course will be able cs.	
20. Thematics of lectures	4			1	·····	
In the Control Engineering lectures, students learn the basics of classical and modern control engineering for linear, time-invariant systems through practical examples (from automotive, transport, and logistics fields). The lectures will be presented in Matlab Live Script format in order to demonstrate the applicable methods directly in algorithmic form and to allow the students to easily try them in an interactive way. Lecture topics: basic concepts of control engineering, control design process, time domain analysis of system properties, BIBO stability, Laplace transformation, mathematical modeling of systems, transfer function, system identification, description of systems with basic transfer functions, control block diagram, frequency domain, Bode diagram, closed loop systems analysis, series compensation structure, PID control, tuning of PID control, filters, physical realization of controls/filters, state space theory, state space canonical forms, relationship between transfer function and state space, state space properties (stability, controllability), feedback control structure, pole placement, LQ control, state space identification, discrete-time state space, discrete-time LQ control, Kalman filtering.						
21. Thematics of practices						
In the practical part of the Control Engineering course, students will learn the basics of classical and modern control engineering for linear, time-invariant systems by solving practical examples. Topics of the exercises: system modeling (electronic and mechanical systems), time domain analysis, stability analysis, Laplace transformation, transfer function calculation, frequency domain analysis, application of Bode diagrams, series compensation problems, state space theory based modeling and analysis (stability, controllability), application of feedback control structure (pole placement, LQ control), discrete time state space, discrete time LQ control.						
22. Thematics of laboratories						
-						
23. Subject learning outco	mes (lowercase let	ters) and their connect	tion to programme	level learning outcome	es (capital letters)	
The student a) knowledge (t) 1. Knowledge of the basic modeling, analysis and regulation paradigms of the control engineering for linear, time-invariant systems in the field of vehicle engineering, transport and logistics. (J:T9,T15)						
 b) skills (k) 2. The student understands the modeling approach and the regulation method used for a given control problem for linear, time-invariant systems in the field of vehicle engineering, transport and logistics. (J:K10,K11,K12,K17,K36,K40,K42,K43,K44;K:K10,K11,K12,K17,K28,K32,K34,K35,K36;L:K10,K11,K12,K17,K31,K35,K37,K38,K39) 						

c) attitude (a)

3. The student is interested in the implementation of system modeling and control in the field of vehicle engineering, transport and logistics. (J,K,L:A2)

d) autonomy and responsibility (o)

4. The student is able to independently resolve a given control problem in the field of vehicle engineering, transport and logistics. (J,K,L:O1,O3)

24 Midtorm assessments

Name	Code	Share in final grade	Assessed learning outcomes		
1. written midterm test 1.	1. ZH1	1. 40%	1 +1 +1 01 01		
2. written midterm test 2.	2. ZH2	2. 40%	1.11, K1, A1, 01		
4. four electronic practice assignments	3. EF	3. 20%	2. LI,KI,AI,OI		

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance				
Successful completion of the midterm tests (min. 50% each electronic practice assignments (min. 85% each).	Excellent 92-100%				
28. Attendance and participation requirements		Good 79-91%			
according to the rules of CoS	Satisfactory 67-78%				
29. Late completion opportunities	Fail 0-49%				
Second retake or delayed completion is allowed for both					
30. Consultation opportunities					

There will be a practical lesson and a consultation before the midterm exam. Moreover, consultation is possible at a time and in a form agreed with the teacher.

31. Validity of the subject datasheet starts from:

01 September, 2025

BSc training programme	transport	ation.bm	e.hu	1/100 old	lal V	version: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name	Electrotec	hnics	s - Electi	ronics		
2 in Hungarian	Elektrotechnika - E	Elektronik	a		3. Programme code	jkl
4. Subject code					5. Term role	2 k
6. Credits	6	7. Eval	uation type	е	8. Form	with contact hours
9. Weekly contact hours	3 lecture	1 pract	ice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE					
12. Working hours for fulfi	lling the requirement	nts of th	e subject			180 hours
Contact hours	70 hours	Prepar semina	ation for ars	14 hours	Homework	16 hours
Reading written materials	26 hours	Midterm prepara	n test tion	24 hours	Exam preparation	30 hours
13. Organisational unit in charge	Department of Cor	ntrol for T	ransport and `	Vehicle Systems		
14. Subject coordinator	Dr. Szabó Géza			15. Email address	szabo.geza@kjk.bme	.hu
16department	Department of Cor	ntrol for T	ransport and	Vehicle Systems		
17. Lecturers	Dr. Szabó Géza					
18. Indicative prerequisites	18. Indicative					
19. Aim of the subject						
The aim of the course is to in basic level of proficiency.	ntroduce the most im	iportant e	engineering top	pics in electronics ar	nd electrical engineering	and to provide a
20. Thematics of lectures						
It provides basic engineering the operating principles of the selection/engineering option switching circuitry, and show electrical machines as well a	g knowledge of princi le basic elements of s. It also introduces t vs the special transpo as their application in	ples of e electroni the stude ortation a vehicle	lectrotechnics, cs, to their par ents to the sche and vehicle app and transporta	, of its measurement ameters, features, c ematics, modelling a plications. It present tion.	ts, of its basic models. In haracteristics as well as and analysis principles of s the principles and main	troduces students to their amplifying and parameters of
21. Thematics of practices						
Application of the principles and independent problem so	presented on lecture blving.	s, solvin	g exercises. Tl	he aim is to teach in	dependent application of	circuit principles
22. Thematics of laborator	ies					
Laboratory measurements fr	om selected topics.					
23. Subject learning outco	mes (lowercase lett	ters) and	l their connec	tion to programme	e level learning outcom	es (capital letters)
The student						
 a) knowledge (t) 1. understands the basic principles and basic relationships of electrotechnics, the operation, symbols, features and characteristics of basic electronic components, the amplifying and switching circuits, and the working principles of electrical machines. (J,K,L:T2,T4,T6,T7) b) skills (k) 						
1. is able to understand and analyze the operation of simple electronic circuits. (J,K,L:K10,K17;J:K36,K42;K:K28,K34;L:K31,K37)						
c) attitude (a) 1. participates in solving basic electric problems in the field of transport or vehicle, to work efficiently and willingly with specialists of other						
tielos (in particular: electrical engineering). (A2)						
1. is aware of and treats the analysis. (01 03)	responsibility associ	ated with	the task solut	tion during electric a	nd electronic system pro	blem solving and
24. Midterm assessments						
Name			Code	Share in final grade	Assessed learning of	outcomes
1. midterm test			1. ZH1	1.6%	1. t1,k1,a1,o1	
2. midterm test			2. ZH2	2.6%	2. t1,k1,a1,o1	

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3. homework	3. HF1	3. 7,5%	3. t1,k1,a1,o1	
4. homework	4. HF2	4. 7,5%	4. t1,k1,a1,o1	
5. laboratory measurement and report	t 5. LJ1	5. 2%	5. t1,k1,a1,o1	
6. laboratory measurement and report	t 6. LJ2	6. 2%	6. t1,k1,a1,o1	
7. laboratory measurement and report	t 7. LJ3	7.2%	7. t1,k1,a1,o1	

25. Exam assessments					
Code	Share in final grade	Assessed learning outcomes			
1. V	1. 67%	1. t1,k1,a1,o1			
e		27. Final grade in percentage of performance			
During the semester: two midterm tests, two homework and three laboratory measurements with their report about the results.					
		0%-49%: fail: 50%-60%: pass: 61%-70%:			
29. Late completion opportunities					
The midterm tests have individual re-tests and second (paid) re-tests; the second (paid) re- test can be taken only if a test or a re-test has been taken. Homeworks can be corrected or submitted during the delayed completion week (paid). The laboratory practices can be re- taken during the delayed completion week; protocols about labs can be submitted or corrected during the delayed completion week (paid).					
30. Consultation opportunities					
At a time and in a form agreed with the teacher.					
31. Validity of the subject datasheet starts from:					
01 September, 2025					
	Code 1. V e nd three labora aid) re-tests; th . Homeworks a e laboratory pr ut labs can be	Code Share in final grade 1. V 1. 67% e			

BSc training programme	transportation	.bme.hu	1/100 olda	l V	ersion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Flight operat	ion			
2 in Hungarian	Repülés üzemeltetés			3. Programme code	k
4. Subject code				5. Term role	5 sp
6. Credits	4 7. E	valuation type	е	8. Form	with contact hours
9. Weekly contact hours	2 lecture 1 p	ractice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 EDUCATION 8 ECONOM	WORK AND IC GROWTH 9 INDUSTRY, INN AND INFRASTR			
12. Working hours for fulfil	ling the requirements o	f the subject			120 hours
Contact hours	42 hours Pre	paration for ninars	15 hours	Homework	20 hours
Reading written materials	28 hours Mid	term test paration	0 hours	Exam preparation	15 hours
13. Organisational unit in charge	Department of Aeronau	tics and Naval Arc	chitecture		
14. Subject coordinator	Dr. Rohács Dániel		15. Email address	rohacs.daniel@kjk.bm	e.hu
16department	Department of Aeronau	tics and Naval Are	chitecture		
17. Lecturers	Jankovics István, Faltin	Zsolt István, Gál	István		
18. Indicative prerequisites	Transport technology (, 	suggested),			
19. Aim of the subject					
The student who has complete the economic and transport s	eted this course will have system, the related proce	a comprehensive sses and systems	knowledge of the ope	ration of aircraft and en	gines. Their use in
The basics of flight theory: th components, their functions. Aircraft engine theory: structu flight characteristics. Airworth	e generation of lift, drag Aircraft operation: basics ural design of aircraft eng niness. Flight procedures	and its componen of operation theo ines and gas turb design considera	ts, aircraft performand ry, methods of mainte ine engines. Special a ttions and characteris	ce data. Aircraft structure enance and repair, types aircraft: structural desigr tics. Safety and security	e, main of maintenance. s, structural and
21. Thematics of practices					
Solving practical problems re	elated to the theory prese	nted in the lecture			
22. Thematics of laboratori	es				
- 23. Subject learning outco	mes (lowercase letters)	and their connec	tion to programme	level learning outcome	es (capital letters)
The student a) knowledge (t) 1. understand the processes and tasks of the avionics and its stakeholders 2. understand the sources and methods of further learning in the aviation b) skills (k) 1. can apply their knowledge to the topics covered in flight operation 2. be able to communicate ideas and plans about aviation clearly and visually to others 3. use information technology and computer tools in the work c) attitude (a) 1. aims to create exact, aesthetic and obvious documentation. 2. is interested, responsive, independent, take care for the deadlines. d) autonomy and responsibility (o) 1. able to create technical documentation independently. 2. aware of the significance of his work and the consequences of mistakes. 24. Midterm assessments					
Name		Code	Share in final	Assessed learning o	utcomes
1. semestrial homework		1. HF	1. 15%	1. t1,t2.k1.k2.k3.a1.a2	.01.02
				,,,,,,,,,,	,- ·,

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25. Exam assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
1. written exam	1. V	1. 85%	1. t1,t2,k1,k2,k3,a1,a2,o1,o2	
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance	
submission of homework on time or of	Excellent 80-100%			
28. Attendance and participation re	quirements		Good 70-79%	
according to the rules of CoS			Satisfactory 60-69%	
29. Late completion opportunities			Pass 50-59%	
Second retake from the homework.			Fail 0-49%	
30. Consultation opportunities				
at a time and in a form agreed with the	e lecturers			
31. Validity of the subject datasheet starts from:				
01 September, 2025				

Subject datasheet

ikl

3 | k

hours

English

120 hours

0 hours

32 hours

with contact

BSc training programme 1/100 oldal transportation.bme.hu BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering Fluid dynamics, thermodynamics and heat transfer 1. 1. Subject name 3. Programme code 2. ... in Hungarian Hő- és áramlástan 1. 4. Subject code 5. Term role 6. Credits 4 7. Evaluation type е 8. Form 1 lecture 9. Weekly contact hours 1 laboratory 10. Language 2 practice **9** INDUSTRY, INNOVATION 8 DECENT WORK AND ECONOMIC GROWTH QUALITY 11. SDG 4 FRUCATION Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject **Preparation for Contact hours** 56 hours 10 hours Homework seminars **Midterm test Reading written** 22 hours Exam preparation 0 hours materials preparation 13. Organisational unit in Department of Aeronautics and Naval Architecture charge 15. Email Dr. Veress Árpád 14. Subject coordinator veress.arpad@kjk.bme.hu address 16. ...department Department of Aeronautics and Naval Architecture **17. Lecturers** Dr. Hargitai Csaba, Jankovics István, Dr. Veress Árpád Basic theories of engineering (suggested), **18. Indicative** Mathematics A2a (suggested), prerequisites 19. Aim of the subject Understanding the basic thermodynamic, heat transfer and flow processes, learning their theoretical and practical aspects 20. Thematics of lectures Introduction: Systems, Fluid dynamics, thermodynamics and heat transfer and their applications in logistics, transportation and vehicle engineering, Continuum mechanics, Kinetic theory of gases, introduction of basic parameters (p, v, p, T), equations of state. Fluid dynamics: Liquids, steams, and gases in p-v-T state space (compressible and incompressible mediums), Description of fluid motions according to Euler and Lagrange, The principle of mass, momentum and energy conservation laws, Hydrostatics, Newtonian fluid, The basic laws of viscous flow, Boundary layer, Boundary layer separation, Internal, external and cascade flows, Fluid dynamics in and around of logistics', transportation's and vehicle's systems - forces and coefficients, Similarity theory of fluids, Compressible fluids: sound speed in liquids and gases, Pressure waves, Doppler's effect, Sound barrier, Mach cone, Allievi's water hammer effect. Thermodynamics: Heat and specific heat, The 1st law of thermodynamics, Thermodynamic processes, The 2nd law of thermodynamics, Cycles, useful work, thermal efficiency and coefficient of performance, Air with moisture and corresponding processes, Introduction to heat transfer - classification, principles, characteristics, applications and their conditions. 21. Thematics of practices Exercises are completed after each corresponding chapter by means of solving calculation tasks. 22. Thematics of laboratories Temperature measurement of gases. Measurement of thermodynamic processes. Determination the ratio of specific heats by experiments. Investigation of thermodynamic processes in moist air. Reynolds experiment. Volume flow measurement. Determination of contraction factor. Jet engine model. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. knows the theoretical together with measurement- and analytical calculation-based practical aspects of the studied chapters in fluid dynamics, technical thermodynamics and heat transfer in continuum flow regime with especial care for the logistics, transportation and vehicle engineering, meanwhile she/he knows the advantages, disadvantages, conditions and application ranges of the different processes and methods; (J,K,L:T4,T7;J:T9) 2. knows the relevant professional literature, she/he knows the way of finding, questing the needed detailed technical information about

the investigated problem and the student knows and the student is able to use diagrams and tables in the field of fluid dynamics, thermodynamics and heat transfer. (J,K,L:T4,T7;J:T9)

b) skills (k)

1. can complete theoretical and practical (measurements, experiments, tests and calculations) tasks in the field of fluid dynamics, technical thermodynamics and heat transfer in line with the content of the subject in the field of maintenance and developments with verification, plausibility check and validation (in case of relevancies) (J,K,L:K10,K11,K17;J:K22,K26,K27,K29,K32,K33,K36;K:K28;L:K31)

2. can recognise the desired modifications (e.g.: improve the needed actions for changes and can check, analyse a	ments and de and understa	evelopments) in the fiel nd the results of the mo	ds of the subject, the student can perform odifications.		
(J,K,L:K10,K11,K17;J:K22,K26,K27,K29,K32,K33,K36;K:K28;L:K31)					
3. can understand complex systems and processes, can plan, monitor, evaluate and making decision together with considering all external and internal effects acting on the investigated activity and the effects of her/his activity on other systems. (J,K,L:K10,K11,K17;J:K22,K26,K27,K29,K32,K33,K36;K:K28;L:K31)					
c) attitude (a)					
1. aims to complete the studies at the highest level, under the shortest time, by providing the knowledge and capacity at the best to obtain knowledge for deep and independent professional work; (J,K,L:A2)					
2. cooperates with professors and mates during the studi	es; (J,K,L:A2)			
3. continuously increases the knowledge independently b complete the studies; (J,K,L:A2)	y having info	rmation from the extern	nal literature given by the lectures to		
d) autonomy and responsibility (o)					
1. completes the homework, reports about laboratory pra	ctices and ma	akes exercises about c	alculation tasks independently; (J,K,L:O3)		
2. takes responsibility for guiding mates by the quality of	the work and	by keeping ethic norm	s; (J,K,L:O3)		
3. takes responsibility for applying the knowledge in line v	with the studie	ed conditions, limitatior	ns and constraints; (J,K,L:O3)		
4. can friendly accept the well-established constructive cr	iticism and ca	an utilize that in future;	(J,K,L:O3)		
5. can accept the form of the cooperation; she/he can wo	rk alone or in	a team member deper	nds on the actual situation; (J,K,L:O3)		
24. Midterm assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
1. midterm test	1. ZH	1.0%	1. t1,t2,k1-k3,a1-a3,o1-o5		
25. Exam assessments		- <u>'</u>			
Name	Code	Share in final grade	Assessed learning outcomes		
1. Written exam	1. V	1. 100%	1. t1,t2,k1-k3,a1-a3,o1-o5		
26. Conditions for obtaining signature / midterm grad	le		27. Final grade in percentage of performance		
Requirement for signature of the subject: successful com the laboratory practices.	pletion of the	midterm exam and	Excellent 80-100%		
28. Attendance and participation requirements			Good 70-79%		
According to the rules of Study and Examination Regulat	ions.		Satisfactory 60-69%		
29. Late completion opportunities			Fail 0-49%		
Second retake from the midterm test.					
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

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BUDAPEST UNIVERS	SITY OF TECHNOLOG	BY AND ECONOMICS gineering and Veh	icle Engineerir	ng Subj	ect datasheet
1. Subject name	Individual	research			
2 in Hungarian	Önálló kutatás			3. Programme code	k
4. Subject code				5. Term role	3 k
6. Credits	3	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 9	INDUSTRY, INNOVATION AND INFRASTRUCTURE INEQUALITIES			
12. Working hours for fulfil	ling the requireme	nts of the subject		1	90 hours
Contact hours	42 hours	seminars	6 hours	Homework	20 hours
Reading written materials	6 hours	Midterm test preparation	16 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	insport Technology and	Economics	_	
14. Subject coordinator	Dr. Csonka Bálint		15. Email address	csonka.balint@kjk.bme	e.hu
16department	Department of Tra	insport Technology and	Economics		
17. Lecturers	Dr. Csonka Bálint,	Dr. Földes Dávid, Dr. C	siszár Csaba		
18. Indicative prerequisites	, , 				
19. Aim of the subject					
Learning the basic methods, necessary to carry out engine 20. Thematics of lectures	literature review, fre eering and scientific	eely available databases work, and the skills nee	, data collection me ded to work indepe	thods, and the structure c ndently.	of a research plan,
Characteristics of science an collection; Qualitative and qu research and exploitation of projects.	d scientific research antitative research; results; Ethical dilen	n; History of science; Re Reasoning errors; Prese nmas and protection of c	search design; Liter entation of results; S wn work; Presentat	ature review and source of Scientific writing and publi ion of national and interna	collection; Data cation; Funding ational research
21. Thematics of practices					
Document and diagram edition hypotheses; Preparing a reserved assignment.	ng applications; Lite earch plan; Professi	rature research and prol onal discussion on a tra	blem formulation; Fonstein Depart development	ormulating research quest topic; Presentation of a r	tions and nid-term
22. Thematics of laboratori	es				
-					
23. Subject learning outcom	mes (lowercase let	ters) and their connect	ion to programme	level learning outcome	s (capital letters)
The student a) knowledge (t)					
 Understands the requirem (T2) Learns applications and pressure of the second seco	ents and standards resentation tools to	of research work to ensigned present results and profe	ure that the work ca essional discussion	rried out is of high quality guidelines to communicat	and fit for purpose.
(T11,T13,T16) 3. Prioritises goals and tasks	and organises wo	k when developing a reg	earch plan (T15)	-	
b) skills (k)	, and organises wor	k when developing a rea			
 Uses systematic informatic develop new interpretations. Able to evaluate the qualit 	 Uses systematic information and data collection, processing, analysis and aggregation processes to evaluate current practice and develop new interpretations. Develops scenarios that are prioritised based on goals and objectives. (K4,K9,K19,K25,K28,K29) Able to evaluate the quality of scientific research and logical reasoning. (K15) 				
c) attitude (a)	-		· · ·		
 Accepts responsibility and Values independent and c (A3,A5,A20) 	accountability for th ritical thinking, value	neir protessional decision es participation in tasks f	is and actions. (A2) or the benefit of soc	ciety and learning about b	est practices.
3. Values intercultural skills a 4. Has a positive attitude tow	and participation in t	he scientific community.	(A7,A16,A17)	ifelong learning (A13)	
Has a positive attitude tow		onging needs that call U		iciony icaning. (ATS)	

d) autonomy and responsibility (o)

- 1. Proactively formulates creative proposals without external pressure. (01,02,04)
- 2. Critically checks the reliability of data against quality criteria for scientific work before sharing results. (05,06)
- 3. Controls and monitors personal development. (O10)

N	0.1	Share in final		
Name	Code	grade	Assessed learning outcomes	
1. midterm test	1. ZH	1. 60%	1. t1,t2,t3,k1,a1,a2,a3,o3	
2. literature review assignment	2. HF	2. 40%	2. t2,k1,k2,a2,a4,o1,o2	
25. Exam assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
-	-	-	-	
26. Conditions for obtaining signature / midt		27. Final grade in percentage of performance		
min. 50% completion of the midterm test, and s assignment of acceptable quality	Excellent: 88-100%			
28. Attendance and participation requirement	nts		Good: 75-87%	
According to CoS			Satisfactory: 63-74%	
29. Late completion opportunities			Pass: 50-62% Fail: 0-49%	
Second retake or delayed completion is only from	m one midterm requi	rement.		
30. Consultation opportunities				
At a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts fr	om:			
01 September, 2025				

BUDAPEST UNIVERS	ITY OF TECHNOLOG	Y AND ECONOMICS gineering and Vehi	cle Engineering	Subj	ect datasheet
1. Subject name	Integrated	freight transp	ort system	S	
2 in Hungarian	Integrált áruszállítá	si rendszerek	-	3. Programme code	k
4. Subiect code				5. Term role	5 k
6. Credits	5	7. Evaluation type	m	8. Form	with contact
9 Weekly contact hours	2 lecture	2 practice	0 laboratory		hours
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 8	DECENT WORK AND ECONOMIC GROWTH CONOMIC GROWTH CONO	ON		
12. Working hours for fulfill	ling the requirement	nts of the subject			150 hours
Contact hours	56 hours	Preparation for seminars	25 hours	Homework	0 hours
Reading written materials	34 hours	Midterm test preparation	35 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	nsport Technology and E	conomics		
14. Subject coordinator	Dr. Duleba Szabol	cs 1	l5. Email address	duleba.szabolcs@kjk.b	ome.hu
16department	Department of Tra	nsport Technology and E	conomics		
17. Lecturers	Dr. Duleba Szabol	cs, Dr. Mészáros Ferenc,	Dr. Kővári Botond		
18. Indicative prerequisites	, ,				
19 Aim of the subject					
Transmitting knowledge to fur integrated approach, i.e. cons technologies, and the proced	ture transport mana sidering multiple trar ure of customs and	gers on designing, organ nsport modes, the caracte customs formalities.	izing and controlling eristics of the goods	the transportation of go to be transported, the p	oods by applying an possible transport
20. Thematics of lectures					
Decision making and activitie Mechanisms after completing economic issues in freight tra decisions, creating and apply process. Cost and fare pre-ca transport and freight forwardi	s before freight tran the freight forwardi insport, integrated s ing combined trasn alculations and post- ng.	sportation. Manipulation ng, inverse logistics, tech olutions. Elements of trar port systems. Track and t calculations, cost analys	and interventions du nnical and economic nsport service and th race, creating an in is for the whole tran	uring the transportation analysis. Connections heir interaction. Mode ch tegrated IT support for t sport process for both c	process. of technical and noice analysis and he whole transport wn vehicle
21. Thematics of practices					
Industrial experts introduce the fares of freight forwarding in p and creating an integrated tra	ne practical aspects practical case studie ansport process by a	of the freight transportati s and real-world problem appling the known decisio	on, furthermore a ca s: comparative moo n making tools in fro	alculation of pre-, inter- a de choice analysis base eight forwarding.	and post costs and d on calculations
22. Thematics of laboratori	es				
-					
23. Subject learning outcom	nes (lowercase lett	ers) and their connection	on to programme I	evel learning outcome	s (capital letters)
The student a) knowledge (t) 1. Selects and uses ICT syste 2. Selects and uses ICT reso 3. Knows engineering method b) skills (k) 1.Identifies customer needs r 2. Uses logic and reasoning t to freight transport tasks. (K9 3. Solves problems that arise generates new ideas or comb	ems for various com urces to solve freigh ds for the safe and e elated to freight tran o identify and evalue ,K26) during planning, pri bines existing ones t	plex freight transport tash at transport tasks. (T9) efficient transport of good asport. (K1) ate the strengths and we coritising, organising, dire o develop novel solutions	ks to meet a variety s. (T14) aknesses of alterna cting/promoting acti s. (K19,K27)	of needs. (T8) tive solutions, conclusio on and evaluating perfo	ns or approaches rmance and also
 4. Browses, searches and filt c) attitude (a) 	ers data, digital cont	tent and information, and	applies digital com	petences. (K25,K29)	

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^{1.} Willing to accept responsibility and accountability for own and delegated professional decisions. (A2)

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000	nummig	programmic

2. Solves freight transport tasks while striving to achieve objectives with minimal time, effort or cost. (A10)

3. Committed to maintaining a positive attitude towards new and challenging demands that arise in freight transport and is ready for lifelong learning. (A13,A20)

d) autonomy and responsibility (o)

1. Comply with and enforce environmental and social standards in their chosen field of work, and are able to self-monitor and correct errors independently, while listening to the professional opinions of others.

2. Makes responsible decisions in solving managerial tasks in his/her chosen field of activity, formulating independent proposals to solve the challenges identified. (O4)

24. Midterm assessments

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

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance		
successful (min. 50% each) completion of the midterm te	Excellent 88-100%				
28. Attendance and participation requirements	Good 75-87%				
According to the rules of CoS	Satisfactory 63-74%				
29. Late completion opportunities	Pass 50-62%				
Second retake or delayed completion is only from one mi	Fail 0-49%				
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Introduction	on to transpo	ort economic	S	
2 in Hungarian	Bevezetés a közle	ekedésgazdaságtanba		3. Programme code	k
4. Subject code				5. Term role	2 k
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	3 lecture	0 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	7 AFFORDABLE AND CLEAN ENERGY 9	INDUSTRY, INNOVATION AND INFRASTRUCTURE	CITIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION AND PRODUCTION AND PRODUCTION		
12. Working hours for fulfil	ling the requireme	nts of the subject			120 hours
Contact hours	42 hours	Preparation for seminars	20 hours	Homework	0 hours
Reading written materials	12 hours	Midterm test preparation	46 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	l Economics		
14. Subject coordinator	Dr. Hörcher Dánie	:I	15. Email address	horcher.daniel@kjk.bm	e.hu
16department	Department of Tra	ansport Technology and	Economics		
17. Lecturers	Dr. Hörcher Dánie	l, Dr. Duleba Szabolcs			
18. Indicative prerequisites	, , 				
19. Aim of the subject					
The course provides fundam the movement of goods and equilibrium, as well as the mo	ental knowledge in people, the basic m easurement and eva	micro- and macroecond echanisms of consume aluation of societal cost	mics. It offers an ove r behaviour, the conc and benefits.	rview of the economic ro epts of the transport mar	le of mobility and ket and market
20. Thematics of lectures					
1. Microeconomics. The aims modelling. Production function regulation. Quality and variet Macroeconomics. The theory market, unemployment, and	s and functions of ea ons and costs. The s y. Introduction to ga a of the market econ employment. Extern	conomics. Fundamenta supply function. Market ame theory. Core princip nomy. Fiscal policy and nal market mechanisms	l principles of market equilibrium. Market s ples of welfare econo budgetary regulation. , exports and imports	operation. Utility and pre tructures. Market failures mics and their relevance Financial markets and ir	ferences. Demand and their to transport. 2. flation. The labour
21. Thematics of practices					
-					
22. Thematics of laboratori	es				
- 23. Subject learning outcor	nes (lowercase let	ters) and their connec	tion to programme	level learning outcome	s (capital letters)
The student			Programme		
a) knowledge (t)					
1. Understands and becomes	s able to apply the f	undamental theories of	economics to transpo	ort-related problems.	
2. Students become able of f models. (T4)	ormulating and solv	ring transport planning	problems with econor	nic aspects in the form of	mathematical
3. Understanding the relation methodologies of both fields.	iship between the e	ngineering and social s	cience aspects of trai	nsport, and is able to app	ly the relevant
 Categorisation and comprehension of the key theoretical topics of micro- and macroeconomics. (T5) b) skills (k) 					
1. Identifying and modelling of with opposing interests, and	conflicts of interest i derive optimal decis	n transport planning pro sions. (K1,K16,K19,K25	blems, understand th ,K27,K28,K29)	ne rationale and motivation	ons of stakeholders
2. Analysing cost and benefit based on their marginal char	s in the form of mat ges. (K11,K17,K19	hematical models, and)	being able to identify	the optimal transport pla	nning decision
3. Understands and recognis context of everyday transport	3. Understands and recognises the macroeconomic processes occurring in the national economy and their impact on transport in the context of everyday transport planning work. (K8,K26)				

c) attitude (a)

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1. Recognising the social impacts arising in the course of transport engineering work, with particular attention to secondary effects that do not affect the transport users directly. (A2,A15)					
2. Students become open to dialogu (A9,A17)	ue and collaboration with pro	ofessiona	Is with both the en	gineering and social s	science backgrounds.
3. Becoming professionals who rely	on empirical, data-driven a	nalysis ar	nd strives for object	ive and transparent d	ecision-making. (A10)
d) autonomy and responsibility ())				
1. Recognises the prominent role of and strives to carry out responsible	transport in the national ec analytical work in light of th	onomy, a is recogni	s well as in the fun tion.	ctioning of urban and	regional economies,
2. Verifying or refuting transport policritical mindset. (O5)	cy trends that may lack full	empirical	support, and appro	baches fashionable in	tellectual trends with a
3. Aims to harness innovation to imp (O15)	prove the efficiency of the tr	ansport s	ystem and promote	e the societal benefits	of new technologies.
24. Midterm assessments					
Name	Cod	le	Share in final grade	Assessed learnin	ig outcomes
1. midterm test 2. midterm test	1. Z 2. Z	H1 H2	1. 50% 2. 50%	1. t1,t2,t3,t4,k1,k2 2. t1,t2,t3,t4,k1,k2	k3,a1,a2,a3,o1,o2,o3 k3,a1,a2,a3,o1,o2,o3
25. Exam assessments	I	i			
Name	Cod	le	Share in final grade	Assessed learnin	ig outcomes
-	-		-	-	
26. Conditions for obtaining sign	ature / midterm grade			27. Final grade in performance	percentage of
successful (min. 50%) completion o	f the midterm tests			Excellent 88-100%	,
28. Attendance and participation	requirements			Good 75-87%	<u>,</u>
according to the rules of CoS				Satisfactory 63-74	%
29. Late completion opportunities	;			Pass 50-62%	
Second retake or delayed completion	Second retake or delayed completion is only allow for one midterm test. Fail 0-49%				
30. Consultation opportunities					
at a time and in a form agreed with	the teacher				
31. Validity of the subject datashe	eet starts from:				
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BUDAPEST UNIVER Faculty of Trai	sity of technolo nsportation En	gy and economics i <mark>gineering and Ve</mark> ł	nicle Engineerir	ng Sub	ject datasheet
1. Subject name	Labour sa	ifety			
2 in Hungarian	Biztonságtechnika	a		3. Programme code	kl
4. Subject code				5. Term role	5 k
6. Credits	3	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	1 lecture	0 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 8	B DECENT WORK AND ECONOMIC GROWTH DECENTION OF AND INFRASTRU	VATION 11 SUSTAINABLE CITIES	12 CONSUMPTION AND PRODUCTION	HIPS DALS
12. Working hours for fulfi	lling the requireme	ents of the subject			90 hours
Contact hours	28 hours	Preparation for seminars	10 hours	Homework	8 hours
Reading written materials	24 hours	Midterm test preparation	20 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Ma	aterial Handling and Logi	istics Systems		
14. Subject coordinator	Dr. Rinkács Angé	la	15. Email address	rinkacs.angela@kjk.b	me.hu
16department	Department of Ma	aterial Handling and Logi	istics Systems		
17. Lecturers	Dr. Rinkács Angé	la, Dr. Bohács Gábor			
18. Indicative prerequisites	Electrotechnics - , 	Electronics (strong),			
19. Aim of the subject					
The aim of the students' occ and transport systems are a safety education are: accide techniques, ensuring a safe	upational health and ware of the basic ru nt prevention, legal working environme	d safety education is to e les and practices of occi and regulatory knowledg nt, post-accident procedu	ensure that profession upational health and ge, knowledge of oc ures, etc.	onals involved in the oper l safety. The goals of occ cupational health and sat	ration of logistics upational health and fety tools and
20. Thematics of lectures					
Occupational accident proce labour safety. Working envir Safety-technical characterist Formulation and professiona of the application of ergonon current electrical equipment. methods with and without pr equipment. Taking the huma technologies. Issues of ergo for rooms and workspaces. I sources. Noise pollution reduinstallation. Factors influence	ar safety, the forms esses, causes of occ onment protection, l tics of protective equ al treatment of ergor nics. Electrical safe . Contact protection otective conductors an factor into accour nomic analysis and Workplace noise ab uction with installation ing human performation	of manifestation of dang cupational accidents, the labour health. Basic ergo upment. Influence of en- nomic problems. Man-ma ty regulations and regula . Contact protection clas . Labour safety issues of nt when designing techni design. Lighting of work atement. Properties of n on and organization met ance and strain in the hu	ers and narms. The course of accidents promic concepts. Ge vironmental effects of achine-environment ations. Safe installati ses. Grounded and f material handling n ical systems. Proces places. Natural and oise sources, noise hods. Labour safety man-computer syste	concept and current level s, consequences. Areas a eneral principles of safety on the safe operation of r relationship systems. Th on, operation and mainte ungrounded networks, con nachines. Labour safety is sees of introducing new in artificial lighting requiren reduction methods. Flow and environmental aspe em. Ergonomic analysis.	and boundaries of y technology. nachines. e domestic situation enance of high- ontact protection ssues of storage nformation nents and methods t technology noise cts of plant
21. Thematics of practices	;				
-	ine				
22. I nematics of laborator Safety issues of warehouse	technology and ma	terial handling machines	. Racking systems a	and personal protective e	guipment. New
occupational safety trends.		ttoro) and their correct	tion to programme		
25. Subject learning outco	mes (lowercase le	tters) and their connec	aion to programme	e level learning outcome	es (capital letters)
 a) knowledge (t) 1. knows the basics and con 	cepts of safety tech	nology, the language of	the applied regulation	ons (K,L:T1,T2)	(((), TO TO)
 2. Knows the related electrot 3. knows the operation and o b) skills (k) 1. is called to ensure compliant 	econnical and natura	II science aspects, require Il handling machines rela	rements, and design ated to safety techno	n tools of safety technolog blogy (K:T10;L:T11,T16)	ду (К,L:16,17)

1. is able to ensure compliance with legal requirements and interpret relevant risk assessment measures (K,L:K6,K17;K:K21,K23,K26;L:K25,S1)

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c) attitude (a)					
1. strives to precisely organize and in	mplement safety proc	cesses in his	her work (K,L:A2,A4,	A5,A6)	
2. interested in new developments, h	nas a cooperative atti	tude toward	s organizing safety pro	ocesses (K:A14;L:A1	I4,A15,A16,A17)
d) autonomy and responsibility (o)				
1. independently responsible for operating safety processes and performing basic organizational and planning tasks (K,L:O2,O4,O5;K:O12)					
2. aware of the significance of his/he	er work and the conse	equences of	errors (K,L:O3,O6;L:C	017)	
24. Midterm assessments					
Name		Code	Share in final grade	Assessed learn	ing outcomes
1. semester task		1. F	1. 60%	1. t1,t2,t3,k1,a1,a	a2,o1,o2
2. midterm test		2. ZH	2. 40%	2. t1,t2,t3,k1,a1,a	a2,o1,o2
25. Exam assessments					
Name		Code	Share in final grade	Assessed learn	ing outcomes
-		-	-	-	
26. Conditions for obtaining signature / midterm grade 27. Final grade in percentage of performance				in percentage of	
Completion of at least 50% of the semester task and at least 50% of the midterm separately, and completion of the laboratory tasks.					
28. Attendance and participation requirements			Good 75-87.5%	0070	
According to the rules of CoS.			Satisfactory 62,5	-75%	
29. Late completion opportunities Pass 50-62,5%					
The midterm test, the semester task and one laboratory work can be retaken once during the semester or the delayed completion period.					
30. Consultation opportunities					
At a time and in a form agreed with the teacher.					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Management and business economics 1. Subject name 2. ... in Hungarian Menedzsment és vállalkozás gazdaságtan 3. Programme code ikl 4. Subject code 5. Term role 3 | k with contact 4 6. Credits 7. Evaluation type m 8. Form hours 3 lecture 9. Weekly contact hours 0 laboratory 10. Language English 0 practice **9** INDUSTRY, INNOVATION 8 DECENT WORK AND ECONOMIC GROWTH QUALITY Education 11. SDG 4 Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 120 hours **Preparation for** Contact hours 42 hours 20 hours Homework 0 hours seminars **Midterm test Reading written** 30 hours 0 hours 28 hours Exam preparation materials preparation 13. Organisational unit in Department of Transport Technology and Economics charge 15. Email Dr. Kővári Botond 14. Subject coordinator kovari.botond@kjk.bme.hu address 16. ...department Department of Transport Technology and Economics **17. Lecturers** Dr. Kővári Botond - - -, 18. Indicative - - -, prerequisites - - -19. Aim of the subject To familiarize students with the basic operations, economic, marketing and human resources tasks of companies, and to prepare them to perform managerial tasks in companies. 20. Thematics of lectures General overview of companies, its environment, and company forms. Types of companies, foundation in the practise. Liquidation of the companies. Competition regulation. Features of a market. Company resources, processes. Evaluation of resources. Productivity indicators, correlations. Cost definitions, correlations. Human resource management. Basic tax knowledge. Innovation and its process. Management aspects of the transportation modes. 21. Thematics of practices -22. Thematics of laboratories 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. knows the customer and market needs of companies' products (K,L:T2) 2. knows the costs incurred during production and the provision of services, their groups (K,L:T5) 3. is able to apply communication techniques in business life appropriately (K:T11) 4. is able to evaluate and determine the position of the market and companies, and set relevant goals (K:T15) 5. is able to evaluate basic data and information related to the market and the operation of the company (K:T9,T12;L:T9) b) skills (k) 1. analyzes market needs, manages customers, performs marketing tasks (K,L:K1,K2,K5) 2. effectively manages company processes, controls costs (K:K3,K8,K30;L:K33) 3. uses communication with competitors and partners, supports decisions with economic studies (K:K7,K9,K12,K31;L:K34,S1) analyzes alternative decisions, the offered portfolio, economic factors related to production (K:K16,K19,K21) 5. examines market conditions, characteristics, is able to plan the delivery of products (K:K20,K26,K29;L:K20,K32) c) attitude (a) 1. strives to the best of his/her abilities to solve complex economic tasks (K,L:A1,A2,A4,A5,A11,A12) 2. strives to solve complex problems in his/her work, always taking into account multiple aspects (K,L:A7,A8,A9,A13;K:A14,A15,A18,A22) d) autonomy and responsibility (o)

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1. is able to solve economic and marketing problems independently or as part of a team to a high standard (K,L:O4,O5,O6,O10)				
2. feels responsible for the results and quality of his work (K,L:O7,O8,O11;K:O18)				
24. Midterm assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
1. midterm test	1. ZH1	1. 50%	1. t1,t2,t3,t4,t5,k1,k2,k3,k4,k5,a1,a2,o1,o2	
2. midterm test	2. ZH2	2. 50%	2. t1,t2,t3,t4,t5,k1,k2,k3,k4,k5,a1,a2,o1,o2	
25. Exam assessments				
Name	Code	Share in final grade	Assessed learning outcomes	
-	-	-	-	
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance	
successful (min. 50%) completion of the midterm test	Excellent 88-100%			
28. Attendance and participation requirements			Good 75-87% Satisfactory 63-74% Pass 50-62%	
according to the rules of CoS				
29. Late completion opportunities				
Second retake or delayed completion is only from one midterm requirement. Fail 0-49%				
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	1. Subject name Manager training in transportation				
2 in Hungarian	Menedzser tréning	a közlekedésben		3. Programme code	k
4. Subject code		,		5. Term role	6 k
6. Credits	3	7. Evaluation type	m	8. Form	with contact
9. Weekly contact hours	0 lecture	2 practice	0 laboratory	10. Language	English
S. Weekly contact notics Onecture 2 practice Onecture 1 aboratory 10. Language English 11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals 4 education 8 economic growth information 9 industry, innovation 9 industry, innovation					
12. Working hours for fulfil	ling the requireme	nts of the subject			90 hours
Contact hours	28 hours	Preparation for seminars	10 hours	Homework	16 hours
Reading written materials	24 hours	Midterm test preparation	12 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	nsport Technology and	Economics		
14. Subject coordinator	Dr. Mészáros Ferenc 15. Email address meszaros.ferenc@kjk.			meszaros.ferenc@kjk.b	me.hu
16department	Department of Transport Technology and Economics				
17. Lecturers	Dr. Mészáros Fere	enc			
18. Indicative prerequisites	, , 				
19. Aim of the subject					
To prepare future transport m work effectively and deal with	nanagers to go beyo n people.	ond a narrow profession	al knowledge to learr	n management technique	s that help them to
20. Thematics of lectures					
-					
21. Thematics of practices					
Innovative enterprises, their creation and evaluation; time management; basics of literature search and research; professional and academic careers; interviewing, CVs, motivation letters; negotiation techniques; project management, team work, problem solving tools; presentation techniques; role and importance of chambers of commerce; sources of market information.					
22. Thematics of laboratories					
<u> </u>					
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
 The student a) knowledge (t) 1. become familiar with the managerial activities and tasks in their chosen field 2. have an overview of employment opportunities in academia and industry and know the conditions for finding a job 3. identify sources of professional and market information 4. be familiar with the principles of professional chambers b) skills (k) 					
 be prepared to perform middle-level managerial tasks in your chosen field apply the conditions for professional and academic fulfilment, and take steps to plan a professional and/or academic career examine the sources of information available in his/her chosen field of activity and use credible information, prepare and communicate professionally use information technology and computer tools in his/her work attitude (a) 					
towards members of his/her team					

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2. is receptive and proactive in the performance of the tasks assigned to him/her, self-critical of the tasks assigned to him/her

d) autonomy and responsibility (o)

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1. comply with and enforce environmental and social standards in their chosen field of work, and are able to self-monitor and correct errors independently, while listening to the professional opinions of others

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2. makes responsible decisions in solving managerial tasks in his/her chosen field of activity, formulating independent proposals to solve the challenges identified

5			
24. Midterm assessments			
Name	Code	Share in final grade	Assessed learning outcomes
 midterm test literature research task time management task curriculum vitae task motivation letter task presentation task 	1. ZH 2. F1 3. F2 4. F3 5. F4	1. 40% 2. 15% 3. 15% 4. 15% 5. 15%	1. t1,t2,k1,k2,a1,o1 2. t3,t4,k1,k2,a1,o1 3. t3,t4,k1,k2,a1,o1 4. t3,t4,k1,k2,a1,o1 5. t3,t4,k1,k2,a1,o1

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
-	_	-	-

26. Conditions for obtaining signature / midterm grade	27. Final grade in percentage of performance			
submission of assignments on time or on lessons and successful (min. 50%) completion of the midterm test	Excellent 88-100%			
28. Attendance and participation requirements	Good 75-87% Satisfactory 63-74% Pass 50-62% Fail 0-49%			
according to the rules of CoS				
29. Late completion opportunities				
Second retake or delayed completion is only from one midterm requirement.				
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Material technology, vehicle maintanance 1. Subject name 2. ... in Hungarian Anyagtechnológia, járműfenntartás 3. Programme code k 4. Subject code 5. Term | role 3 | k with contact 5 6. Credits 7. Evaluation type е 8. Form hours 9. Weekly contact hours 2 lecture 2 laboratory 10. Language English 0 practice QUALITY **9** INDUSTRY, INNOVATION AND INFRASTRUCTURE CLIMATE Action 11. SDG 4 3 FRUCATION Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 150 hours **Preparation for** Contact hours 56 hours 10 hours Homework 0 hours seminars **Midterm test Reading written** 30 hours 30 hours 24 hours Exam preparation materials preparation 13. Organisational unit in Department of Automotive Technologies charge 15. Email 14. Subject coordinator Dr. Pál Zoltán pal.zoltan@kjk.bme.hu address 16. ...department Department of Automotive Technologies **17. Lecturers** Dr. Bán krisztián, Dr. Markovits Tamás, Dr. Pál Zoltán, Dr. Hlinka József - - -, 18. Indicative - - -, prerequisites - - -19. Aim of the subject Providing transportation engineers with the basic knowledge of materials, manufacturing technology and vehicle maintenance that is necessary to perform their tasks. 20. Thematics of lectures Overview of materials used in transportation, metal alloys and their characteristics, important material testing procedures. Main groups of steel and aluminum materials, their heat treatment. Basics of typical component manufacturing processes (casting, plastic forming, machining, surface modification). Subassembly manufacturing processes (bonding technologies, assembly technology, basics of technological sequence). Design of types of industrial manufacturing systems and main system elements. Basics of quality assurance. Examination of component characteristics, diagnostic and testing methods. Typical failures and testing techniques. Basics of repair technology procedures. 21. Thematics of practices 22. Thematics of laboratories Material tests (strength tests), machine demonstration lab, hardness measurement lab, geometric measurements lab, surface quality testing, diagnostic lab (thermal imaging), diagnostic lab (endoscope, high-speed camera), analysis of repair case studies. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. Knows the main types of raw materials and their main characteristics and the basics of testing methods. (T2) 2. Knows the basics of the main parts and components manufacturing processes and the specifics of manufacturing systems. (T1) 3. Knows the quality assurance aspects related to manufacturing. (T2) 4. Knows the methods of analyzing the failure of parts and the basics of the main repair technologies. (T10) b) skills (k) 1. is able to take production aspects into account based on the procedures and methods described and, where appropriate, apply them to their own tasks. (K8-10,K13-15,K17,K21-K24,K26,K33,K35,K36) c) attitude (a) 1. is open to new opportunities and solutions in the field. (A2,A4,A10,A15,A19,A20) d) autonomy and responsibility (o) Can be involved in tasks and processes. (O1,O5)

24. Midterm assessments

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Name		Code	Share in final grade	Assessed learning outcomes
1. midterm test		1. ZH1	1.0%	1. t1-t4,k1
2. laboratory measurement records		2. JK	2. 15%	2. t1,t4,a1,o1
25. Exam assessments				
Name		Code	Share in final grade	Assessed learning outcomes
1. Written exam		1. Vizsg1	1. 85%	1. t1-t4,k1
26. Conditions for obtaining signa	ture / midterm grad	e		27. Final grade in percentage of performance
The midterm test is passed if more than 50% of the maximum score is achieved. Attendance at labs during the semester is mandatory and submission of the measurement records at an acceptable level is required. A successful midterm test, completion of all labs and submission of records with an acceptable grade is required to receive a passing grade.			0-<50%: fail (1),	
28. Attendance and participation requirements				50-<62%: pass (2), 62-<75%: satisfactory (3), 75-<87%: good (4),
According to TVSZ				
29. Late completion opportunities				
The midterm test can be retaken once. During the delayed completion week, an combined test for the signature can be taken from the knowledge material of the entire semester. Practices and labs can be completed during the semester till the limit of participants. One of the practices or labs can be completed during the delayed completion week.			87-100%: excellent (5).	
30. Consultation opportunities				
Every lecture				
31. Validity of the subject datashee	et starts from:			
01 September, 2025				

BUDAPEST UNIVERS	SITY OF TECHNOLOG	ey and economics gineering and Ve	hicle Engineeri	ng	ect datasheet
1. Subject name	Mathemati	cs A1a			
2 in Hungarian	Matematika A1a			3. Programme code	jkl
4. Subject code				5. Term role	1 k
6. Credits	6	7. Evaluation type	e	8. Form	with contact hours
9. Weekly contact hours	4 lecture	2 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 EDUCATION 8	DECENT WORK AND ECONOMIC GROWTH			
12. Working nours for fulfil	ling the requireme	nts of the subject Preparation for			180 nours
Contact hours	84 hours	seminars	34 hours	Homework	0 hours
Reading written materials	6 hours	Midterm test preparation	24 hours	Exam preparation	32 hours
13. Organisational unit in charge	Department of Sto	chastics (TTK)			
14. Subject coordinator	Bodrogné Dr. Réff	y Júlia Anna	15. Email address	reffyj@math.bme.hu	
16department	Department of Ana	alysis and Operations F	Research (TTK)		
17. Lecturers	Dr. Sándor Csaba	, Dr. Mikovszki Tamás			
18. Indicative prerequisites					
19. Aim of the subject					
Students will learn the basics this, students will develop the practical tasks.	s of mathematics an eir problem-solving s	d the fundamental matl skills and develop a cor	hematical concepts r mmitment to precise	needed for technical thinki , demanding engineering v	ng. In addition to work through
20. Thematics of lectures					
Students will learn the basics calculus, the analytic geometer	s of mathematics: the try of three-dimension	e use of complex numb onal Euclidean space.	pers, differential calc	ulus of univariate real fund	ctions, integral
21. Thematics of practices					
Students will learn the basic mathematical concepts necessary for technical thinking: the use of complex numbers, differential calculus of univariate real functions, integral calculus, analytic geometry of three-dimensional Euclidean space. In addition to this, students will develop their problem-solving skills and, through practice-oriented tasks, will develop a commitment to precise, demanding engineering work.					
22. Thematics of laboratori	es				
00 Oublest Issue !					o (oonit-11-tt
23. Subject learning outcom	nes (lowercase let	ters) and their connec	ction to programme	e level learning outcome	s (capital letters)
 a) knowledge (t) 1. Understand the principles and methods of mathematics applied in the field of engineering (T4) 2. Know the general and specific mathematical, scientific and social principles, rules, contexts and procedures for the operation of vehicles and mobile machinery (T9) b) skills (k) 1. Demonstrates an understanding of mathematical concepts and expressions and the application of basic mathematical principles and processes to the interpretation of data and facts (K11) c) attitude (a) 1. Choose from several options (A4) d) autonomy and responsibility (o) 					
24. Midterm assessments			Share in final		
Name		Code	grade	Assessed learning or	utcomes
 nidterm test midterm test midterm test 		1. ZH1 2. ZH2 3. ZH3	1. 13% 2. 13% 3. 14%	1. t1,k1,a1 2. t1,k1,a1 3. t1,k1,a1	

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25. Exam assessments			
Name	Code	Share in final grade	Assessed learning outcomes
1. Exam papers	1. V	1.60%	1. t1,k1,a1
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance
At least 30% completion of each mid			
28. Attendance and participation re			
according to the rules of CoS			Excellent 86-100%, 71-85%, satisfactory 55-69%, pass 40-54%, fail 0-39%
29. Late completion opportunities			
The midterms can only be retaken once			
30. Consultation opportunities			
at a time and in a form agreed with th	ne teacher		
31. Validity of the subject datashee	et starts from:		
01 September, 2025			

BUDAPEST UNIVERS	SITY OF TECHNOLOG	er and economics gineering and Vel	hicle Engineeri	ng	ject datasheet
1. Subject name	Mathemati	ics A2a			
2 in Hungarian	Matematika A2a			3. Programme code	jkl
4. Subject code				5. Term role	2 k
6. Credits	6	7. Evaluation type	e	8. Form	with contact hours
9. Weekly contact hours	4 lecture	2 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 8	DECENT WORK AND ECONOMIC GROWTH			
12. Working hours for fulfil	lling the requireme	nts of the subject			180 hours
Contact hours	84 hours	seminars	34 hours	Homework	0 hours
Reading written materials	6 hours	Midterm test preparation	24 hours	Exam preparation	32 hours
13. Organisational unit in charge	Department of Sto	chastics (TTK)			
14. Subject coordinator	Dr. Rónyai Lajos		15. Email address	lajos@math.bme.hu	
16department	Department of Alg	ebra and Geometry (T	ΓK)		
17. Lecturers	17. Lecturers Dr. Sándor Csaba, Dr. Mikovszki Tamás				
18. Indicative prerequisites	18. Indicative prerequisites Mathematics A1a (strong),				
19. Aim of the subject					
Students will learn the basics this, students will develop the practical tasks.	Students will learn the basics of mathematics and the fundamental mathematical concepts needed for technical thinking. In addition to this, students will develop their problem-solving skills and develop a commitment to precise, demanding engineering work through practical tasks.				
20. Thematics of lectures					
Students will learn the basics multivariable functions; and t	s of mathematics: the important series	e main concepts and m in engineering applicat	ethods of linear alg ions.	ebra; the fundamental pro	perties of
21. Thematics of practices					
Students will learn the basic mathematical concepts necessary for engineering thinking: the main concepts and methods of linear algebra; the basic properties of multivariable functions; and the important series for engineering applications. In addition to this, students will develop their problem-solving skills and, through practice-oriented tasks, will develop a commitment to precise, demanding engineering work					
22. Thematics of laboratori	ies				
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
The student a) knowledge (t) 1. Understand the principles and methods of mathematics applied in the field of engineering (T4) 2. Know the general and specific mathematical, scientific and social principles, rules, contexts and procedures for the operation of vehicles and mobile machinery (T9) b) skills (k) 1. Demonstrates an understanding of mathematical concepts and expressions and the application of basic mathematical principles and processes to the interpretation of data and facts (K11) c) attitude (a) d) autonomy and responsibility (o)					
24. Midterm assessments					
Name		Code	Share in final grade	Assessed learning o	utcomes
1. midterm test		1. ZH1	1. 20%	1. t1,k1 2. t1 k1	
		2. 21 12	2.20/0	2 . U,NI	

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25. Exam assessments

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Name	Code	Share in final grade	Assessed learning outcomes
1. Exam papers	1. V	1.60%	1. t1,k1
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance
At least 30% completion of each midterm tests			
28. Attendance and participation requirements			
according to the rules of CoS			Excellent 86-100%, 71-85%, satisfactory
29. Late completion opportunities			-
The midterms can only be retaken once			
30. Consultation opportunities			
at a time and in a form agreed with the teacher			
31. Validity of the subject datasheet starts from:			
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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Mathemat	ics A3k			
2 in Hungarian	Matematika A3k			3. Programme code	k
4. Subject code				5. Term role	3 k
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	2 lecture	0 practice	2 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 8	ECONOMIC GROWTH			
12. Working hours for fulfil	lling the requireme	ents of the subject			120 hours
Contact hours	56 hours	Preparation for seminars	30 hours	Homework	0 hours
Reading written materials	10 hours	Midterm test preparation	24 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of An	alysis and Operations F	Research (TTK)		
14. Subject coordinator	Dr. Burai Pál		15. Email address	buraip@math.bme.hu	
16department	Department of An	alysis and Operations F	Research (TTK)		
17. Lecturers	Dr. Mikovszki Tan	nás, Dr. Burai Pál			
18. Indicative prerequisites	18. Indicative prerequisites Mathematics A2a (strong),				
19. Aim of the subject					
Students will learn the basics this, students will develop the practical tasks.	s of mathematics an eir problem-solving	d the fundamental mati skills and develop a cor	hematical concepts mmitment to precise	needed for technical think , demanding engineering	ing. In addition to work through
20. Thematics of lectures					
21. Thematics of practices					
22. Thematics of laborator	ies				
23. Subject learning outcom	mes (lowercase let	ters) and their connec	ction to programme	e level learning outcome	es (capital letters)
 a) knowledge (t) 1. Know the general and specific mathematical, scientific and social principles, rules, contexts and procedures for the operation of vehicles and mobile machinery (T9) b) skills (k) c) attitude (a) d) autonomy and responsibility (o) 					
24. Midterm assessments					
Name		Code	Share in final grade	Assessed learning o	utcomes
 midterm test midterm test 		1. ZH1 2. ZH2	1. 50% 2. 50%	1. t1,k1 2. t1,k1	
25. Exam assessments					
Name		Code	Share in final grade	Assessed learning o	utcomes
-	a signatura / midte	-	-	- 27. Final grade in pe	rcentage of
At least 30% completion of e	ach midterm tests	ann grade		performance	
, theast 50 % completion of e					

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28. Attendance and participation	on requirements		
according to the rules of CoS	Excellent 86-100%, 71-85%, satisfactory		
29. Late completion opportunit	55-69%, pass 40-54%, fail 0-39%		
The midterms can only be retake	n once		
30. Consultation opportunities			
at a time and in a form agreed wi	th the teacher		
31. Validity of the subject data	sheet starts from:		
01 September, 2025			

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BUDAPEST UNIVERS	SITY OF TECHNOLOG	er and economics gineering and Vel	nicle Engineerin	g Subj	ject datasheet
1. Subject name	Prohemati	cs Programo	zás		
2 in Hungarian	Programozás			3. Programme code	jkl
4. Subject code				5. Term role	1 k
6. Credits	7	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	2 lecture	0 practice	4 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	INDUSTRY, INNOVATION AND INFRASTRUCTURE			
12. Working hours for fulfil	ling the requireme	nts of the subject			210 hours
Contact hours	84 hours	Preparation for seminars	36 hours	Homework	40 hours
Reading written materials	10 hours	Midterm test preparation	40 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Co	ntrol for Transport and \	/ehicle Systems		
14. Subject coordinator	Dr. Bécsi Tamás		15. Email address	becsi.tamas@kjk.bme	.hu
16department	Department of Control for Transport and Vehicle Systems				
17. Lecturers	Dr. Bécsi Tamás,	Dr. Fehér Árpád, Dr. Sz	abó Ádám, Dr. Törő	Olivér	
18. Indicative prerequisites	, , 				
19. Aim of the subject					
To develop the algorithmic th	inking of engineerin	g students through the	teaching of a selecte	d, widespread programn	ning language.
20. Thematics of lectures During the lecture, students v use of functions and data stru approach. Students will learn examples. The course prepa	20. Thematics of lectures During the lecture, students will learn about the need for programming, control structures (branches, loops), data management, and the use of functions and data structures. The lecture introduces the fundamentals of algorithm theory and the basics of the object-oriented approach. Students will learn debugging, file management, and the application of basic algorithms (searching, sorting) through practical				nagement, and the le object-oriented l) through practical
21. Thematics of practices		1 3 3			
-					
22. Thematics of laboratori	es				
The lab sessions help to dee design tasks independently.	pen the practical lea	arning of the lecture. As alified instructor.	part of this, students	perform basic program	ning and algorithm
23. Subject learning outcor	nes (lowercase let	ters) and their connec	tion to programme	level learning outcome	s (capital letters)
The student a) knowledge (t) 1 knows the basic concents	of computer science				
 2. knows the basic concepts of structured programming and the syntax of a language studied in the course (K:T17;J:T21;L:T21) 3. knows elementary algorithm design methods and their implementation options (K:T16:J:T17) 					
 4. has knowledge of the basics of object-oriented programming (K:T16;J:T17) b) skills (k) 					
1. Able to understand, model and measure the functioning of the physical world using digital tools, as well as to explore cause-and-effect relationships and apply them in rule-based systems. (J,K,L:K10)					
2. Able to process structured data, effectively search, evaluate and manage digital content. (K:K28 K29 K30 K31: I:K36 K37 K38 K39I: K31 K32 K33 K34)					
3. Able to design, program, c (K:K12,K32,K34,K35,K36;J:k	operate and test IT s (12,K40,K42,K43,K	ystems based on mode 44;L:K12,K35,K37,K38,	ls. K39)		
c) attitude (a)		,,	,		
1. Recognizes and accepts the take ownership of, and respe	hat designing, progr ect the consequence	amming, and applying one of professional decision	digital systems involven ons — both for thems	es responsibility, and str selves and others. (J,K,L	ives to understand, ::A2)
Strives to critically assess and select from various digital technology solutions, and to apply them in a way that achieves the desired goals with minimal use of time, effort, or resources. (J,K,L:A4,A10)					

d) autonomy and responsibility (o)

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Makes decisions independently and responsibly during the design and implementation of digital solutions, is capable of identifying and correcting own mistakes, and formulates proposals for optimal programming steps in a creative manner. (J,K,L:O2,O3)
 Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes		
1. midterm test	1. ZH1	1. 1/3	1. t1,t2,k1		
2. midterm test	2. ZH2	2. 1/3	2. t3,t4,k2,k3		
3. programming homework	3. HF	3. 1/3	3. a1,a2,o1		
25. Exam assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grad		27. Final grade in percentage of performance			
A minimum 40% average of ZH1 and ZH2, and a minimum 40% result of HF.					
28. Attendance and participation requirements			Excellent: 85–100%		
according to the rules of CoS			Satisfactory: 55–69%		
29. Late completion opportunities			Pass: 40–54%		
Only one of the mid-semester requirements can be made up through repeated replacement.			Fail: 0–39%		
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BSc training programme	transpor	tation.bme.hu	1/100 old	lal Ve	ersion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Rail tracks	6			
2 in Hungarian	Vasúti pályák			3. Programme code	k
4. Subject code				5. Term role	4 sp
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	1 lecture	2 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	NOUSTRY, INNOVATION AND INFRASTRUCTURE 11 SUSTAINABLE C AND COMMUNIT	THES 15 LIFE ON LAND		
12. Working hours for fulfi	lling the requireme	ents of the subject		1	120 hours
Contact hours	56 hours	Preparation for seminars	10 hours	Homework	25 hours
Reading written materials	9 hours	Midterm test preparation	20 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics		
14. Subject coordinator	Dr. Lakatos Andrá	is Rudolf	address	lakatos.andras@kjk.bn	ne.hu
16department	Department of Tra	ansport Technology and	Economics		
17. Lecturers	Dr. Lakatos Andrá	is, Dr. Szabó József			
18. Indicative prerequisites	18. Indicative prerequisites Transport technology (strong),				
40 Aim of the cubicot					
The sim of the course is to p	repare future trapsr	ort engineers with comp	rehensive and deta	niled professional knowled	ge to perform
operational and planning tas	ks related to railway	infrastructure as a railw	ay subsystem.		ge to perioriti
20. Thematics of lectures					
Most important basic characteristics of railway transportation. Basic concepts of the railway tracks and vehicles (clearances, gauge, wheel profiles, superstructure, substructures, cross-sections). Principals of movement characteristics, speed, acceleration, changing of acceleration. Geometrical design of the railway tracks, curves, transition curves, superelevations, superelevation tansitions. Surveying of railway lines, staking of major points and details of curves and transition curves. Types, materials and requirements of structural elements of the railway track (rails, sleepers, rail fastenings, ballast, rail joints, welding of rails, structural elements of highway crossings). Types of turnouts, crossings, double slips, their geometrical parameters and structural elements. Calculation and geometry of simple track connections. Most important criteria of horizontal and vertical design parameters of the railway tracks. Cross-sections of the					
21. Thematics of practices					
Application of knowledge lea	irnt on lectures by p	ractical tasks. Preparatic	n of project task.		
22. Thematics of laborator	ies				
Site visits to the facilities of the railway companies operating the track network. Interactive presentation in the laboratory of the BME Department of Highway and Railway Engineering.					
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
 The student a) knowledge (t) 1. Knows the main circumstances of the horizontal and vertical tracing of railway tracks. 2.Knows the main functions of the elements of railway tracks, the main types, main technical parameters 3. Knows these: railway network, design levels, elements of layout tracing, straight, arc, transition curve, calculation and drawing of transition curves, cross-sections 					
b) skills (k)					
 Is able to visually represent the elements of railway track. Is able to identify, analyse and solve modest track building problems. 					
c) attitude (a)					
1. Continuously broaden the	ir technical vocabula	ary.			
 Pursue accurate and mista Pursue to enforce the prind) autonomy and responsi 	ake-free problem so ciples of energy effi bility (o)	iving. ciency and environment	consciousness.		
	/				

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1. Is able to solve railway building problems individually of high standard.

2. Is open to well established critics.

3. Uses systematic approach during problem solving.

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test	1. ZH	1. 55%	1. t1,t2,t3,k1,k2,a1,o3
2. homework	2. HF1	2. 15%	2. k1,k2,k3,a1,a2,a3,o1,o2,o3
3. homework	3. HF2	3. 15%	3. k1,k2,k3,a1,a2,a3,o1,o2,o3
4. homework	4. HF3	4. 15%	4. k1,k2,k3,a1,a2,a3,o1,o2,o3
5. control test	5. ET1	5.0%	5. t1,t2,t3,k1,k2,a1,o3
6. control test	6. ET2	6.0%	6. t1,t2,t3,k1,k2,a1,o3

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade	27. Final grade in percentage of performance
During the semester, 2 control tests, 3 homeworks and 1 midterm test must be taken. In each assessment at least 50% of the points must be reached. Completion of the control tests is a criterion-type requirement, classic classification (giving a grade of 1-5) does not take place here. In the case of homework and midterm test, there is an evaluation on a grade scale of 1-5 (1 not passed, 2-5 passed). The grade - of those who meet the attendance conditions and the requirements - is calculated on the basis of the weighted average of the grades (1-5) received for the 3 homeworks and 1 midterm test.	
28. Attendance and participation requirements	Excellent 87 5-100%
Participation in contact classes is 70% mandatory. The contact classes of practical competences are indicated separately in the "Detailed Semester Schedule", which is prepared with specific dates per semester and is available on the subject's website (Moodle). The Department examines the 70% attendance separately for "theoretical" and "practical" contact hours. A student who does not reach the 70% participation rate for any type of contact class will receive a failing grade for the subject.	Good 75-87% Satisfactory 62,5-74,5% Pass 50-62% Fail 0-49%
29. Late completion opportunities	
The control tests can be retaken between the first and last day of classes. The midterm test can be retaken between the first and last day of classes or in the late completion period. Homeworks can be retaken (delayed submission) between the first and last day of classes as specified in the detailed semester schedule - published at the beginning of the semester - against a fee specified in the Code of Studies.	
30. Consultation opportunities	
at a time and in a form agreed with the teacher	
31. Validity of the subject datasheet starts from:	
01 September, 2025	

BSc training programme 1/100 oldal transportation.bme.hu BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering **Rail transport informatics** 1. Subject name 2. ... in Hungarian Vasúti informatika 3. Programme code k 4. Subject code 5. Term role 4 | sp with contact 6. Credits 3 7. Evaluation type m 8. Form hours 1 lecture 9. Weekly contact hours 2 laboratory 10. Language English 0 practice 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE QUALITY Education 11. SDG 4 Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 90 hours **Preparation for** Contact hours 42 hours 10 hours Homework 15 hours seminars **Midterm test Reading written** 15 hours **Exam preparation** 0 hours 8 hours materials preparation 13. Organisational unit in Department of Transport Technology and Economics charge 15. Email 14. Subject coordinator Dr. Lakatos András Rudolf lakatos.andras@kjk.bme.hu address 16. ...department Department of Transport Technology and Economics **17. Lecturers** Bányácski Csaba - - -, **18. Indicative** - - -, prerequisites - - -19. Aim of the subject The aim of the course is to prepare future transport engineers with comprehensive and detailed professional knowledge to master the structure and operation of IT systems necessary for the operation and design of railway systems. 20. Thematics of lectures Demonstration of railway informatics systems for different business processes of the railway transportation, through the functional services of railway informatics systems and the IT structures (software and hardware) of the railway transportation. Analysis of criteria for specific IT systems of different railway related stakeholders, their main attributes, their connections and business processes. Demonstration of methods of train path requesting and infrastructure charge calculation, their support by informatics. Demonstration of passenger information systems connected to railway passenger transportation. Systems used before, during and after travel, related functions and services. Demonstration of electronic seat booking and paying systems. Demonstration of railway freigth informatics systems: - Planning, operation, tracking of freight train transportations, freight wagon register. - Commercial and costumer relationship supporting informatics system of railway freight transport. 21. Thematics of practices 22. Thematics of laboratories Students apply knowledge from Transport informatics and Railway informatics lectures in practice on the field of railway transportation. Analysis, modelling and planning of business procesess for different railway stakeholders. Students work individually and in small groups on railway informatics related projects. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. knows the basic businesss processes of the railway sector, participants, their relevant tasks and relationship network. 2. knows the architecture elements of informatics systems (software, hardware, network), has practical knowledge in programming, database planning and operation. 3. knows the methodological steps of informatics system planning, as well as the elements of software life-cycle.

b) skills (k)

- 1. Is able to connect the studied system functions and integration of railway informatics systems to railway operation processes.
- 2. Is able to individually create an informatics system-modell to a defined railway operation process by the system-design methodology.
- 3. Is able to create and plan the outlinses of a software and hardware architecture needed for specific railway operation processes.
- c) attitude (a)

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1. Can see through the (the whole, modul-level, element-level) functionality of a given railway informatics system, is able to situate the services of the informatics system in the railway operation processes with an integral approach.

2. Has an algorithmic ability to create a railway informatics system/system-element for supporting a railway business process/processelement.

d) autonomy and responsibility (o)

1. Is able to individually perform sub-tasks effectively as a part of a greater team during the creation of an extensive, complex railway informatics system.

2. Performing their tasks with great responsibility, in order to achieve the goals in line with informatics system's targets.

24. Midterm assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
1. midterm test	1. ZH	1. 50%	1. t1,t2,t3,k1,k2,k3,a1,a2,o1,o2			
2. homework 1	2. HF1	2. 25%	2. t1,t2,t3,k1,k2,k3,a1,a2,o1,o2			
3. homework 2	3. HF2	3. 25%	3. t1,t2,t3,k1,k2,k3,a1,a2,o1,o2			
25. Exam assessments						
Name	Assessed learning outcomes					
-	-	-	-			
26. Conditions for obtaining signature / midterm grad		27. Final grade in percentage of performance				
Participation in lab classes and taking the minimum requireaching at least 40% of the maximum point. The exam is reached in midterm test.	Excellent 87,5-100%					
28. Attendance and participation requirements			Satisfactory 62.5-74.5%			
according to the rules of CoS			Pass 50-62%			
29. Late completion opportunities			Fail 0-49%			
There are 2 retake options regarding the midterm test.						
30. Consultation opportunities						
at a time and in a form agreed with the teacher						
31. Validity of the subject datasheet starts from:						
01 September, 2025						

BSc training programme	raining programme transportation.bme.hu 1/100 oldal Version: 08 May, 2								
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering									
1. Subject name	Rail trans	port managem	ient						
2 in Hungarian	Vasúti menedzsm	ent		3. Programme code	k				
4. Subject code				5. Term role	6 sp				
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours				
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English				
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	1 [№] ñ¥††î	1 NO POVERTY 3 GOOD HEALTH AND WELL-BEING AND WELL-BEING AND CLEAN ENERGY 9 INDUSTRY, INNOVATION AND PRODUCTION AND PRODUCTION AND PRODUCTION AND PRODUCTION AND PRODUCTION							
12. Working hours for fulfi	lling the requireme	ents of the subject	-		120 hours				
Contact hours	42 hours	Preparation for seminars	10 hours	Homework	18 hours				
Reading written materials	14 hours	Midterm test preparation	36 hours	Exam preparation	0 hours				
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics						
14. Subject coordinator	Dr. Hörcher Dánie	el	15. Email address	horcher.daniel@kjk.bm	ne.hu				
16department	Department of Tra	ansport Technology and	Economics						
17. Lecturers	Dr. Hörcher Dánie	el, Dr. Farkas Bálint							
18. Indicative prerequisites	18. Indicative prerequisites								
19. Aim of the subject									
This course covers the econ	omic theory, statisti	cs and public policy of pa	ssenger and freight	transport within the railw	ay sector.				
20. Thematics of lectures		<u> </u>							
derivation of consumer bene root principle; modelling inter profit oriented supply and co Preference and Revealed Pr	onomic modelling o fits; cost function is ractions between tra mpetition. Empirical eference data colle	t transport markets; the r public transport; welfare ansport modes; the Dowr themes: discrete choice ction.	ore of pricing in weir oriented pricing and is-Thomson Parado modelling and calir	are economics; demand I capacity optimisation; M x; optimal cost recovery a bation; Random Utility Th	nodels and the lohring's square and subsidies; neory, Stated				
21. Thematics of practices									
The seminar sessions of the and its policy environment. S presenters.	course enable stud Some of the seminar	ents to enrich their pract s are given by leading p	cal knowledge of the olicy makers and co	e Hungarian and Europe rporate managers of the	an railway market field as visiting				
22. Thematics of laborator	ies								
-									
23. Subject learning outcom	mes (lowercase let	tters) and their connect	ion to programme	level learning outcome	s (capital letters)				
The student a) knowledge (t)									
1. Understanding the basic microeconomic effects involved in planing public transport systems.									
 Knowledge of pricing mod Knowledge of the microec courses. 	els amid various us onomic foundations	er, operational and exter of capacity optimisation	nal costs. , substituting the tec	hnological skills acquired	l in engineering				
b) skills (k)									
1. Students get an understar and economic costs and ben	nding of the fact that nefits.	t capacity optmisation of	passenger transport	t requires finding a balan	ce between social				
2. Students recognise the im is itself dependent on the qua	portance that passe ality and price of su	enger behaviour has in tr ch services.	ansport systems pla	ning, and the fact that de	mand for transport				
1. Students learn critical thin	king to identify cont	roversial social and econ	omic effects in the t	ransport engineering pra	ctice.				
2. They become sensitive to d) autonomy and response	 2. They become sensitive to the interactions between technological and social processes in the context of public transport, specifically. d) autonomy and responsibility (o) 								

d) autonomy and responsibility (o)
 1. Through the lectures and the course assignment students become more prepared to the application of up-to-date transport economics literature when solving practical problems.

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24. Midterm assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
1. midterm test	1. ZH1	1. 40%	1. t1,t2,k1,k2,a1,o1		
2. midterm test	2. ZH2	2. 30%	2. t1,t3,k1,k2,a1,o1		
3. assignment: paper review	2. F	3. 30%	3. k2,a1,a2,o1		
25. Exam assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / mi		27. Final grade in percentage of performance			
Submission of assignment F on time and suc tests ZH1 and ZH2.	etion of the midterm	Excellent 88-100%			
28. Attendance and participation requirem	ents		Good 75-87% Satisfactory 63-74%		
according to the rules of CoS					
29. Late completion opportunities		Fail 0-49%			
Second retake or delayed completion is only					
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BSc training programme	transpor	tation.bme.hu	1/100 old	al Ve	ersion: 08 May, 2025			
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering								
1. Subject name	1. Subject name Rail transport operation							
2 in Hungarian	Vasúti üzemtan			3. Programme code	k			
4. Subject code				5. Term role	4 sp			
6. Credits	5	7. Evaluation type	е	8. Form	with contact hours			
9. Weekly contact hours	2 lecture	1 practice	1 laboratory	10. Language	English			
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 9	DINDUSTRY, INNOVATION AND INFRASTRUCTURE	tes 15 Life on Land					
12. Working hours for fulfi	lling the requireme	ents of the subject			150 hours			
Contact hours	56 hours	Preparation for seminars	20 hours	Homework	54 hours			
Reading written materials	5 hours	Midterm test preparation	0 hours	Exam preparation	15 hours			
13. Organisational unit in charge	Department of Tra	ansport Technology and I	Economics					
14. Subject coordinator	Dr. Mándoki Péte	r	15. Email address	mandoki.peter@kjk.bn	ne.hu			
16department	Department of Ra	ilway Vehicles and Vehic	le System Analysis					
17. Lecturers	Dr. Mándoki Péte	r, Dr. Lakatos András						
18. Indicative prerequisites	Transport techno	logy (strong),						
19. Aim of the subject								
Preparing future transport er rail transport organization tas	ngineers - mainly de sks.	aling with rail transport -	for the highly profe	ssional performance of ra	ilway operation and			
20. Thematics of lectures								
Railway stations, their main different raillines. Scheduling wagon- and staffturns. Capa maintenance cycles. Analysi solutions in EU.	functions. Train ope g. Route assignmen city calculation of st is and planning of cl	ration technologies on sta t of loaded and empty wa ations and raillines. Vehi- assification yard technolo	ations. Planning of gonflows, assignm cle maintenance teo ogies. Interoperabili	daily operations. Rail traf ent of trains. Planning of chnologies, scheduling of ty and open track usage	fic control on locomotive-, f different problems and			
21. Thematics of practices								
Application of knowledge lea conduction, and freight trans	arnt on lectures by p sport.	ractical tasks, specifically	for the operational	plan of railway stations,	HR and vehicle			
22. Thematics of laborator	ies							
Calculation in scheduling, ra (summer, renovation, etc.)	illine capacity, wago	on flow assignment topics	. Scheduling by de	dicated software for differ	rent scenarios			
23. Subject learning outco	mes (lowercase let	tters) and their connect	ion to programme	level learning outcome	es (capital letters)			
 The student a) knowledge (t) 1. Knows the main attributes of railway flows, their conditions and quality connection system. 2. Knows the main technology methods of rail freight transport and the main freight train types. 3. Knows the main parameters of the rail tranport operation technologies and railway terminology. 								
 b) skills (k) 1. Is able to elaborate railway timetables and station operation plans in line with technology and safety aspects. 2. Is able to propose several assignment plans for different railway flows. 3. Is able for practical use of vehicle- and staff turn planning methods. c) attitude (a) 								
1. Is able to use the most fitt specialities of the different flo	ing parameters, qua ows.	ality systems for different	topics (railway pass	senger or freight transpor	t), is aware of the			
2. Seeks the optimal and most cost-efficient railway traffic flow options.d) autonomy and responsibility (o)								

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1. Is able to solve railway operation problems individually of high standard.

2. Feels responsibility about the outcome and quality of their work; is able to find the most cost-efficient railway infrastructure and traffic flow development options.

24. Midterm	assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. Timetable planning individual homework	1. MTHF	1. 25%	1. t1, t2, t3, k1, a1, a2, o1, o2
2. Operational plan individual homework	2. ÜTHF	2. 25%	2. t1, t2, t3, k1, a1, a2, o1, o2
3. Turn design in-class exercise	3. FTÓF	3. 7,5%	3. t1, t2, t3, k2, k3, a1, a2, o1, o2
4. Empty car movement in-class exercise	4. ÜEÓF	4. 7,5%	4. t1, t2, t3, k2, k3, a1, a2, o1, o2
5. Directing station in-class exercise	5. RPÓF	5. 10%	5. t1, t2, t3, k2, k3, a1, a2, o1, o2
25. Exam assessments			

Name	Code	Share in final grade	Assessed learning outcomes		
1. Verbal	1. SZ	1. 25%	1. t1,t2,t3,k1,k2,k3,a1,a2,o1,o2		
26. Conditions for obtaining signature / midterm gra	de		27. Final grade in percentage of performance		
Taking the minimum requirements of all mid-semester in 50% of the points for the homeworks and in-class exerci					
28. Attendance and participation requirements		Excellent 87,5-100%			
Participation in lectures, courses and labors - as detailed well as taking part in the plant visit.	Good 75-67% Satisfactory 62,5-74,5% Pass 50-62% Fail 0-49%				
29. Late completion opportunities					
All the individual projects, homeworks can be resubmitte repeat period.	ast the end of the				
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					

01 September, 2025

BSc training programme	transport	transportation.bme.hu 1/100 olda		al Ve	ersion: 08 May, 2025				
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering									
1. Subject name	Railway a	utomatics							
2 in Hungarian	Vasúti automatika			3. Programme code	k				
4. Subject code				5. Term role	5 sp				
6. Credits	5	7. Evaluation type	e	8. Form	with contact hours				
9. Weekly contact hours	2 lecture	1 practice	1 laboratory	10. Language	English				
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	Comes' to EU/UN Goals								
12. Working hours for fulfi	lling the requireme	nts of the subject			150 hours				
Contact hours	56 hours	Preparation for seminars	32 hours	Homework	0 hours				
Reading written materials	16 hours	Midterm test preparation	16 hours	Exam preparation	30 hours				
13. Organisational unit in charge	Department of Co	ntrol for Transport and V	/ehicle Systems						
14. Subject coordinator	Dr. Szabó Géza		15. Email address	szabo.geza@kjk.bme.	hu				
16department	Department of Co	ntrol for Transport and	/ehicle Systems						
17. Lecturers	Dr. Szabó Géza								
18. Indicative prerequisites	, , 								
19. Aim of the subject									
The aim of the course is to fa modelling and measurement management and safety sys	amiliarise students v t approaches and te tems.	vith the system and bas chnologies of rail traffic,	ic concepts of rail tra and knowledge of th	ffic management. These ne design and operation o	are essentially the of rail traffic				
20. Thematics of lectures									
The role and grouping of railway control systems. Rail traffic management systems and tools. Regulation and provision of train following. Signals and their indications. Signalling systems: evolution, classification aspects. Occupancy detection, positioning axle counters and track circuits. Satellite positioning in railway operations. Control and safeguarding of track elements. Track alignment, use, management, criteria. Automatic train control, control of signal dispatching. Train running control functions and design methods. Point-to-point, continuous and bi-directional systems. Characteristics of the main systems used in Europe. The system of MAV. Design and levels of the European Train Control System (ETCS). Level crossing protection and signalling connections. Provision of train protection. Contingency insurance, safety clearance, line connections Control-command systems, characteristics of different control-command systems. Signalling and electronic equipment. Handling and feedback. Power supply. Automation in the management of protection devices. Central traffic control and central traffic management. Fallback levels									
21. Thematics of practices									
Demonstration and practice	of the methods pres	ented in the lectures thr	ough practical exam	ples.					
22. Thematics of laboratories									
Laboratory activities help to reinforce what you have learned in the practical sessions.									
Zo. Subject learning outco	mes (lowercase let	ters) and their connec	ation to programme	level learning outcome	is (capital letters)				
 a) knowledge (t) 1. knows the purpose and role of railway traffic management and the use of signalling equipment, the basic signalling functions and signalling elements b) skills (k) 1. can interpret the specifications and descriptions of the subject, can identify basic fuse problems and know how to solve them c) attitude (a) 									
 strives to learn about new advances in the field of fuse engineering, thereby enriching their knowledge. autonomy and responsibility (o) is able to participate in the solution of fuse problems and is success of the responsibilities involved 									
24. Midterm assessments									

BSc training programme	transportation.bme	.hu	2/100 olda	l Version: 08 May, 2025	
Name		Code	Share in final grade	Assessed learning outcomes	
1. midterm test		1. ZH1	1. 25%	1. t1,k1,a1,o1	
2. midterm test		2. ZH2	2. 25%	2. t1,k1,a1,o1	
25. Exam assessments					
Name		Code	Share in final grade	Assessed learning outcomes	
1. Exam		1. V	1. 50%	1. t1,k1,a1,o1	
26. Conditions for obtaining signa		27. Final grade in percentage of performance			
Passing the midterm tests.					
28. Attendance and participation r					
According to the rules of CoS.				0%-49%: fall; 50%-60%: pass; 61%-70%: satisfactory: 71-80%: good: 81%-100%:	
29. Late completion opportunities		excellent			
The midterm tests have individual re test can be taken only if a test or a re					
30. Consultation opportunities					
At a time and in a form agreed with t	he teacher.				
31. Validity of the subject datashe					
01 September, 2025					

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering								
1. Subject name	1. Subject name Road traffic control							
2 in Hungarian	Közúti forgalomirá	nyítás			3. Programme code	k		
4. Subject code					5. Term role	5 sp		
6. Credits	5	7. Eval	uation type	e	8. Form	with contact hours		
9. Weekly contact hours	2 lecture	1 pract	ice	1 laboratory	10. Language	English		
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	3 GOOD HEALTH AND WELL-BEING 	3 GOOD HEALTH AND WELL-BEING AND WELL-BEING						
12. Working hours for fulfil	ling the requireme	nts of th	e subject		1	150 hours		
Contact hours	56 hours	Prepara semina	ation for ars	32 hours	Homework	0 hours		
Reading written materials	16 hours	Midterm prepara	n test tion	16 hours	Exam preparation	30 hours		
13. Organisational unit in charge	Department of Cor	ntrol for T	ransport and \	/ehicle Systems				
14. Subject coordinator	Dr. Varga István			15. Email address	varga.istvan@kjk.bme	.hu		
16department	Department of Cor	ntrol for T	ransportation	and Vehicle Systems				
17. Lecturers	Dr. Varga István, I	Dr. Tettar	manti Tamás, V	Vágner Tamás				
18. Indicative prerequisites , 19. Aim of the subject The aim of the course is to familiarise students with the system and basic concepts of road traffic management. These are essentially								
management systems.								
20. Thematics of lectures Structure and operation of road traffic control systems. Description of road traffic. Measurement of traffic engineering parameters. Urban and highway traffic control (control strategies, devices, software). Structure of road traffic automation systems. Basic electronic concepts and components. Road measurements: traffic detection and evaluation systems. Classification, structure, operating modes, and safety aspects of road traffic control devices. Implementation of highway and urban traffic control centers. In-vehicle systems. CAN networks. Microscopic and macroscopic traffic modeling approaches. The law of vehicle conservation, the fundamental diagram. Characteristics of free-flow (highway) traffic, wave speed, and shockwaves. State-space description of urban traffic networks. Construction and estimation of turning rates and the origin-destination matrix. Implemented road traffic control systems and methods.								
21. Thematics of practices								
Microscopic traffic modeling. engineering companies).	Least Squares meth	hod for tr	affic model cal	ibration. Site visits (B	udapest traffic control ce	enter, traffic		
22. Thematics of laboratori	es							
Model parameter tuning (MATLAB). Microscopic traffic simulation (SUMO). Programming PLC to realize traffic light control. Map API programming								
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)								
 a) knowledge (t) 1. Knowledge of the basic modeling and control methods applied in the field of road traffic management. b) skills (k) 2. The student understands the modeling approach and the control method used for a given road traffic management problem. c) attitude (a) 3. The student is interested in the systems and applied tools of road traffic management. d) autonomy and responsibility (o) 4. The student is able to independently resolve a given control problem in the field of road traffic management. 								
24. Midterm assessments				Sharo in final				
Name			Code	grade	Assessed learning o	utcomes		
1. written midterm exam			1. ZH	1. 35%	1. t1,k1,a1,o1			

BSc training programme	transportation.bm	e.hu	2/100 olda	l Version: 08 May, 2025	
2. four practice assignment		2. GYF	2. 15%		
25. Exam assessments		1			
Name		Code	Share in final grade	Assessed learning outcomes	
1. oral exam		1. V	1. 50%	1. t1,k1,a1,o1	
26. Conditions for obtaining sign		27. Final grade in percentage of performance			
submission of assignments on time the midterm test	50%) completion of	Excellent 88-100%			
28. Attendance and participation		Good 75-87%			
according to the rules of CoS		Satisfactory 63-74%			
29. Late completion opportunities		Pass 50-62% Fail 0-49%			
Second retake or delayed completion					
30. Consultation opportunities					
Consultation is possible at a time ar	nd in a form agreed w	ith the teacher			
31. Validity of the subject datasheet starts from:					
01 September, 2025					

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name	Road trans	sport iı	nforma	tics		
2 in Hungarian	Közúti informatika				3. Programme code	k
4. Subject code					5. Term role	4 sp
6. Credits	3	7. Evaluat	tion type	m	8. Form	with contact hours
9. Weekly contact hours	1 lecture	0 practice)	2 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals						
12. Working hours for fulfil	ling the requirement	nts of the s	subject			90 hours
Contact hours	42 hours	Preparation seminars	on for	7 hours	Homework	20 hours
Reading written materials	15 hours	Midterm te preparatio	est n	6 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Trai	nsport Tech	nology and	Economics		
14. Subject coordinator	Dr. Tóth János			15. Email address	toth.janos@kjk.bme.h	J
16department	Department of Trai	nsport Tech	nnology and	Economics		
17. Lecturers	urers Dr. Tóth János					
18. Indicative prerequisites	18. Indicative prerequisites					
19. Aim of the subject						
Presentation of information te analysis.	echnology solutions	for road tra	nsport. Base	ed on these, acquisiti	ion of the ability to perfor	m evaluative
20. Thematics of lectures						
Elements, tasks and informat Application of telematics is ro Possibilities for improving the existing systems.	tion of road transpor ad transportation. Ir e quality of public tra	tation inforr nfluencing ti ansport serv	natics syste raffic by dev vices by usir	m. Possibilities of int eloping IT systems in ng telematic systems	egration in the field of tra n the field of individual tra . Best practises to prese	ansportation. ansport. nt the features of
21. Thematics of practices						
-						
ZZ. Thematics of laboratori	es Nomatic system in a	chooson ci	ity and make	suggestions for imp	vrovomonto	
23. Subject learning outcor	nes (lowercase lett	ters) and th	neir connec	tion to programme	level learning outcome	es (capital letters)
The student a) knowledge (t) 1. knows telematic systems of 2. knows the integration poss b) skills (k) 1. is able to select and telema 2. is able to systemize road the c) attitude (a) 1. collaborates with the lecture 2. solve the homework to the d) autonomy and responsible 1. is able to manage road transit 24. Midterm assessments	of road transport sibilities in the field o atic solution ransport IT soulution rer and show interes best of his/her abilit bility (o) nsport IT solutions in	of transport ns st in topics ty ndividually a	and in group	os with responsibility		
Name		С	ode	Share in final	Assessed learning o	utcomes
 midterm test urban telematics system si presentation task 	urvey and evaluatior	n task 2 3	. ZH . F1 . P1	1. 50% 2. 25% 3. 25%	1. t1,t2 2. t1,t2,k1,k2,a1,a2,o1 3. t1,t2,k1,k2,a1,a2,o1	

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25. Exam assessments				
Name	C	Code	Share in final grade	Assessed learning outcomes
-	-	-	-	-

27. Final grade in percentage of

performance

Pass 50-59%

Fail 0-49%

Excellent 85-100% Good 70-84%

Satisfactory 60-69%

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according to the rules of CoS

29. Late completion opportunities

30. Consultation opportunities

26. Conditions for obtaining signature / midterm grade

28. Attendance and participation requirements

at a time and in a form agreed with the teacher 31. Validity of the subject datasheet starts from:

furthermore successful (min. 50%) completion of the midterm test

submission of assignments on time and its presentation at the end of the semester,

Second retake or delayed completion is only from one midterm requirement.

BSc training programme	transportation.bme.hu		1/100 ol	dal V	Version: 08 May, 2025	
BUDAPEST UNIVERS	sity of technolog	GY AND ECONOMICS gineering and Ve	hicle Engineeri	ng Sub	ject datasheet	
1. Subject name	Road tran	sport manage	ement			
2 in Hungarian	Közúti menedzsm	ient		3. Programme code	k	
4. Subject code				5. Term role	6 sp	
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals		NOUSTRY, INNOVATION AND INFRASTRUCTURE AND PRODUCTION	ALE 13 CLIMATE			
12. Working hours for fulfi	lling the requireme	ents of the subject			120 hours	
Contact hours	42 hours	Preparation for seminars	5 hours	Homework	30 hours	
Reading written materials	8 hours	Midterm test preparation	35 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics			
14. Subject coordinator	Dr. Sipos Tibor		15. Email address	sipos.tibor@kjk.bme.hu		
16department	Department of Tra	ansport Technology and	l Economics			
17. Lecturers	Dr. Sipos Tibor, D	r. Szabó Zsombor, Dr.	Török Ádám			
18. Indicative prerequisites	Transport econor , 	nics A (suggested),				

19. Aim of the subject

The aim of the course is to provide students with a comprehensive understanding of the systemic operation of road transport, with particular focus on its economic, environmental, and safety aspects. The course also aims to familiarize students with key performance indicators and models used in characterizing road transport, the fundamentals of project management in road infrastructure investments, and the relationship between climate change and road transport. Additional topics include the use of alternative fuels, the framework of road safety and accident analysis, the specific requirements of special road freight (e.g., hazardous materials, temperature-controlled goods, oversized and overweight cargo), the application of INCOTERMS in international logistics, and the regulatory and social conditions affecting road transport personnel.

20. Thematics of lectures

Understand the indicators and models that can be used to characterize road transport. Project management basics for a road investment project. The relationship between climate change and road transport. Use of alternative fuels in road transport. Road safety conditions, traffic accidents. Special transportations of goods by road: transport of controlled-temperature goods, transport of dangerous goods, transport of oversized and overweight goods. Parities used in international shipments (INCOTERMS standards). Personal, social and driver regulations in road transport.

21. Thematics of practices

Understand the indicators and models that can be used to characterize road transport. Vehicle procurement, operational economics, fleet management. Cost structure, cost calculation. Fee offer, fee calculation methods. Decision preparation methods and their application in a computer environment (delivery task, vehicle and personnel management). Getting to know vehicle safety equipment. Analysis of the operation of the road tachograph. Calculation and evaluation of road externalities and ways to reduce them.

22. Thematics of laboratories

-

23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)

The student

a) knowledge (t)

- 1. Knows the main indicators and models used to describe road transport.
- 2. Understands the connection between climate change and road transport, and knows about alternative fuels.
- 3. Knows the basics of road safety and the main types and causes of traffic accidents.
- 4. Is familiar with the fundamental rules of temperature-controlled, dangerous, and oversized freight transport.
- 5. Knows the basic principles of INCOTERMS applied in international transport.

b) skills (k)

- 1. Able to apply road transport indicators for analyzing a given project.
- 2. Able to assess the interactions between road transport and climate change.

BSc training programme

- 3. Capable of applying project management thinking to road infrastructure projects.
- 4. Able to identify and document specific regulations related to road freight transport.
- 5. Capable of applying INCOTERMS rules in analyzing transportation cases.

c) attitude (a)

- 1. Strives to learn and apply environmentally friendly transport solutions.
- 2. Open to new technologies and alternative fuels.
- 3. Values the improvement of road safety.
- 4. Takes into account the importance of international regulations and standards.
- 5. Committed to responsible and transparent project management.

d) autonomy and responsibility (o)

- 1. Takes responsibility for professional decisions made in road transport projects.
- 2. Independently applies INCOTERMS rules in international freight transport situations.
- 3. Capable of managing road safety and environmental considerations independently in a project.
- 4. Supervises and ensures compliance with regulations related to special road transports.
- 5. Formulates independent proposals for harmonizing transport and environmental protection.

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test	1. ZH1	1. 30%	1. t1,t2,t3,t4,t5,k1,k2
2. midterm test	2. ZH2	2. 30%	2. k3,k5,a4
3. independent research assignment	3. F1	3. 15%	3. k4,k5,a1,a2,a3,a5,o1,o2,o3,o5
4. presentation of the independent research assignment	4. F2	4. 15%	4. k4,a2,a3,a5,o1,o3,o4,o5

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grad	le	• •	27. Final grade in percentage of performance		
submission of assignments on time or on lessons and su the midterm test	50%) completion of				
28. Attendance and participation requirements			Excellent 88-100%		
according to the rules of CoS	Satisfactory 63-74%				
29. Late completion opportunities			Pass 50-62%		
Midterm tests can be retaken separately in week 14th. The resubmitted at week 14th. During the delayed completion assignment can be replaced.	Fail 0-49%				
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BUDAPEST UNIVERS	sity of technolog nsportation En	ау амд есомоміся <mark>gineering and Ve</mark> ł	nicle Engineeri	ng Subj	ect datasheet			
1. Subject name	Roads							
2 in Hungarian	Közúti pályák	Közúti pályák 3. Programme code k						
4. Subject code				5. Term role	4 sp			
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours			
9. Weekly contact hours	1 lecture	2 practice	1 laboratory	10. Language	English			
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	DECENT WORK AND ECONOMIC GROWTH OF ADD INFRASTRU						
12. Working hours for fulfi	lling the requireme	ents of the subject			120 hours			
Contact hours	56 hours	Preparation for seminars	14 hours	Homework	20 hours			
Reading written materials	0 hours	Midterm test preparation	30 hours	Exam preparation	0 hours			
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics					
14. Subject coordinator	Dr. Kisgyörgy Lajo	os	15. Email address	kisgyorgy.lajos@kjk.br	ne.hu			
16department	Department of Tra	ansport Technology and	Economics					
17. Lecturers	Dr. Kisgyörgy Lajo	os						
18. Indicative prerequisites	18. Indicative prerequisites Transport tracks (strong),							
19. Aim of the subject								
The aim of the course is to in fundamental principles of de of roadways.	ntroduce the main c sign, methods for tr	oncepts and methods re affic management, junct	lated to road transp ion layouts, as well	portation infrastructure. It c as the construction materi	overs the als and execution			
20. Thematics of lectures								
Elements of Roadways: Des signage, traffic engineering. Assurance. Road Asset Mar	ign principles, horiz Intersection Design nagement and Road	ontal and vertical alignm . Pavement Structures: I Operation	ient, cross-sections Materials, design, a	. Traffic Management: Tra nd construction. Asphalt P	ffic regulation, roduction. Quality			
21. Thematics of practices								
Proper Design of Roads, Ro	ad Signs, and Inters	section Layouts. Term P	aper and Presentat	ion.				
22. Thematics of laborator	ies							
Site visit to a project.								
23. Subject learning outco	mes (lowercase let	tters) and their connec	tion to programme	e level learning outcome	s (capital letters)			
The student a) knowledge (t)								
 Understands the key cond interrelationships. Learns the methods applied 	ed for traffic plannin	a and management in th	nderstands the fun	damental principles and m	ain			
3. Learns about the material	s used in road cons	truction and their main c	haracteristics.					
4. Understands the technolo	gies related to road	construction. Understar	ids the fundamenta	l principles and main inter	elationships.			
b) skills (k)	aluza tha adaguaau	of road transport infrast	ruoturo dogiano					
2. Is able to read and interpr	et technical drawing	is and documentation of	road infrastructure	S.				
c) attitude (a)								
1. Accepts responsibility and	l accountability in th	e done work.	mort field					
 Is able to make choices al Establishes connections v 	mong multiple option vith other engineers	during road infrastructu	re planning and eva	aluation.				
4. Demonstrates a keen inte	rest in road technol	ogy innovations.	g and ove					
d) autonomy and responsi	bility (o)							
1. Demonstrates commitmer	nt to completing task	s that require hard and	demanding work.					

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24. Midterm assessments

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Name		Code	Share in final grade	Assessed learning outcomes		
1. midterm test		1. ZH1	1. 40%	1. t1,t2,k1,k2,k3,k4,k5,k6,k7,a1,a2,o1		
2. midterm test		2. ZH2	2. 45%	2. t1,t2,k1,k2,k3,k4,k5,k6,k7,a1,a2,o1		
3. assignment paper		3. T1	3. 15%	3. t1,t2,k1,k2,k4,k6,k7,a1,a2,o1		
25. Exam assessments						
Name		Code	Share in final grade	Assessed learning outcomes		
-		-	-	-		
26. Conditions for obtaining signa	ture / midterm grad	е	1	27. Final grade in percentage of performance		
Successful (min. 50%) completion of paper with a presentation.	the midterm tests ar	nd the submise	sion of the term	Excellent 80-100% Good 70-79%		
28. Attendance and participation r	equirements					
according to the rules of CoS				Satisfactory 60-69%		
29. Late completion opportunities		Pass 50-59% Fail 0-49%				
Second retake or delayed completion						
30. Consultation opportunities						
at a time and in a form agreed with the teacher						
31. Validity of the subject datasheet starts from:						
01 September, 2025						

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name Ship informatics						
2 in Hungarian	Hajózási informati	ika			3. Programme code	k
4. Subject code				_	5. Term role	4 sp
6. Credits	3	7. Evalu	ation type	m	8. Form	hours
9. Weekly contact hours	1 lecture	0 pract	ce	2 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 education 8	DECENT WORK A ECONOMIC GROU	ND 9 INDUSTRY, INNO WITH 9 AND INFRASTRI	ATION CTURE 12 RESPONSIBLE CONSUMPTION AND PRODUCTION		
12. Working hours for fulfil	ling the requireme	ents of the	e subject			90 hours
Contact hours	42 hours	Prepara semina	ation for rs	10 hours	Homework	0 hours
Reading written materials	15 hours	Midterm prepara	test tion	23 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Ae	ronautics	and Naval Arc	chitecture		
14. Subject coordinator	Dr. Hargitai L. Csa	aba		15. Email address	hargitai.laszlo.csaba@	kjk.bme.hu
16department	Department of Ae	ronautics	and Naval Arc	chitecture		
17. Lecturers	Dr. Hargitai L. Csa	aba				
18. Indicative prerequisites	, , 					
19. Aim of the subject						
The aim of the course is to fa	amiliarize students v	with the in	formation tech	nology systems use	d in shipping.	
Navigational IT systems in st	nipping. Communica	ation IT sv	stems in ship	oing, Radar and inte	arated shipping systems.	Informatics in
shipping traffic management	and logistics. On-bo	oard data	acquisition an	d decision support s	ystems. Cybersecurity in	shipping.
21. Thematics of practices						
22. Thematics of laboratori	es					
Nautical charts and navigation	on systems practice					
AIS data processing and ana Radar information and integr	ılysis ated display manag	jement				
23. Subject learning outcor	nes (lowercase let	tters) and	their connec	tion to programme	level learning outcome	s (capital letters)
The student a) knowledge (t) 1. knows the ship information technologies and processes b) skills (k) 1. is able to reproduce, adapt and interpret the elements and devices of ship informatics in a meaningful way 2. is able to communicate the ideas and plans about ships clearly and visually to others c) attitude (a)						
 strives for completeness in towards members of the tear 	n the acquisition of k m	knowledge	e, cooperates	with the instructor ar	d tellow students, is emp	athetic and tolerant
2. is receptive and proactive	2. is receptive and proactive in the performance of the tasks assigned to itself, self-critical towards the assigned tasks					
 a) autonomy and responsibility (o) 1. comply with and enforce environmental and social standards in their chosen field of work, and are able to self-monitor and correct errors independently, while listening to the professional opinions of others 2. makes responsible decisions in solving tasks in the chosen field of activity, formulating independent proposals to solve the challenges identified 						
24. Midterm assessments						
Name			Code	Share in final grade	Assessed learning ou	utcomes

BSc training programme	transportation.bme.hu	2/100 old	lal Version: 08 May, 2025			
1. midterm test	1. ZH	1. 100%	1. t1,k1,k2,a1,a2,o1,o2			
25. Exam assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
-	-	-	-			
26. Conditions for obtaining sign	27. Final grade in percentage of performance					
successful (min. 50%) completion of	of the midterm test		Excellent 88-100%			
28. Attendance and participation	requirements		Good 75-87%			
according to the rules of CoS			Satisfactory 63-74%			
29. Late completion opportunities	S		Pass 50-62%			
Second retake from the midterm te	st.		Fail 0-49%			
30. Consultation opportunities			·			
at a time and in a form agreed with	the teacher					
31. Validity of the subject datash	31. Validity of the subject datasheet starts from:					
01 September, 2025						

BSc training programme	transportation.bme.hu 1/100 oldal Ve				ersion: 08 May, 2025		
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering							
1. Subject name	Shipping r	mana	gement				
2 in Hungarian	Hajózási menedzs	sment			3. Programme code	k	
4. Subject code					5. Term role	6 sp	
6. Credits	4	7. Eval	uation type	m	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	1 pract	tice	0 laboratory	10. Language	English	
11. SDG B ECENT WORK AND 9 INDUSTRY, INNOVATION 13 CLIMATE Learning outcomes' Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN Sustainable Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN Development Goals Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN							
12. Working hours for fulfil	lling the requireme	nts of th	e subject			120 hours	
Contact hours	42 hours	Prepar semina	ation for ars	9 hours	Homework	20 hours	
Reading written materials	25 hours	Midtern prepara	n test tion	24 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tra	Insport Te	echnology and	Economics			
14. Subject coordinator	Dr. Mészáros Fere	enc		15. Email address	meszaros.ferenc@kjk	.bme.hu	
16department	Department of Tra	Insport Te	echnology and	Economics			
17. Lecturers	Dr. Mészáros Fere	enc					
18. Indicative prerequisites	, , 						
19. Aim of the subject							
To familiarise you with the na authorities and shipping com	ational and internation panies.	onal legal	l framework of	river and maritime na	avigation, and the respo	nsibilities of ports,	
20. Thematics of lectures							
The role of shipping and port intermodality. Multilateral age organization, documents neo compatibility, route restriction management in shipping. Ins Compliance with technical re 21. Thematics of practices	ts in the economy. E reements. Marine, ri- cessary for transport ns. State sanctions. surance. Fleet, fleet gulations, applicable	U directiver and la Tasks contransport Transport design. La regulati	ves and interna ake shipping a of waterborne to t administratio .oading techno ons, standards	ational regulations or nd infrastructure requ ransport. Characteris n, customs. Meteorol logy, transportable g S.	waterborne transport. T uirements. Timetables, r tics of the shipping mar ogy, geographical featu oods and requirements.	The importance of outes. Transport ket. Vessel res. Personnel Refueling policy.	
Shipping documents. Examp of charges on route choice. S document their results in the	les of calculation of Selection of vehicles form of a seminar p	port capa to be us aper and	acity, freight ar ed. Students p l present at the	nd infrastructure char rocess, summarize a end of the semester	ges, definition of loading ind draw conclusions fro	technology, impact m a specific topic,	
22. Thematics of laboratori	ies						
 23. Subject learning outcom The student a) knowledge (t) 1. understand the regulatory b) skills (k) 1. be able to perform basic s c) attitude (a) 1. strives for completeness in team, is receptive to the task d) autonomy and responsibility for the task of a strive strip on the task of a strip on the task of task of the task of task	mes (lowercase let environment and the hip management tas n the acquisition of k is assigned to him/he bility (o) e environmental and	ters) and e basic ta sks knowledg er, and u social as	d their connect asks of the ship e, cooperates ses information pects of shippi	tion to programme oping industry with the instructor an n technology and cor	level learning outcome d fellow students, integr nputer tools in his/her w essional opinion of othe	es (capital letters) ates into the work ork rs in his/her work,	
24 Midterm assessments		nny task,	nanules challe	enges responsibly			
Name			Code	Share in final grade	Assessed learning o	utcomes	
1. midterm test			1. ZH	1. 70%	1. t1,k1		

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2. individual assignment and prese	ntation	2. F	2. 30%	2. t1,k1,a1,o1
25. Exam assessments				
Name		Code	Share in final grade	Assessed learning outcomes
-		-	-	-
26. Conditions for obtaining sign	ature / midterm grad	e		27. Final grade in percentage of performance
min. 50% completion of the midterr indivudual assignment of acceptable	Excellent 88-100%			
28. Attendance and participation	requirements			Good 75-87% Satisfactory 63-74%
according to the rules of CoS				
29. Late completion opportunitie	S			Pass 50-62% Fail 0-49%
Second retake or delayed completi				
30. Consultation opportunities				
at a time and in a form agreed with	the teacher			
31. Validity of the subject datash	eet starts from:			
01 September, 2025				

BSc training programme	dal V	ersion: 08 May, 2025				
BUDAPEST UNIVER Faculty of Trai	SITY OF TECHNOLOG	GY AND ECONOMICS gineering and Veh	icle Engineeri	ng	ject datasheet	
1. Subject name	Shipping	operation				
2 in Hungarian	Hajózási üzemtar	l		3. Programme code	k	
4. Subject code				5. Term role	5 sp	
6. Credits	5	7. Evaluation type	e	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	1 practice	1 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	DECENT WORK AND ECONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH ICONOMIC GROWTH	ATION 12 RESPONSIBLE CONSUMPTION AND PRODUCTION			
12. Working hours for fulfi	lling the requireme	ents of the subject			150 hours	
Contact hours	56 hours	Preparation for seminars	24 hours	Homework	0 hours	
Reading written materials	20 hours	Midterm test preparation	20 hours	Exam preparation	30 hours	
13. Organisational unit in charge	Department of Ae	ronautics and Naval Arcl	nitecture			
14. Subject coordinator	Dr. Simongáti Gyó	őző	15. Email address	simongati.gyozo@kjk.	bme.hu	
16department	Department of Ae	ronautics and Naval Arcl	nitecture			
17. Lecturers	Dr. Hargitai L. Cs	aba, Dr. Simongáti Győz	Ő			
18. Indicative prerequisites	18. Indicative prerequisites					
19. Aim of the subject						
The aim of the course is to p	provide students with	n important information o	n the operation of	ships.		
20. Thematics of lectures						
Types of ships. Description of and port shipping. Floating n shipping crew. The ship's op Rules. International regulato	of navigation mode: nachinery - floating peration in the port. I ry system for inland	s. Specialties in pushing, cranes, excavators, lifeb (nowledge of inland wate navigation. Inland navig	towing and self-pr pats, etc. Special s erways, signs, nau ation authorities.	opelled shipping. Unique hipping operations. Life o tical rules. Basic navigatio	features of estuary n board. Duties of n skills. Shipping	
21. Thematics of practices						
Solving and practicing exerc	ises required by the	lectures.				
22. Thematics of laborator	ies					
Hajótípusok, hajózási módol kikötői hajózás egyedi jellem hajózó személyzet feladatai. ismeretek. Hajózási szabály.	k. A belvízi hajózási nzői. Úszó munkagé . A hajó üzeme a kik zat. Belvízi hajózás	módok ismertetése. A to pek – úszódaruk, kotrók, ötőben. Belvízi hajóút is nemzetközi szabályozás	ló, vontató és az ö mentőhajók, stb. meret, kitűzési jele i rendszere. A belv	onjáró hajózás specialitása Speciális hajózási művele k, nautikai szabályok. Ala /ízi hajózás hatóságai.	ii. A torkolati és tek. Élet a hajón. A pvető navigációs	
23. Subject learning outco	mes (lowercase let	tters) and their connect	ion to programm	e level learning outcome	es (capital letters)	
The student a) knowledge (t) 1. knows the ship operation b) skills (k)	technologies and pr	ocesses				
1. is able to reproduce, adapt and interpret the operation environment of ships in a meaningful way						
2. is able to communicate th	e ideas and plans a	bout snips clearly and vis	sually to others			
1. strives for completeness in towards members of the teal	n the acquisition of I	knowledge, cooperates v	vith the instructor a	and fellow students, is emp	athetic and tolerant	
2. is receptive and proactive	2. is receptive and proactive in the performance of the tasks assigned to itself, self-critical towards the assigned tasks					
d) autonomy and responsi	bility (o)	-		-		
1. comply with and enforce e errors independently, while I	environmental and s istening to the profe	ocial standards in their c ssional opinions of other	hosen field of work s	, and are able to self-mon	itor and correct	
2. makes responsible decision identified	ons in solving tasks	in the chosen field of act	ivity, formulating ir	dependent proposals to s	olve the challenges	

BSc training programme	transportation.bme.hu 2		2/100 ole	dal Version: 08 May, 2025
Name		Code	Share in final grade	Assessed learning outcomes
1. midterm test		1. ZH	1. 50%	1. t1,k1,k2,a1,a2,o1,o2
25. Exam assessments				
Name		Code	Share in final grade	Assessed learning outcomes
1. written exam		1. V	1. 50%	1. t1
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance	
successful (min. 50%) completion of the midterm test				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. Late completion opportunities				
Second retake from the midterm test.				
30. Consultation opportunities				
at a time and in a form agreed with	the teacher			
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BSc training programme	transportation.bme.hu 1/1		1/100 old	lal Ve	ersion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Technical	chemistry			
2 in Hungarian	Műszaki kémia			3. Programme code	jkl
4. Subject code	BMEVEKTAKO1			5. Term role	1 k
6. Credits	3	7. Evaluation type	е	8. Form	hours
9. Weekly contact hours	2 lecture	0 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	6 CLEAN WATER AND SANITATION	AFFORDABLE AND CLEAN ENERGY 9 AND INFRASTRUC	TION 12 RESPONSIBLE CONSUMPTION AND PRODUCTION		
12. Working hours for fulfi	lling the requireme	nts of the subject		1	90 hours
Contact hours	42 hours	seminars	11 hours	Homework	3 hours
Reading written materials	20 hours	Midterm test preparation	4 hours	Exam preparation	10 hours
13. Organisational unit in charge	Department of Ch	emical and Environment	al Process Enginee	ering (VBK)	
14. Subject coordinator	Dr. Kun Róbert		15. Email address	kun.robert@vbk.bme.h	ıu
16department	Department of Ch	emical and Environment	al Process Enginee	ering (VBK)	
17. Lecturers	Dr. Kun Róbert				
18. Indicative prerequisites					
19. Aim of the subject					
The aim of the course is to p structural materials, and to a treatment, lubricants, corrosi	rovide students with pply this knowledge on protection, and e	fundamental chemical k in practice. Students wil lectrochemical power so	nowledge related t l gain insight into th urces, along with re	o energy production, tech ne chemistry of energy ca elevant laboratory testing	nical fluids, and rriers, fuels, water methods.
20. Thematics of lectures					
An overview of general chemistry knowledge to understand the curriculum. Chemical aspects of energy production, environmental issues: Basic concepts of combustion technology, Coal (in brief), Petroleum and natural gas as energy and chemical raw materials (overview), Properties of motor fuels, production, combustion, exhaust gas cleaning, Principle of nuclear energy release, nuclear reactors (in brief), Characterization of alternative energy sources (in general), Alternative motor fuels, Chemical power sources (galvanic cells, batteries, fuel cells). Technical fluids: Characterization, preparation, wastewater and treatment of waters used in industrial practice, Characterization, production, grouping, wear of lubricants (mainly motor oils). Chemistry of structural materials: General properties of structural materials, Main types of ceramics, their properties, Structure and properties of metals, production (in brief), corrosion and corrosion protection of major metals, metals, Characterization of macromolecules, main types, properties of plastics, their production (in brief).					
22. Thematics of laboratories Catalytic cleaning of Otto engine exhaust, engine energy balance, lon exchange water treatment, Lubricants (engine oils and machine					
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
 The student a) knowledge (t) 1. knows the basic thermodynamic laws of chemical transformations, electrochemical relations related to electrochemical corrosion, (J,K,L:T7) 2. is familiar with the content, context and environmental impact of basic technical terms related to combustion technology, (J,K,L:T2) 3. knows the types of crude oil and the names of the fractions that can be obtained from them, the most important properties of each type of fuel and lubricant (J,K,L:T7) 4. is familiar with drinking water and wastewater treatment sub-technologies (J,K,L:T7) b) skills (k) 					
1. is able to detect the possibility of electrochemical corrosion and intervene in the case of metallic structural materials, (J,K,L:K10,K17;J:36;K:28;L:31)					
2. is able to assess the energy content and quality of each fuel and lubricant, the technical consequences of their use and the environmental impact, (J,K,L:K10,K17;J:36;K:28;L:31)					

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3. is able to perform simpler operational tasks with the knowledge of wastewater and drinking water treatment procedures. (J,K,L:K10,K17;J:36;K:28;L:31)

c) attitude (a)

1. cooperates with the lecturer and fellow students in expanding the knowledge, expands his / her knowledge by continuous acquisition of knowledge,

2. open to the use of information technology tools, sensitive to environmental issues,

3. strives for the accurate and error-free solution of tasks, in its work it purposefully co-operates with experts in border area topics. (J,K,L:A2)

d) autonomy and responsibility (o)

1. solves tasks and problems independently or together with experts in other fields, openly receives well-founded critical remarks (J,K,L:O3)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. laboratory measurements' reports	1. LJ	1. 30%	1. t1-t4,k1-k3,a1-a3,o1
2. midterm test	2. ZH	2.0%	2. t1-t4,k1-k3
3. optional: five homeworks issued on lectures	3. FHF	3.0%	3. k1-k3,a1-a3,o1
25. Exam assessments			

Name	Code	grade	Assessed learning outcomes	
1. written exam	1. V	1. 70%	1. t1-t4,k1-k3,a1-a3,o1	
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance			
Required: Write a report on laboratory measurements. O issued at the lecture, chemical calculation related to the opoints), independent processing of the topic related to the 20 extra points. One grade (score) in each lab. Condition least 50% midterm test and max. at least 50% of the laboratory score.	0%-45%: fail; 46%-60%: pass; 61%-70%: satisfactory; 71-80%: good; 81%-100%: excellent			
28. Attendance and participation requirements				
according to the rules of CoS				
29. Late completion opportunities				
One midterm test can be re-taken once in the study period week.				
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
04 Contember 2025				

01 September, 2025
BSc training programme	transpor	tation.bme.hu	1/100 olda	al V	ersion: 08 May, 2025
BUDAPEST UNIVERS	sity of technolog	GY AND ECONOMICS gineering and Veh	icle Engineerin	ng Sub	ject datasheet
1. Subject name	Traffic eng	gineering			
2 in Hungarian	Forgalomtechnika	l		3. Programme code	k
4. Subject code				5. Term role	5 sp
6. Credits	5	7. Evaluation type	е	8. Form	with contact hours
9. Weekly contact hours	2 lecture	1 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	3 GOOD HEALTH AND WELL-BEING	NDUSTRY, INNOVATION AND INFRASTRUCTURE 11 SUSTAINABLE CI AND COMMUNIT	TIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION		
12. Working hours for fulfi	lling the requireme	ents of the subject			150 hours
Contact hours	56 hours	Preparation for seminars	36 hours	Homework	0 hours
Reading written materials	10 hours	Midterm test preparation	18 hours	Exam preparation	30 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and I	Economics		
14. Subject coordinator	Kózel Miklós		address	kozel.miklos@kjk.bme	e.hu
16department	Department of Tra	ansport Technology and I	Economics		
17. Lecturers	Kózel Miklós, Solt	ész Tamás			
18. Indicative prerequisites	Basics of transpo Transport techno	rtation engineering (sugo logy (strong),	gested),		
19. Aim of the subject					
To help students understand road or traffic engineering ta	l the specifics of roa sks related to either	d traffic on both the dem	and and infrastructu	ire sides, laying the foun	dation for future
20. Thematics of lectures					
Aim of road traffic engineerir Traffic counts, capacities and signalized intersections, sign synchronized control, proces	ng. Characteristics c d defining peak traff ns, pavement markir as of a signal timing	f vehicles, spatial-time p ic volumes. Types of inte ngs and traffic interventio plan. Public transport pri	arameters of road tr rsections and their i ns. Characteristics o oritization and contr	affic flow and its relation improvement. Characteri of signalized intersection ol, bicycle-, parking- and	s, service levels. stics of non- s. Stand-alone and l pedestrian traffic.
21. Thematics of practices					-
Practice of theoretical relatio	ns and planning pro	cesses during individual	and group excercis	es.	
22. Thematics of laborator	ies				
Practice of theoretical relatio	ns and planning pro	cesses during individual	and group excercis	es.	
23. Subject learning outco	mes (lowercase let	tters) and their connect	ion to programme	level learning outcome	es (capital letters)
 a) knowledge (t) 1. knows the characteristics, 2. identifies traffic count met 3. sees intersection control, e 4. understands other road us b) skills (k) 1. illustrates the relations of f 2. able to elaborate traffic su 3. introduces intersections ty 4. designs a signal timing platic attitude (a) 1. has an overview about traffic at a signal timing plate attitude (a) 3. during signal timing plate attitude signal timing plate attitude attitud	states and relations hods and traffic volu capacities and chara- sers road traffic paramet rveys and define per ypes and calculates an and capable to sy ffic flow relations appropriate intersect lesign tries to consid bility (o)	s of road traffic imes acteristics, the basics of s ers eak traffic volumes their capacity based on t ynchronize them tion type to the traffic der all road users interes	signalised control ar hat	nd synchronisation	
1. able to elaborate technica	l problems on high :	standards alone or as a r	nember of a group,	as well	

2. feels responsibility for the result and standard of their work; aims to describe reality as close and accurate as possible when describing road traffic

24. Midterm assessments

z4. midterm assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
1. axle load excercise practice task	1. F1	1.0%	1. a1,a2,o1,o2		
2. time-space diagram practice work	2. F2	2.0%	2. t1,k1,a1,o2		
following distance, overtaking practice work	3. F3	3.0%	3. t1,t3,k1,a1,o2		
4. flow-speed diagram practice work	4. F4	4.0%	4. t1,t3,k1,k2,a1,o1,o2		
5. LOS excercise practice work	5. F5	5.0%	5. t1,t3,k1,k2,a1,o1,o2		
6. 1. midterm test	6. 1. ZH	6. 20%	6. t1,t3,k1,k2 a1,a2,o1,o2		
gap accaptance practice work	7. F6	7.0%	7. t1,t2,t3,t4,k1,k2,a1,o1,o2		
traffic signal timing plan practice work	8. F7	8.0%	8. t1,t2,t3,t4,k2,k3,k4,a1,a2,a3,o1,o2		
9. signal coordination practice work	9. F8	9.0%	9. t1,t2,t3,t4,k2,k3,k4,a1,a2,a3,o1,o2		
10. 2. midterm test	10. 2. ZH	10. 20%	10. t1,t2,t3,t4,k1,k2,k3,k4,a1,a2,a3,o1,o2		
25. Exam assessments					
Name	Code	Share in final grade	Assessed learning outcomes		
1 oral exam 1 question	1 T1	1 30%	1 t1 t2 t3 t4 k1 k2 k3 k4 a1 a2 a3 o1 o2		

Name	Code	grade	Assessed learning outcomes
1. oral exam, 1. question	1. T1	1. 30%	1. t1,t2,t3,t4,k1,k2,k3,k4,a1,a2,a3,o1,o2
2. oral exam, 2. question	2. T2	2. 30%	2. t1,t2,t3,t4,k1,k2,k3,k4,a1,a2,a3,o1,o2
26. Conditions for obtaining signature / midtorm grad	•		27. Final grade in percentage of
26. Conditions for obtaining signature / inditerni grad	e		performance

successful completion of the 2 midterms and 8 assignments on classesexcellent 86-100%
god 74-85%
satisfactory 61-73%
pass 48-60%29. Late completion opportunitiesaccording to the rules of CoSaccording to the rules of 00 S29. Late completion opportunitiespass 48-60%
failed 0-47%30. Consultation opportunitiesfailed 0-47%during the consultation time slot or at a time and format agreed upon with the instructor31. Validity of the subject datasheet starts from:

01 September, 2025

n oubjeet name	Transpo	ort automation A	Α		
2 in Hungarian	Közlekedési a	utomatika A		3. Programme code	k
4. Subject code				5. Term role	4 k
6. Credits	3	7. Evaluation type	е	8. Form	with contact
9. Weekly contact hours	1 lecture	1 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH 9 INDUSTRY, IN 9 INDUSTRY, IN 9 INDUSTRY, IN 9 INDUSTRY, IN 10 INFRAST			
12. Working hours for fulfi	lling the require	ements of the subject			90 hours
Contact hours	28 hours	Preparation for seminars	8 hours	Homework	0 hours
Reading written materials	20 hours	Midterm test preparation	18 hours	Exam preparation	16 hours
I3. Organisational unit in charge	Department of	Control for Transport and	Vehicle Systems		
14. Subject coordinator	Dr. Bartha Tar	nás	15. Email address	bartha.tamas@kjk.bm	e.hu
16department	Department of	Control for Transport and	Vehicle Systems		
17. Lecturers	Dr. Bartha Tar	nás, Dr. Baranyi Edit, Lövé	étei István Ferenc, F	arkas Balázs	
18. Indicative	Electrotechnic	cs - Electronics (strong),			
19. Aim of the subject		its with the assessment an	d management of th	e risks posed by the threa	ats to road safety
19. Aim of the subject The aim of the course is to faintroduces the options and s development process of safe 20. Thematics of lectures	amiliarise studen trategies for mar ety-critical traffic	its with the assessment an naging faults and achieving automation systems.	d management of th g as well as maintair	e risks posed by the threa ing safety. Provides insig	ats to road safety ht into the
19. Aim of the subject The aim of the course is to fa ntroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety. Sources of danger in safety, risk reduction, risk tol Development processes for	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys	its with the assessment an naging faults and achieving automation systems. in the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity leve	d management of th g as well as maintair le role of traffic contr in transport systems y and safety. Fault m els.	e risks posed by the threa ning safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st	ats to road safety ht into the I maintaining traff al and functional rategies.
19. Aim of the subject The aim of the course is to faintroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety. Sources of danger in safety, risk reduction, risk tol Development processes for 21. Thematics of practices	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys	its with the assessment an naging faults and achieving automation systems. in the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity leve	d management of th g as well as maintair ne role of traffic contr in transport systems y and safety. Fault m els.	e risks posed by the threa ning safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st	ats to road safety ht into the I maintaining traff al and functional rategies.
19. Aim of the subject 19. Aim of the subject The aim of the course is to fantroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety. Sources of danger in safety, risk reduction, risk tol Development processes for s 21. Thematics of practices The concept and parameters pages of redundancy. Depen Reliability calculations. Relia calculations.	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability parameter	its with the assessment an naging faults and achieving automation systems. in the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity leve y. Reliability of elements an able systems. Availability. calculations for serial, para	d management of th g as well as maintair ne role of traffic contr in transport systems y and safety. Fault m els. nd systems. Method Comparison of differ allel and other reliab	e risks posed by the threa ning safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st s to increase reliability. Th rent redundancy and repa ility system structures. Ma	ats to road safety ht into the I maintaining traff al and functional rategies. ne concept and ir methods. arkov models and
 19. Aim of the subject 19. Aim of the course is to fantroduces the options and s development process of safe 20. Thematics of lectures 20. Thematics of lectures 21. Thematics of practices 21. Thematics of practices 21. Thematics of practices 22. Thematics of laborator 	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repaira ibility parameter	its with the assessment an naging faults and achieving automation systems. in the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity leve y. Reliability of elements at able systems. Availability. calculations for serial, para	d management of th g as well as maintair ne role of traffic contri in transport systems y and safety. Fault m els. nd systems. Method Comparison of differ allel and other reliab	e risks posed by the threa ing safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st s to increase reliability. Th rent redundancy and repa ility system structures. Ma	ats to road safety ht into the I maintaining traff al and functional rategies. ne concept and ir methods. arkov models and
19. Aim of the subject 19. Aim of the course is to fantroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety. Sources of danger in safety, risk reduction, risk tol Development processes for s 21. Thematics of practices The concept and parameters ypes of redundancy. Depen Reliability calculations. Relia calculations. 22. Thematics of laborator 23. Subject learning outcome	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repaira ibility parameter	its with the assessment an naging faults and achieving automation systems. in the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity leve y. Reliability of elements an able systems. Availability. calculations for serial, para	d management of th g as well as maintair ne role of traffic contri in transport systems y and safety. Fault m els. Ind systems. Method Comparison of differ allel and other reliab	e risks posed by the threa ing safety. Provides insig rol devices in creating and s. The concept of technica hanagement and safety st s to increase reliability. Th rent redundancy and repa ility system structures. Ma	ats to road safety ht into the I maintaining traff al and functional rategies. The concept and ir methods. arkov models and
19. Aim of the subject 19. Aim of the subject The aim of the course is to faintroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety, risk reduction, risk tol Development processes for s 21. Thematics of practices The concept and parameters types of redundancy. Depen Reliability calculations. Relia calculations. 22. Thematics of laborator 33. Subject learning outcon The student	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repaira ibility parameter ies	Its with the assessment an naging faults and achieving automation systems. In the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity level y. Reliability of elements an able systems. Availability. calculations for serial, para	d management of th g as well as maintair ne role of traffic contr in transport systems y and safety. Fault m els. Ind systems. Method Comparison of differ allel and other reliab	e risks posed by the threa ing safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st s to increase reliability. Th rent redundancy and repa ility system structures. Ma e level learning outcome	ats to road safety ht into the I maintaining traff al and functional rategies. ne concept and ir methods. arkov models and es (capital letters
 19. Aim of the subject 19. Aim of the course is to fantroduces the options and s development process of safe 20. Thematics of lectures 20. Thematics of lectures 21. Thematics of danger in safety, risk reduction, risk tol Development processes for safety, risk reduction, risk tol Development processes for safety, risk reductions. Relia calculations. Relia calculations. Relia calculations. 22. Thematics of laborator 23. Subject learning outcoor 24. Knowledge (t) 1. knows the key terminology 29. skills (k) 	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repaira ibility parameter ies mes (lowercase	ats with the assessment an naging faults and achieving automation systems. In the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity level y. Reliability of elements an able systems. Availability. calculations for serial, para e letters) and their conne	d management of th g as well as maintair ne role of traffic contri in transport systems y and safety. Fault m els. Ind systems. Method Comparison of differ allel and other reliab	e risks posed by the threa ning safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st s to increase reliability. Th rent redundancy and repa lity system structures. Ma e level learning outcome to safety (T1,T2,T6)	ats to road safety ht into the I maintaining traff al and functional rategies. The concept and ir methods. arkov models and es (capital letters
19. Aim of the subject 19. Aim of the subject The aim of the course is to fantroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety, risk reduction, risk tol Development processes for 21. Thematics of practices The concept and parameters ypes of redundancy. Depen Reliability calculations. Relia calculations. 22. Thematics of laborator 23. Subject learning outcor The student a) knowledge (t) 1. knows the key terminology b) skills (k) 1. can apply the principles and 2. can assess threats to traff 3. Students can identify fault 4. can apply basic safety end	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repaira ibility parameter ies mes (lowercase y, the key relation nd methods of ar ic systems, the r s in the traffic sy gineering method	Its with the assessment an naging faults and achieving automation systems. In the transport system. Th cept and calculation of risk ationship between reliability stems. Safety integrity level y. Reliability of elements an able systems. Availability. calculations for serial, para b letters) and their conne nships and the theoretical nalysis, calculation and mo- risk they pose and their impose stems and select a strateg ds and solutions, designing	d management of th g as well as maintair in transport systems y and safety. Fault m els. Ind systems. Method Comparison of differ allel and other reliab ction to programm background related odelling of safety-critt pact on safety (K6,K gy to deal with them g a system architectu	e risks posed by the threat ing safety. Provides insig fol devices in creating and s. The concept of technicat nanagement and safety st s to increase reliability. The rent redundancy and repatility system structures. Mai e level learning outcome to safety (T1,T2,T6) ical traffic systems (K10,K 10,K15,K24,K26,K32,K35 (K6,K14,K15,K26,K32,K3 ure to meet specific required	ats to road safety ht into the I maintaining traff al and functional rategies. ne concept and ir methods. arkov models and es (capital letter (14,K26,K36) 5) 5) rements
19. Aim of the subject 19. Aim of the subject The aim of the course is to faintroduces the options and s development process of safe 20. Thematics of lectures The purpose and place of tra safety, risk reduction, risk tol Development processes for a 21. Thematics of practices The concept and parameters types of redundancy. Depen Reliability calculations. Relia calculations. 22. Thematics of laborator 23. Subject learning outcon The student a) knowledge (t) 1. knows the key terminology b) skills (k) 1. can apply the principles an 2. can assess threats to traff 3. Students can identify fault 4. can apply basic safety eng (K6,K14,K24,K26,K34,K35,K c) attitude (a) 1. monitors the best practice	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical sys s of dependability dability of repair ability parameter ies mes (lowercase y, the key relation nd methods of ar ic systems, the r s in the traffic sy gineering method (36) , and the legislat	Its with the assessment an naging faults and achieving automation systems. In the transport system. The cept and calculation of risk ationship between reliability stems. Safety integrity level y. Reliability of elements an able systems. Availability. calculations for serial, para b letters) and their conne nships and the theoretical nalysis, calculation and mo- risk they pose and their imports restems and select a strateg ds and solutions, designing tive, technical, technologic	d management of th g as well as maintair in transport systems y and safety. Fault m els. Ind systems. Method Comparison of differ allel and other reliab ction to programm background related odelling of safety-critt pact on safety (K6,K gy to deal with them g a system architector al and administrative	e risks posed by the threat ning safety. Provides insig rol devices in creating and s. The concept of technicat nanagement and safety st s to increase reliability. The rent redundancy and repatility system structures. Material lity system structures. Material e level learning outcometer to safety (T1,T2,T6) ical traffic systems (K10,K 10,K15,K24,K26,K32,K35 (K6,K14,K15,K26,K32,K35 ure to meet specific require e changes in the field of safety of the safety of t	ats to road safety ht into the I maintaining traff al and functional rategies. ne concept and ir methods. arkov models and es (capital letter (14,K26,K36) 5) 5) rements afety critical traffic
 19. Aim of the subject 19. Aim of the course is to faintroduces the options and s development process of safe 20. Thematics of lectures 20. Thematics of lectures 21. Thematics of danger in safety. Sources of danger in safety, risk reduction, risk tol Development processes for safety. Sources of practices 21. Thematics of practices 21. Thematics of practices 22. Thematics of laborator 23. Subject learning outco 24. Thematics of laborator 25. Subject learning outco 26. Khuk (k) 1. can apply the principles and 2. can assess threats to traff 3. Students can identify fault 4. can apply basic safety eng (K6,K14,K24,K26,K34,K35,Kz) attitude (a) 1. monitors the best practice systems (A2,A4,A20) 4) autonomy and responsi 	amiliarise studen trategies for mar ety-critical traffic affic automation i traffic. The conc lerance. The rela safety critical syst s of dependability dability of repain bility parameter ies mes (lowercase y, the key relation nd methods of an ic systems, the r s in the traffic sy gineering method (36) , and the legislat bility (o)	ts with the assessment an naging faults and achieving automation systems. In the transport system. The cept and calculation of risk ationship between reliability stems. Safety integrity level y. Reliability of elements an able systems. Availability. calculations for serial, para eletters) and their conne nships and the theoretical nalysis, calculation and mo risk they pose and their imp retems and select a strateg ds and solutions, designing tive, technical, technologic	d management of th g as well as maintair in transport systems y and safety. Fault mels. Ind systems. Method Comparison of differ allel and other reliab ction to programm background related odelling of safety-crit pact on safety (K6,K gy to deal with them g a system architectu	e risks posed by the threa ing safety. Provides insig rol devices in creating and s. The concept of technica nanagement and safety st s to increase reliability. Th rent redundancy and repa ility system structures. Ma e level learning outcome to safety (T1,T2,T6) ical traffic systems (K10,k 10,K15,K24,K26,K32,K35 (K6,K14,K15,K26,K32,K35 ure to meet specific requir e changes in the field of sa	ats to road safety ht into the I maintaining traff al and functional rategies. The concept and ir methods. The concept and ir methods. The concept and ir methods. The concept and is methods. The concept and is methods. The con

BSc training programme

transportation.bme.hu

Version: 08 May, 2025

BSc training programme	transportation.bm	e.hu	2/100 old	al Version: 08 May, 2025	
Name		Code	Share in final grade	Assessed learning outcomes	
1. midterm test 1		1. ZH1	1. 25%	1. t1,k1,k2,k3,k4	
2. midterm test 2		2. ZH2	2. 25%	2. t1,k1,k2,k3,k4	
25. Exam assessments					
Name		Code	Share in final grade	Assessed learning outcomes	
1. oral exam		1. SZV	1. 50%	1. t1,k1,k2,k3,k4,a1,o1	
26. Conditions for obtaining signature / midterm grade				27. Final grade in percentage of performance	
successful (min. 50%) completion of	the midterm tests			Excellent 88-100% Good 75-87%	
28. Attendance and participation r	equirements				
according to the rules of CoS				Satisfactory 63-74%	
29. Late completion opportunities				Pass 50-62%	
The two midterms can be retaken du	iring the semester or	the late comp	letion period.	Fail 0-49%	
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BSc training programme	transpor	tation.bme.hu	1/100 ole	dal	Version: 08 May, 2025	
BUDAPEST UNIVER	sity of technologisty of technologisty of technologisty of technologisty of the technologisty of the technologisty of the technologisty of the technologisty of technologistic of technologisty of technologistic of t	gy and economics i <mark>gineering and Vel</mark>	nicle Engineeri	ng Su	ıbject datasheet	
1. Subject name	Transport	economics A				
2 in Hungarian	Közlekedésgazda	aságtan A		3. Programme cod	le k	
4. Subject code				5. Term role	5 k	
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	2 lecture	2 practice	0 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	8 DECENT WORK AND ECONOMIC GROWTH	AND INFRASTRUCTURE 11 SUSTAINABLE	CITIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE		
12. Working hours for fulfi	lling the requireme	ents of the subject			120 hours	
Contact hours	56 hours	Preparation for seminars	15 hours	Homework	20 hours	
Reading written materials	6 hours	Midterm test preparation	23 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics			
14. Subject coordinator	Dr. Török Ádám		15. Email address	torok.adam@kjk.bn	ne.hu	
16department	Department of Tra	ansport Technology and	Economics			
17. Lecturers	Dr. Török Ádám,	Dr. Sipos Tibor				
18. Indicative prerequisites	Transport statisti , 	cs (strong),				
19. Aim of the subject						
The aim of the course is to p	provide students with	n an understanding of th	e fundamental cond	cepts of transport econo	omics, its role within	
scientific and economic syst	ems, and the econo	mic, technical, and soci	al functions of trans	portation. The course f	urther aims to enable	

students to interpret the multiplier effects of transport and comprehend the interconnections between transport, economic policy, and transport policy. Students will gain insight into the cost structure of transport systems, the principles of pricing and external costs, as well as the characteristics of transport sector structure and modal split. The course also covers the strategic objectives of Hungarian and EU transport policy, the role of asset management and technological development, as well as topics such as mobility management, deregulation, and privatization.

20. Thematics of lectures

The subject of transport economics, its place in the system of sciences. Functions and specific technical, economic and operational characteristics of transport. The multiplier effect of transport. Relationship between economic policy and transport policy. Main features of Hungary's transport, main directions of changes. Strategic objectives of EU transport policy. Sectoral structure of transport, characteristics and main types of transport division of labor. Peculiarities of labor productivity in transport. The concept of transportation cost and cost. Individual and social cost. External costs. Needs and supply of passenger and freight transport. Basics of pricing and charging in transport. Traffic taxes, charges. The tasks of asset management and technical development in transport, some specific features of the sub-sector. Transport aspects of the Hungarian technology foresight program. Mobility Management. Deregulation, privatization.

21. Thematics of practices

Spatial statistics and spatial econometric model calculations with a computer

22. Thematics of laboratories

23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)

The student

a) knowledge (t)

1. Knows and defines the fundamental concepts, functions, and role of transport economics within scientific and economic systems. (T5)

2. Recognizes the multiplier effects of transport and understands the interrelations between transport, economic, and transport policy. (T5)

3. Understands and describes the cost structure of transport systems, including transport costs, individual and social costs, and externalities. (T4,T5)

4. Knows and lists the strategic objectives of the EU's transport policy and identifies their relevance in the national context. (T4) b) skills (k)

1. Analyzes and evaluates the operation of transport systems, and processes and interprets transport economic indicators in terms of technical and economic correlations. (K11,K25,K26)

2. Applies fundamental mathematical and analytical principles to calculate transport costs and pricing, and performs technical calculations to determine external costs. (K11,K17)

3. Assesses the efficiency and sustainability of transport systems and is capable of developing new approaches aligned with transport policy objectives. (K19,K26,K27)

4. Uses digital tools and methods to search, filter, and process data, as well as to structure and interpret information effectively. (K28,K29)

c) attitude (a)

1. Values the social and economic significance of transportation, and strives to consider external costs and sustainable development in professional decisions. (A2)

2. Critically examines and reflectively evaluates the effects of economic and transport policy measures, and is willing to take responsibility for their own professional proposals and conclusions. (A2)

3. Aims to perform professional tasks efficiently and cost-effectively, consciously keeping in mind aspects of labor productivity, costefficiency, and mobility management. (A10)

4. Shows interest in the functioning and development potential of transport systems, is open to technological innovations and their social impacts, while remaining committed to a quality-oriented and conscious professional attitude. (A10)

d) autonomy and responsibility (o)

1. The student autonomously develops innovative transport solutions with a focus on integrating digital technologies and data management. (O15)

2. They independently propose new mobility models, promoting the shift from private transport ownership to on-demand and shared mobility services. (O15)

3. They make responsible decisions and use available resources as efficiently as possible to achieve transport-economic objectives. (O17)

4. The student analyzes the economic aspects of the transport sector independently and optimizes cost and time utilization either under guidance or autonomously. (015,017)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test	1. ZH1	1. 30%	1. t1,t2,t4,k1,k4,a1,a4
2. midterm test	2. ZH2	2. 30%	2. t1,t2,t4,k1,k4,a1,a4
3. independent research assignment	3. F1	3. 15%	3. t3,k2,k3,a2,a3,o3,o4
4. presentation of the independent research assignment	4. F2	4. 15%	4. k1,k3,k4,a2,o1,o2,o4
25 Exam assessments			

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance		
submission of assignments on time or on lessons and su the midterm test					
28. Attendance and participation requirements	Excellent 88-100%				
according to the rules of CoS			- G000 /5-8/% Satisfactory 63-74%		
29. Late completion opportunities			Pass 50-62%		
Midterm tests can be retaken separately in week 14th. The seminar work can also be resubmitted at week 14th. Semester tes or seminarwork can be delayed completed till end of delayed completion period.			Fail 0-49%		
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					

01 September, 2025

BSc training programme	transport	tation.bme.hu	1/100 olda	al Ve	rsion: 08 May, 2025
BUDAPEST UNIVERS	SITY OF TECHNOLOG	бу AND ECONOMICS <mark>gineering and Ve</mark> l	hicle Engineerin	g Subj	ect datasheet
1. Subject name	Transport	network plan	ning		
2 in Hungarian	Közlekedési hálóz	attervezés		3. Programme code	k
4. Subject code				5. Term role	6 k
6. Credits	5	7. Evaluation type	е	8. Form	with contact hours
9. Weekly contact hours	2 lecture	2 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	10 REDUCED INEQUALITIES				
12. Working hours for fulfil	ling the requireme	nts of the subject			150 hours
Contact hours	56 hours	Preparation for seminars	40 hours	Homework	0 hours
Reading written materials	5 hours	Midterm test preparation	29 hours	Exam preparation	20 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics		
14. Subject coordinator	Dr. Tóth János		15. Email address	toth.janos@kjk.bme.hu	
16department	Department of Tra	ansport Technology and	Economics		
17. Lecturers	Dr. Tóth János, Ko	ózel Miklós, Soltész Tar	nás		
18. Indicative prerequisites	Basics of transpo , 	rtation engineering (sug	ggested),		
19. Aim of the subject					
Acquiring a systems-based k	nowledge of the tra	nsport network and the	transport-related asp	ects of theoretical knowle	edge of settlements
20. Thematics of lectures					
Properties and main element and demand. Traffic surveys Settlement theory, the interact city and intercity public transp	s of transport netwo and statistics. Netw cition of settlements port.	orks. Pupose and proce ork planning models: tr and transport network.	ss of network plannin ip generation, trip dis Urban and inter urba	ng. Relationship between tribution, modal split, trafi an road network system. T	transport supply fic assignment. The operation of
21. Thematics of practices					
The calculation methods for t	theory				
22. Thematics of laboratori	es				
-					
23. Subject learning outcom	nes (lowercase let	ters) and their connec	tion to programme	level learning outcomes	s (capital letters)
 a) knowledge (t) 1. knows the basics and mod 2. knows the relationship bet 3. acquires basic knowledge b) skills (k) 1. is able to apply network place c) attitude (a) 1. try to gain as much knowled collaborates with the lecture 3. solve the homework to the d) autonomy and responsil 1. able to solve tasks related 	lels of transport netw ween transport dem of settlement theory anning models (K4, tent of required tran edge as possible aborer and show interes best of his/her abili bility (o) to transport network	work theory (T14,S1) hand and supply (T14) y (T14) K16,K26,K27) hsport network (K3,K8,k out transport network p st in topics (A13) ity (A2) k planning with respons	(19,K25,K29) lanning (A13) sibility individually or i	n groups (O4,O14,O15)	
24. White m assessments			Share in final		
Name		Code	Sharo III III al	Assessed learning ou	tcomes

Name	Code	grade	Assessed learning outcomes
1. 1st midterm test	1. ZH1	1. 25%	1. t1,t2,k1,a1
2. 2nd midterm test	2. ZH2	2. 25%	2. t1,t3,k2,a1

BSc training programme	transportation.bme.hu	2/100 c	Idal Version: 08 May, 2025			
3. trip recording practice task	3. F1	3.0%	3. t2,a1,a2,a3,o1			
4. gravity model practice task	4. F2	4.0%	4. t1,k1,a2,a3,o1			
5. increasing factor practice task	5. F3	5.0%	5. t1,k1,a2,a3,o1			
modal split practice task	6. F4	6.0%	6. t1,k1,a2,a3,o1			
7. traffic assignment practice task	7. F5	7.0%	7. t1,k1,a2,a3,o1			
8. suburban transport practice task	8. F6	8.0%	8. t1,t2,k2,a2,a3,o1			
25. Exam assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
1. oral exam	1. V	0,5	1. t1,t2,t3,k1,a1			
26. Conditions for obtaining signation	27. Final grade in percentage of performance					
submission of assignments on lessor midterm test	ns and successful (min. 50%) completion of each	Excellent 85-100%			
28. Attendance and participation re	equirements		Good 70-84%			
according to the rules of CoS			Satisfactory 60-69%			
29. Late completion opportunities			Pass 50-59% Fail 0-49%			
Second retake or delayed completion	is possible for all midterm r	equirement.				
30. Consultation opportunities						
at a time and in a form agreed with th	at a time and in a form agreed with the teacher					
31. Validity of the subject datashee	et starts from:					
01 September, 2025						

BSc training programme	transpor	tation.bme.hu	1/100 old	al	Ver	sion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name	Transport	organisation				
2 in Hungarian	Közlekedésszerve	zés		3. Programi	me code	k
4. Subject code				5. Term ro	ole	4 k
6. Credits	5	7. Evaluation type	е	8. Form		with contact hours
9. Weekly contact hours	1 lecture	3 practice	0 laboratory	10. Langua	ge	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals		education 9 and infrastre	VATION ICTURE 10 INEQUALITIES	11 SUSTAINABLE CITIES	17 PARTINERSHIPS FOR THE GOALS	
12. Working hours for fulfil	lling the requireme	ents of the subject				150 hours
Contact hours	56 hours	Preparation for seminars	10 hours	Homework		20 hours
Reading written materials	14 hours	Midterm test preparation	20 hours	Exam prepa	aration	30 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics			
14. Subject coordinator	Dr. Földes Dávid		15. Email address	foldes.david	@kjk.bme.h	u
16department	Department of Tra	ansport Technology and	Economics			
17. Lecturers	Dr. Földes Dávid,	Dr. Csonka Bálint				
18. Indicative prerequisites19. Aim of the subject	, , 	·		· • • • •		
Understanding the fundamer Learning about process char methods.	ntals of transport pla acteristics, planning	anning and the interaction g and operational param	eters and indicators,	s, infrastructure , as well as leai	e, and humai rning about	n elements. their calculation
20. Thematics of lectures						
Process characteristics and Passenger transportation sys infrastructure; Capacity and resources, workforce training	their calculation (sa stems, performance reserve capacity; No g, and personnel de	mple size, confidence le indicators, and trends; etwork planning and lea ployment; Fundamental	evel); Time standards Operation and maint d time; Schedule pla s of Spatial and Urba	s and time base tenance of vehi nning and inve an Planning	es, transport icles and tra entory manag	ation indicators; nsportation gement; Human
21. Thematics of practices						
Process characteristics (time Network planning and lead ti space reallocation (site visit,	e measurement, rep me; Route planning preparation and eva	resentativeness, reliabil and replacement tasks aluation of design altern	ity); Time standards, (for tram and metro atives)	Capacity and systems); Con	ceserve cap iceptual plar	acity, Nivellation; ining for urban
22. Thematics of laborator	ies					
- 23. Subject learning outcom	mes (lowercase let	ters) and their connec	tion to programme	level learning	outcomes	(capital letters)
 a) knowledge (t) 1. Understands the fundame (T1) 2. Acquires knowledge of trasfe, efficient, and sustainab 3. Is able to comprehend the tasks (T15) b) skills (k) 1. Applies systematic data conditional (K9,K16,K19,K21,K27,K36) 3. Organizes transport operation of the task (table) 	ntal principles and r nsportation enginee le design of urban s constraints and inte pllection and analys and modelling based	nethods of transport op ering principles and meth spaces (T14) errelations involved in tr is processes appropriate on original ideas, incor ring the aspects of susta	erations, as well as t nods for planning an ansport organization ely (K4,K19,K25,K29 porating and evaluat ainability (K3,K26)	he operation of d operating tran and in perform) ing existing sol	f vehicles ar nsport syste ning plannin lutions	nd infrastructure ms, aiming for the g or operational
 Performs work with response Demonstrates openness to 	nsibility, self-criticisr o new knowledge al	n, and a constructive at nd is able to choose bet	titude (A2,A6,A9,A11 ween multiple altern	I,A14,A17,A19, atives (A4,A5,A	,A21) A13,A20)	

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d) autonomy and responsibility (o)			
1. Committed and takes responsibility for solving co (03,04,014)	mplex transport o	organization tasks and	improving the provision of transport services
2. Capable of working confidently and proactively, for	orming and prese	nting independent opir	nions and solution proposals (O1,O5,O9)
24. Midterm assessments			
Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test 2. line planning task 3. urban space conceptual planning task	1. ZH 2. F1 3. F2	1. 20% 2. 15% 3. 15%	1. t1,t2,t3,k1,k3,a2,o1 2. t3,k1,k2,k3,a1,a2,o1,o2 2. t2,k2,k3,a2,o1,o2
25. Exam assessments			
Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 50%	1. t1,t2,t3,k1,k3,a2,o1
26. Conditions for obtaining signature / midterm grade			27. Final grade in percentage of performance
successful completion of the midterm test (minimum acceptance of the assigned tasks.	n 50%), and subm	nission on time and	
28. Attendance and participation requirements			Excellent 90-100%
According to the rules of CoS. In addition, participation in site visits and guest lectures is mandatory.			Satisfactory 65-7.54%
29. Late completion opportunities			Fail 0-49 5%
A maximum of two mid-semester requirements may be made up during the delayed completion week.			
30. Consultation opportunities			·
at a time and in a form agreed with the teacher			
31. Validity of the subject datasheet starts from:			

01 September, 2025

BUDAPEST UNIVERS	SITY OF TECHNOLOG	ау AND ECONOMICS gineering and Ver	nicle Engineerii	ng Subj	ect datasheet
1. Subject name	Transport	safety A			
2 in Hungarian	Közlekedésbizton	ság A		3. Programme code	k
4. Subject code				5. Term role	3 k
6. Credits	3	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	3 GOOD HEALTH AND WELL-BEING AND INFRASTRUCTURE 3 AND WELL-BEING 3 AND WELL-BEIN				
12. Working hours for fulfil	ling the requireme	nts of the subject			90 hours
Contact hours	42 hours	Preparation for seminars	8 hours	Homework	18 hours
Reading written materials	0 hours	Midterm test preparation	22 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	nsport Technology and	Economics		
14. Subject coordinator	Dr. Sipos Tibor		15. Email address	sipos.tibor@kjk.bme.ht	L
16department	Department of Tra	insport Technology and	Economics		
17. Lecturers	Dr. Sipos Tibor				
18. Indicative prerequisites	18. Indicative prerequisites Transport tracks (suggested), Introduction to transport economics (suggested),				
19. Aim of the subject					
The aim of the course is to introduce students to the fundamental concepts of traffic safety, its role in the operation of transport systems, and the basic tools and methods for accident prevention. The course provides insight into system-level analysis of accident causes, safety assessment methodologies, and the factors influencing the safety of transport infrastructure and vehicles.					
20. Thematics of lectures					
Safety of road transport: • Legal regulation of road transport safety organization • Basic concepts of transport	 Safety of road transport: Legal regulation of road transport – international and domestic legislation. Transport safety organizations, work teams, relevant databases and their managing organizations. Basic concepts of transport guality evaluation. 				
Absolute and relative indicators for	tors. Interpretation	of international and dom	estic trends of trans	sport safety indicator value	es.
The methodology of data su	urveying for road ac	cidents with personal inj	ury.		
How to determine the seven	rity of personal injur	y?			
Methodology for determinin	g the statistical valu	e of human life, an inter	national compariso	n of data.	
 Efficiency analysis of traffic Surveying infrastructures, n 	safety investments neasuring systems,	, the basics of cost-bene methods for measureme	ent analysis, the exp ent and star rating.	bected effects of an accide	nt.
Vehicle Safety			C C		
ADAS, Safety of Highly Automated Functions					
• C-ITS systems and services, their effects on transport safety.					
Safe operation of rail transport	 Safe operation of rail transport, train protection systems at railway stations and on the open track. 				
Passenger safety and prote	ection.				
 Safety of level crossings, th Safety of froight transport 	e evaluation of thei	r satety.			
Safety of air transport:					
The safety indicators of air	transport, evaluatio	n of trends.			
Safety characteristics of air Safe separation of road yet	port vehicles, types	of vehicle movements a	t airports.		
Safety requirements of strue	ctures for passence	r traffic			
21. Thematics of practices					

In practical classes students can practice and learn simple engineering tasks related to traffic safety through real case studies.

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22. Thematics of laboratories

23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)

The student

a) knowledge (t)

1. Knows the definitions of transport safety concepts. (T2)

2. Has a comprehensive knowledge of the transport safety characteristics of the various branches of transport. (T2,T10,T14)

b) skills (k)

1. Analyzes and evaluates the safety systems, regulatory frameworks, and performance indicators of various transport sectors (road, rail, air, and water); identifies, compares, and assesses transport safety conditions at national and international levels. (K4,K27)

2. Prepares, compiles, documents, and presents accident analyses, and applies methods and systems used for transport safety assessment, testing, and data processing. (K16)

3. Designs, develops, implements, and resolves small-scale transport safety interventions and investments, and calculates and evaluates their effectiveness using cost-benefit analysis. (K8)

4. Collaborates, communicates, maintains professional relationships, and contributes to various transport safety projects and working groups; presents and further develops professional proposals in an interdisciplinary environment. (K12,K26)

5. Participates in educational, planning, and awareness-raising activities; creates, develops, visualizes, and explains materials related to transport safety; operates or tests safety systems, conducts experiments, and validates the results. (K4,K16,K23)

c) attitude (a)

1. Values human life and safety, appreciates the work of professionals involved in accident prevention, respects professional ethical principles, and considers it mandatory to adhere to these principles in their own practice. (A1,A2,A8)

2. Shows interest in current issues, technological innovations, and the societal impact of transport safety; is open to new solutions, critically examines existing systems, and reflects on their own professional role. (A8,A11)

3. Strives to incorporate transport safety aspects into planning and decision-making processes, is ready to collaborate with experts from different disciplines, and takes responsibility for professionally sound proposals. (A1,A2)

4. Recognizes the societal importance of transport safety, takes into account the characteristics and limitations of different transport modes, acts consciously in professional contexts, and demonstrates a self-critical, quality-oriented, and committed attitude toward continuous improvement. (A11,A14)

d) autonomy and responsibility (o)

1. The student takes responsibility for their studies in an autonomous manner, driven by internal motivation, formulates independent suggestions, and works creatively. (O4)

2. They make independent decisions, comply with and enforce professional rules, and are capable of supporting their judgments and correcting their own mistakes. (O5)

3. They communicate in multiple languages, take responsibility and provide guidance in crisis situations, while adhering to established protocols. (O12)

4. They analyze transport safety situations either independently or under supervision, make decisions, and ensure the necessary conditions for appropriate solutions. (04,05,012)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test	1. ZH	1. 65%	1. t1,t2,k1,a1,o1,o2
2. independent research assignment	2. F1	2. 20%	2. k2,k3,k5,a2,a4,o4
3. presentation of the independent research assignment	3. F2	3. 15%	3. k4,k5,a2,a3,o3,o4

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes	
-	-	-	-	
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance			
submission of assignments on time or on lessons and successful (min. 50%) completion of the midterm test			Excellent 88-100%	
28. Attendance and participation requirements	Good 75-87%			
according to the rules of CoS	Satisfactory 63-74%			
29. Late completion opportunities	Fail 0-49%			
Second retake or delayed completion is only from one mi	dterm require	ment.		
30. Consultation opportunities				
at a time and in a form agreed with the teacher				
31. Validity of the subject datasheet starts from:				
01 September, 2025				

BSc training programme	transpo	ortation.bme.hu	1/100 old	lal Ve	ersion: 08 May, 2025
BUDAPEST UNIVER Faculty of Tra	RSITY OF TECHNOLOGY AND ECONOMICS		ng	ect datasheet	
1. Subject name	Transpor	t statistics			
2 in Hungarian	Közlekedésstatis	sztika		3. Programme code	k
4. Subject code				5. Term role	4 k
6. Credits	5	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	1 lecture	2 practice	1 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH 9 AND INFRASTR			
12. Working hours for fulfi	lling the requirem	ents of the subject		1	150 hours
Contact hours	56 hours	Preparation for seminars	12 hours	Homework	30 hours
Reading written materials	17 hours	Midterm test preparation	35 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of T	ransport Technology and	Economics		
14. Subject coordinator	Dr. Sipos Tibor		15. Email address	sipos.tibor@kjk.bme.h	u
16department	Department of T	ransport Technology and	Economics		
17. Lecturers	Dr. Sipos Tibor,	Dr. Szabó Zsombor, Toro	lai Dániel		
18. Indicative prerequisites	18. Indicative prerequisites Mathematics A3k (suggested),				
19. Aim of the subject					
To familiarise students with data-driven answers to ques question, interpret the result	the most fundamer stions arising in the s correctly and be	ntal tools and methods of world of transport. They aware of the limitations o	statistics and data a should be able to se feach method.	analysis, so that they are a elect the appropriate statis	able to provide tical tool for the
20. Thematics of lectures					
Main topics covered in the c means, averages, standard analysis, trend analysis.	ourse: general stat deviation; indices;	istics - Descriptive statist hypothesis testing; correl	ics: transport statisti ation tests: associal	ics, data collection, structu tion, correlation; linear reg	ure of data tables; ression; time series
21. Thematics of practices					
Presentation and practice of theoretical study material with numerical examples.					
22. Thematics of laborator	ies				
Computer aided examination	n of practical exam	ples.			
23. Subject learning outco	mes (lowercase l	etters) and their connec	tion to programme	e level learning outcome	s (capital letters)
The student a) knowledge (t)	The student a) knowledge (t)				
1. Know the most important indicators in descriptive statistics: how to calculate means, standard deviations, indices. (T4)					
3. Knowledge of techniques	for analysing time	series data. (T4)	potriesis testing, co	irelation tests. (14)	
4. Understands the limitations of statistical procedures. (T4,T5)					
b) skills (k)					
1. Ability to identify various i	ndicators of descri	ptive statistics. (K17,K19)	an applytical recults	and interpret them (K1G)	
 ADILITY TO APPLY TO APPLY					
c) attitude (a)	,	. ,			
1. Prepares and carries out	independent data o	collection when evaluating	g transport systems.	. (A2)	
2. In applying the methodolo	gies learnt, endea	vours to interpret the resu	Its obtained profess	sionally and correctly. (A3	,A12) I monitor their
progress to achieve objectiv	es. (A14)	according to the planned	a schedule, regularly	y prioritize their tasks, and	
d) autonomy and responsi	ibility (o)				
1. Ability to develop and ana	alyse transport stati	stics and data, either ind	ependently or as pa	rt of a team. (O2)	

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2. Feel a sense of responsibility for the results and quality of their work; when evaluating transport statistics, they strive to describe the reality faithfully and as accurately as possible. (O2)

24. Midterm assessments			
Name	Code	Share in final grade	Assessed learning outcomes
1. Midterm test	1. ZH1	1. 35%	1. t1,t2,t3,t4,k1,k2,k3,a2,o1
2. Midterm test	2. ZH2	2. 35%	2. t1,t2,t3,t4,k1,k2,k3,a2,o1
3. Lab homework	3. LAB	3. 15%	3. t1,t2,t3,t4,k1,k2,k3,k4,a2,o1
4. Group homework	4. CSOP	4. 15%	4. t1,t2,t3,t4,k1,k2,k3,a1,a2,a3,o1,o2
25. Exam assessments			

Name	Code	Share in final grade	Assessed learning outcomes
-	-	-	-
26. Conditions for obtaining signature / midterm grad	de		27. Final grade in percentage of performance
 Earn at least 50 points during the course Completion of at least 50% of both the theoretical and Completion of at least 50% of the group homework 	Excellent 88-100%		
28. Attendance and participation requirements	Good 75-87%		
according to the rules of CoS	Satisfactory 63-74%		
29. Late completion opportunities			Pass 50-62%
Midterm tests can be retaken separately in week 14th. The can also be resubmitted at week 14th. During the delaye test or the group homework assignment can be retake.	- Fail 0-49%		
30. Consultation opportunities			
at a time and in a form agreed with the teachers			
31. Validity of the subject datasheet starts from:			
01 September, 2025			

BSc training programme	transpor	tation.bme.hu	1/100 old	al Ve	ersion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering		ect datasheet			
1. Subject name	Transport	technology			
2 in Hungarian	Közlekedési techr	nológia		3. Programme code	k
4. Subject code				5. Term role	3 k
6. Credits	7	7. Evaluation type	e	8. Form	with contact hours
9. Weekly contact hours	3 lecture	2 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	Industry, innovation and infrastructure	TIES 15 LIFE ON LAND		
12. Working hours for fulfi	lling the requireme	ents of the subject		1	210 hours
Contact hours	70 hours	seminars	50 hours	Homework	0 hours
Reading written materials	20 hours	Midterm test preparation	45 hours	Exam preparation	25 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics		
14. Subject coordinator	Dr. Mándoki Péte	r	15. Email address	mandoki.peter@kjk.br	ne.hu
16department	Department of Ra	ilway Vehicles and Vehic	cle System Analysis		
17. Lecturers	Dr. Mándoki Péte	r, Dr. Lakatos András, Ko	ózel Miklós, Soltész	Tamás	
18. Indicative prerequisites	Basics of transpo , 	rtation engineering (sug	gested),		
To provide basic concents of	nd systemic knowle	dae related to transporta	tion focusing to the	complex system of trans	port tochnology, oc
well as the ability to conduct	and organize basic	traffic measurements for	the future transpor	tation engineers.	port technology, as
20. Thematics of lectures					
Definition of technology and transportation technology. Relationship between technical and technological development progress. Quantitative description of transport systems, grouping of indicators. Types and grouping of traffic measurements. Road transport facilities and instrumentality. Environmental effects of transport, reduction of them, with special regard to alternative vehicle propulsion systems. Technological and organizational issues of road passenger transport, particularly bus transport. Organization of road freight transport, types of route, determination of capacities and effectivity. Technology and special features of urban public transport. Presentation of sub-sectors by capacity, cost and service level. Rail station and line traffic technologies. Main types and tasks of railway stations. Technology of marshalling yards and dispositonal stations. Organization of rail freight transport. Characteristics of rail passenger transport. Basics of scheduling. Technological tasks related to the clock-face shedules and integrated clock-face schedules. Equipments of aviation transport, equipment, institution, airports, control.					
21. Thematics of practices	lation to used usil a			en eite treffie eeurote euro	
data sets.	Data processing, analysis relating to road, rail and urban transport; and performing external on-site traffic counts, evaluating the resulting data sets.				iuaung me resulung
22. Thematics of laboratories					
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
The student a) knowledge (t) 1. knows the technological e	lements and proces	ses of transport (T10,T1	1,T14)		
2. knows the characteristics service (T10,T11,T14)	2. knows the characteristics of each transport sub-sector (road, rail, air and water transport), the advantages and disadvantages of their service (T10,T11,T14)				
3. knows the specific charac	teristics and special	means of urban transpo	rt (T10,T11,T14)		
 4. knows the basics of the planning process of passenger transport services (T10,T11,T14) 5. knows the environmental effects of transport and the tools of reducing their impact (T10) b) skills (k) 					
 b) skills (k) 1. is able to analyze technology of transport processes (K6,K9,K10,K16,K25,K26,K27) 2. can determine the operational characteristics of transport processes (K9,K10,K16,K24,K25,K26) 3. is able to determine the characteristics of road and rail passenger and freight transport (K9,K10,K12,K16,K25,K26) 4. is able to interpret correctly and use individually the quantitative indicators of transport (K9,K10,K12,K16,K19,K25,K28,K29) 					

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5. is able to collect, analyze and perform related traffic counting for a given planning task (K4,K5,K12,K14,K19,K21,K25,K28,K29)					
c) attitude (a)					
1. can handle all aspects of transport in	1. can handle all aspects of transport in a complex way, taking into account all aspects of transport (A4,A13,A17,A21)				
2. make an effort in error-free planning t the presentation of them in high-quality of	hat takes all aspe documentation (A	cts into accou 2,A10,A12,A1	nt, task execution in a 4)	an independent and	accurate manner and
3. quality based analysis of transport (A2	2,A14,A20)				
d) autonomy and responsibility (o)					
1. Can design and evaluate carefully ind	ividually and in sr	mall groups (C	(9)		
2. Feels responsible for the impact and s	sustainability of tra	ansport on the	economy (02,014)		
3. Have a responsibility for the accuracy	and care of his w	/ork (014)			
24. Midterm assessments				1	
Name		Code	Share in final grade	Assessed learni	ng outcomes
1. 1. midterm test		1. ZH1	1. 27%	1. t1,t2,t3,t4,t5,k1	,k2,k3,k4,a1
 Z. Z. midlerm lesi reports of external measurement (four 	r times) and in-	2. ZH2	2. 27%	2. t1,t2,t3,t4,t5,k1	,k2,k3,k4,a1
class exercises (three times)		3. GYAK	3. 21%	3. k5,a1,a2,a3,o1	,02,03
25. Exam assessments					
Name		Code	Share in final grade	Assessed learni	ng outcomes
1. Verbal exam		1. SZ	1. 25%	1. t1,t2,t3,t4,t5,k1	,k2,k3,k4,a1
26. Conditions for obtaining signature	e / midterm grad	e		27. Final grade in performance	n percentage of
Participation in lectures and courses - as detailed in the BME Code of Studies - as well as, the all measurements and evaluations at an acceptable level must be completed (minimum 50% level for each task) and the two tests must be taken at a minimum level of 50% each.				0%	
28. Attendance and participation requ	iirements			Good 75-87%	
according to the rules of CoS				Satisfactory 62,5-	74,5%
29. Late completion opportunities				Pass 50-62%	
Till the end of repeat period, there are 2 retake options regarding the tests. External on-site traffic measurements and in class exercises can be improved until the last day of repeat period.			Fall 0-49%		
30. Consultation opportunities					
at a time and in a form agreed with the t	eacher				
31. Validity of the subject datasheet s	tarts from:				
01 September, 2025					

BSc training programme	transpor	tation.bme.hu	1/100 old	lal V	ersion: 08 May, 2025
BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering					
1. Subject name	Transport	tracks			
2 in Hungarian	Közlekedési pályá	ik		3. Programme code	k
4. Subject code				5. Term role	2 k
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	2 lecture	1 practice	0 laboratory	10. Language	English
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION	DECENT WORK AND ECONOMIC GROWTH I DIADUSTRY, INNO AND INFRASTRU	/ATION CTURE		
12. Working hours for fulfi	lling the requireme	ents of the subject			120 hours
Contact hours	42 hours	Preparation for seminars	10 hours	Homework	0 hours
Reading written materials	18 hours	Midterm test preparation	50 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Tra	ansport Technology and	Economics		
14. Subject coordinator	Dr. Kisgyörgy Lajo	os	15. Email address	kisgyorgy.lajos@kjk.b	me.hu
16department	Department of Tra	ansport Technology and	Economics		
17. Lecturers	Dr. Kisgyörgy Lajo	os, Mudra István,, Dr. Lie	egner Nándor, Dr. S	imongáti Győző	
18. Indicative prerequisites	, , 				
The aim of the course is to n	present the key conc	ents related to the route	s and infrastructure	s of maritime air rail an	d road transport
20. Thematics of lectures					
Road Infrastructure: network traffic control. Railway Infras regulation.	, facilities, design p tructure: superstruc	rinciples, pavement struc ture, substructure, desig	cture, construction. n principles, networ	Air Transport: airports, ru k. Water Transport: shipp	nways, airspace, air bing routes, ports,
21. Thematics of practices					
Case studies and numerical	calculations.				
22. Thematics of laborator	ies				
-		tere) and their connec	tion to programma		
The student	illes (lowercase let	tiers) and their connec	tion to programme		s (capital letters)
 a) knowledge (t) 1. Understands the key concepts and technologies related to road, air, rail, and water transport infrastructure. Understands how these systems operate. (T10) 2. Learns the methods and technologies used for planning and managing traffic in road, air, rail, and water transport. (T14,S1) b) skills (k) 					
1. Thinks in a problem-orien 2. Applies logical reasoning (K9, K16, K21, K27)	ted, efficiency and s to evaluate the strer	ustainability manner. (Kang the set of the s	3,K26) f different infrastruc	ture technology solutions	and approaches.
3. Is capable of reading and transportation infrastructure.	interpreting technica (K13,K17)	al drawings and docume	ntation, furthermore	e analythical calculations	in the field of
c) attitude (a)		andre alama i di Colta di			
 Accepts responsibility and Is able to make choices at 	accountability in we	orks done in the field of i	nfrastructure planni (A4)	ng and evaluation. (A2)	
 Batablishes connections v Bernonstrates a keen inte autonomy and responsi 	vith other engineers rest in innovation in bility (o)	during planning and eva the chosen field. (A20)	aluating transportation	on infrastructure. (A17)	
1. Demonstrates commitmer	nt to completing task	s that require hard and	demanding work. (C	03)	
24. Midterm assessments					

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Code	Share in final grade	Assessed learning outcomes		
1. ZH1	1. 50%	1. t1,t2,k1,k2,k3,k4,k5,k6,k7,a1,a2,o1		
2. ZH2	2. 50%	2. t1,t2,k1,k2,k3,k4,k5,k6,k7,a1,a2,o1		
Code	Share in final grade	Assessed learning outcomes		
-	-	-		
26. Conditions for obtaining signature / midterm grade				
Successful (min. 50%) completion of the midterm tests				
28. Attendance and participation requirements				
according to the rules of CoS				
29. Late completion opportunities				
Second retake or delayed completion is only from one midterm requirement.				
30. Consultation opportunities				
31. Validity of the subject datasheet starts from:				
	idterm require	Number 2/100 old Code Share in final grade 1. ZH1 1. 50% 2. ZH2 2. 50% Code Share in final grade - -		

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Transportation information systems 1. 1. Subject name 2. ... in Hungarian Közlekedési információs rendszerek 1. 3. Programme code k 4. Subject code 5. Term role 5 | k with contact 5 7. Evaluation type 6. Credits m 8. Form hours 9. Weekly contact hours 2 lecture 2 laboratory 10. Language English 0 practice PARTNERSHIPS For the goals **9** INDUSTRY, INNOVATION AND INFRASTRUCTURE GOOD HEALTH AND WELL-BEING QUALITY 11. SDG 4 FRUCATION Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 150 hours **Preparation for** Contact hours 56 hours 18 hours Homework 30 hours seminars **Midterm test Reading written** 24 hours 0 hours 22 hours Exam preparation materials preparation 13. Organisational unit in Department of Transport Technology and Economics charge 15. Email Dr. Csiszár Csaba 14. Subject coordinator csiszar.csaba@kjk.bme.hu address 16. ...department Department of Transport Technology and Economics **17. Lecturers** Dr. Csiszár Csaba, Dr. Csonka Bálint, Dr. Földes Dávid - - -, 18. Indicative - - -, prerequisites - - -19. Aim of the subject Learning about basic infocommunication technologies used in transport; learning about the structure and operation of transport information systems; learning the basics of database management 20. Thematics of lectures Basic concepts, data modeling; Relational data model, database design; Localization and vehicle tracking systems; Pedestrian and bicycle transport information systems; Urban transport information systems; Road transport information systems; Rail transport information systems; Water transport information systems; Air transport information systems; Comparison of transport subsectors according to information management 21. Thematics of practices -22. Thematics of laboratories Creating relational databases used in transportation systems and processing data in SQL. Creating a data model and processing process for a complex data registration system on a selected transportation topic. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. Understands the systematic approaches to operating and developing systems (T1), 2. Selects and uses ICT systems for complex transport tasks (T8,T9,T12), 3. Adapts to new technology; understands the operation of systems (T10), 4. Uses computers, computer networks and other information technologies and equipment to store and retrieve data (T13) b) skills (k) 1. Able to perform tasks of systematic information collection, analysis and summarization, as well as evaluation and interpretation based on this (K4,K16,K19,K25,K28,K29); 2. Able to analyze, plan and manage operations (K26,K27); 3. Able to design and test systems (K35,K36,K37) c) attitude (a) 1. Accepts responsibility and accountability for own and delegated professional decisions and actions; makes necessary adjustments (A2,A12); 2. Chooses from a variety of options (A4); 3. Shows a keen interest in novelty, is open to experience, finds interesting topics and areas, actively explores new areas (A20)

d) autonomy and responsibility (o)

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1. Proactively takes the first step without waiting for what others say or do (O1);

2. Critically evaluates the authenticity and reliability of information before using it or passing it on to others (O6);

3. Works on innovative ideas to develop transport solutions based on the integration of digital technologies and data management (015,016)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. theoretical midterm from lectures 1-5	1. ZH_E1	1. 25%	1. t1,t2,t3,k2,k3,a1,a2
2. theoretical midterm from lectures 6-10	2. ZH_E2	2. 25%	2. t1,t2,t3,k2,k3,a1,a2
3. practical midterm in the computer lab	3. ZH_L1	3. 17%	3. t4,k1,k3,o1,o2
4. practical midterm in the computer lab	4. ZH_L2	4. 17%	4. t4,k1,k3,o1,o2
5. data model creation homework	5. HF	5. 16%	5. k1,a3,o1,o3
25. Exam assessments			

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

26. Conditions for obtaining signature / midterm grade	27. Final grade in percentage of performance				
successful completion of the midterms and completion of the homework with the appropriate grade (in the case of homework with an inappropriate grade, the signature will be refused)					
28. Attendance and participation requirements	Excellent 88-100%				
Attendance is mandatory for seventy percent of the total number of lectures. Attendance will be checked. In case of absences exceeding 30%, the student will fail the course.	Good 75-87% Satisfactory 63-74% Pass 50-62% Fail 0-49%				
29. Late completion opportunities					
A maximum of two mid-terms can be made up during the supplementary week. Since we provide continuous consultation regarding homework throughout the semester, it is not possible to make up homework that has not been graded properly.					
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Transportation information systems 2. 1. Subject name 2. ... in Hungarian Közlekedési információs rendszerek 2. 3. Programme code k 4. Subject code 5. Term role 6 | k with contact 6. Credits 5 7. Evaluation type е 8. Form hours 2 lecture 9. Weekly contact hours 0 practice 2 laboratory 10. Language English PARTNERSHIPS For the goals **9** INDUSTRY, INNOVATION AND INFRASTRUCTURE **3** GOOD HEALTH AND WELL-BEING QUALITY 11. SDG 4 EDUCATION Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 150 hours **Preparation for** Contact hours 56 hours 18 hours Homework 30 hours seminars **Midterm test Reading written** 12 hours 10 hours 24 hours Exam preparation materials preparation 13. Organisational unit in Department of Transport Technology and Economics charge 15. Email Dr. Csiszár Csaba 14. Subject coordinator csiszar.csaba@kjk.bme.hu address 16. ...department Department of Transport Technology and Economics **17. Lecturers** Dr. Csiszár Csaba, Dr. Csonka Bálint, Dr. Földes Dávid Transportation information systems 1. (strong), **18. Indicative** - - -, prerequisites - - -**19. Aim of the subject** Learning about the structure and operation of transport information systems; developing a database management application on the topic of transport 20. Thematics of lectures Basic knowledge of passenger information systems, pre-trip information (schedule, fares); Seat reservation, fare collection information systems; In-travel information systems; Hardware solutions for passenger transport information systems; Parking information systems; Intermodal hub information systems, the concept of road route booking; Telematically integrated passenger transport, influencing passenger decisions with information services; Information systems supporting road electromobility; Smart transport in the smart city; Fundamentals of artificial intelligence 21. Thematics of practices 22. Thematics of laboratories Acquiring the knowledge necessary for developing easily editable and user-friendly data management applications in transportation systems. Creating queries, forms and reports necessary for organizing data. Learning how to edit events and macros necessary for developing complex applications, learning the basics of Visual Basic programming. Creating a complex data recording system using database management software. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. Understands the systematic approaches to operating and developing systems (T1), 2. Selects and uses ICT systems for complex transport tasks (T8,T9,T12), 3. Adapts to new technology; understands the operation of systems (T10), 4. Uses computers, computer networks and other information technologies and equipment to store and retrieve data (T13) b) skills (k) 1. Able to perform tasks of systematic information collection, analysis and summarization, as well as evaluation and interpretation based on this (K4,K16,K19,K25,K28,K29); Able to analyze, plan and manage operations (K26,K27); 3. Able to design and test systems (K35,K36,K37) c) attitude (a) 1. Accepts responsibility and accountability for own and delegated professional decisions and actions; makes necessary adjustments (A2,A12);

2. Chooses from a variety of options (A4);

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d) autonomy and responsibility (o)

1. Proactively takes the first step without waiting for what others say or do (O1);

2. Critically evaluates the authenticity and reliability of information before using it or passing it on to others (O6);

3. Works on innovative ideas to develop transport solutions based on the integration of digital technologies and data management (O15,O16)

24. Midterm assessments

24. Midterm assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
 theoretical midterm from lectures 1-5 theoretical midterm from lectures 6-10 practical midterm in the computer lab creation of database management application homework presentation of database management application 	1. ZH_E1 2. ZH_E2 3. ZH_L 4. HF 5. HF_B	1. 10% 2. 10% 3. 10% 4. 15% 5. 5%	1. t1,t2,t3,k2,k3,a1,a2 2. t1,t2,t3,k2,k3,a1,a2 3. t4,k1,k3,o1,o2 4. t4,k1,k3,a3,o1,o2,o3 5. k1,o2			
25. Exam assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
1. oral exam	1. V	1. 50 %	1. t1,t2,t3,k2,k3,a1,a2			
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance					
successful completion of the midterms and completion of appropriate grade (in the case of homework with an inapp be refused); the presentation of the homework is optional	Excellent 88-100%					
28. Attendance and participation requirements						
Attendance is mandatory for seventy percent of the total will be checked. In case of absences exceeding 30%, the student will fail t	Good 75-87% Satisfactory 63-74% Pass 50-62%					
29. Late completion opportunities	Fail 0-49%					
A maximum of two mid-terms can be made up during the supplementary week. Since we provide continuous consultation regarding homework throughout the semester, it is not possible to make up homework that has not been graded properly.						
30. Consultation opportunities						
at a time and in a form agreed with the teacher						
31. Validity of the subject datasheet starts from:						
01 September, 2025						

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering Subject datasheet					
1. Subject name	Visualizati	ion technolog	ies		
2 in Hungarian	Vizualizációs tech	nológiák		3. Programme code	k
4. Subject code				5. Term role	2 k
6. Credits	5	7. Evaluation type	m	8. Form	with contact hours
9. Weekly contact hours	0 lecture	2 practice	2 laboratory	10. Language	English
11. SDG 4 QUALITY 8 DECENT WORK AND 9 INDUSTRY, INNOVATION Learning outcomes' Image: Contribution to EU/UN Image: Contribution to EU/UN Image: Contribution to EU/UN Sustainable Image: Contribution to Gails Image: Contribution to Eu/UN Image: Contribution to EU/UN Image: Contribution to EU/UN					
12. Working hours for fulfil	lling the requireme	nts of the subject			150 hours
Contact hours	56 hours	Preparation for seminars	20 hours	Homework	25 hours
Reading written materials	14 hours	Midterm test preparation	35 hours	Exam preparation	0 hours
13. Organisational unit in charge	Department of Ra	ilway Vehicles and Vehic	le System Analysis		
14. Subject coordinator	Dr. Lovas László		15. Email address	lovas.laszlo@kjk.bme.ł	าน
16department	Department of Ra	ilway Vehicles and Vehic	cle System Analysis		
17. Lecturers	Dr. Török István, (Győri Márk			
18. Indicative prerequisites	, , 				
19. Aim of the subject					
Preparing future engineers ir	n the basics of grap	nical communication in e	ngineering		
20. Thematics of lectures					
-					
21. Thematics of practices					
Basics of representation met drawing: types of projections production. Simplified repres	hods: perspective, a and sections. Dime entations.	axonometry, projections. ensioning, dimension sys	Part drawings. Algo tem, text instructions	rithm of drawing. Basics o s. Relationship between	of technical drawing and
22. Thematics of laboratories					
Computer-assisted examples environments. Space require	s based on the prac ements of moving m	tice material. Map creati achines.	on methods based o	n digital database in diffe	rent software
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)					
 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. Selects and uses ICT systems for different complex tasks to meet a wide range of needs (T8) 					
 Selects and uses ICT resources to solve related tasks. (T9) Adapts to new technology: understands how systems work. (T10) 					
4. Uses available ICT systems to support business or organisational decision-making. (T12)					
 b) skills (k) 1. Uses systematic information gathering, analysis and summarisation processes to assess current practice and develops new 					
interpretations of practice. (K4)					
 Uses simple digital tools and technologies to communicate, interact and collaborate with others. (K12) Able to read and interpret technical drawings and documentation prepared by other engineers. (K13) 					
4. Creates technical plans and drawings using special software. (K18,S1)					
information systems) and RS (remote sensing). (K22)					
 o. Applies data processing m 7. Ensures the protection of the protection of	ieinous. //digital.com personal data and p	npetence (K28) rivacy: //digital.competer	nce (K30)		
8. Communicates using digit	al technologies. //di	gital competence (K31)			
9. Uses computer-aided design software. //digital competence (K37)					

c) attitude (a)

1. Accepts responsibility and accountability for own professional decisions and actions and those delegated to others. (A2)

2. Chooses from a range of options. (A4)

3. Makes the necessary adjustments, seeking professional development opportunities to fill gaps in own theoretical and practical knowledge. (A12)

4. Has a keen interest in novelty, is open to experience, finds topics and areas of interest, and actively explores new areas. (A20)

d) autonomy and responsibility (o)

1. Proactively takes the first step without waiting to see what others say or do. (O1)

2. Driven by interest or by the pleasure of the work itself, makes an effort even in the absence of external pressure. (O4)

3. Uses digital tools and technologies for collaborative processes and the co-construction and co-creation of resources and knowledge. (O16)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. homework 2. homework 3. homework 4. homework 5. midterm test 6. midterm test	1. HF1 2. HF2 3. HF3 4. HF4 5. ZH1 6. ZH2	1. 10% 2. 10% 3. 10% 4. 10% 5. 30% 6. 30%	1. 1. 1.,t3,k1,k2,k3,k4,k5,k6,k8,k9,a1,a2,a3,a4, 02,03 2. 11,t3,k1,k2,k3,k4,k5,k6,k8,k9,a1,a2,a3,a4, 02,03 3. 11,t3,k1,k2,k3,k4,k5,k6,k8,k9,a1,a2,a3,a4, 02,03 4. 11,t3,k1,k2,k3,k4,k5,k6,k8,k9,a1,a2,a3,a4, 02,03 5. t1,t3,k2,k3,k6,a1,a2,a3,o3 6. t1,t3,k2,k3,k6,a1,a2,a3,o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes		
-	-	-	-		
26. Conditions for obtaining signature / midterm grad	27. Final grade in percentage of performance				
The two tests and the four homeworks written during the system, the sum of which results in the semester mark; the on the basis of the semester points. The conditions for obtaining a semester mark are: - attendance of 70% of the practice classes; - 40% of the sum of test points; - the sum of the homework and test points reaches 40% of	Excellent 80-100% Good 68-79% Satisfactory 54-67%				
28. Attendance and participation requirements	Fail 0-39%				
according to the rules of CoS					
29. Late completion opportunities					
Combined retake test from the topics of all the midterm te					
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Subject datasheet Faculty of Transportation Engineering and Vehicle Engineering Vízhematics rendszerek 1. Subject name 2. ... in Hungarian Víziközlekedési irányító és kommunikációs rendszerek 3. Programme code k 4. Subject code 5. Term role 5 | sp with contact 6. Credits 5 7. Evaluation type е 8. Form hours 2 lecture 9. Weekly contact hours 1 practice 1 laboratory English 10. Language **3** GOOD HEALTH AND WELL-BEING 8 DECENT WORK AND ECONOMIC GROWTH INDUSTRY, INNOVATION 11. SDG AND INFRASTRUCTURE Learning outcomes' contribution to EU/UN **Sustainable Development Goals** 12. Working hours for fulfilling the requirements of the subject 150 hours **Preparation for** Contact hours 56 hours 15 hours Homework 15 hours seminars **Midterm test Reading written** 15 hours Exam preparation 20 hours 29 hours materials preparation 13. Organisational unit in Department of Control for Transport and Vehicle Systems charge 15. Email 14. Subject coordinator Dr. Varga István varga.istvan@kjk.bme.hu address 16. ...department Department of Control for Transportation and Vehicle Systems **17. Lecturers** Dr. Varga István - - -, **18. Indicative** - - -, prerequisites - - -19. Aim of the subject The objective of the course is to provide students with a comprehensive understanding of modern control and communication systems used in waterborne transport, along with the theoretical foundations and practical applications of navigation. Students will learn about the automation of ship operations, satellite-based positioning systems, radar and electronic navigation tools, as well as the structure and functions of traffic control and communication systems in river and maritime navigation. 20. Thematics of lectures Navigation as a control process. Shipping process system (machine operation, loading, navigation and communication processes). The concept, classification and methods of navigation. Basic concepts of navigation (coordinate systems, coordinates, direction, direction, distance, speed) in river and sea navigation. Navigation as a regulatory process. The control model of navigation. A discrete automatic model of navigation. Areas and directions of shipyard automation. Electronic navigation systems. Classification of electronic navigation systems, their characteristic parameters, overview of their development. Speed (distance traveled) and depth measuring systems. The rotary compass and the robotic steering wheel. Radio direction finding and hyperbolic navigation systems. Radar and its application in positioning. Principles of collision avoidance; use of radar for collision avoidance. Automatic Collision Avoidance Systems (ARPA). Positioning with satellites, development of satellite navigation systems. Structure and operation of the NAVSTAR GPS system. Positioning with the NAVSTAR GPS system. The GLONASS and GALILEO systems. Extension of satellite navigation systems (MSAS, WAAS, EGNOS) differential GPS. Inertial navigation and integrated navigation systems. Electronic Map Display and Information System (ECDIS). Communication systems. Communication systems in river and sea navigation, automation of communication. The Global Maritime Distress and Safety System (GMDSS). The COSPAS-SARSAT and INMARSAT systems. Vessel traffic management. Structure and operation of vessel traffic management systems (VTS, VTMS, EUTELTRACS). The Automatic Ship Identification System (AIS). Authority and business information systems in vessel traffic management. The River Information System (RIS). 21. Thematics of practices Applying what has been learned in the lectures in the context of examples. 22. Thematics of laboratories The lab sessions help to deepen the practical learning of the lecture. 23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters) The student a) knowledge (t) 1. knows the development of navigation systems used in water transport b) skills (k) 1. able to identify the responsibilities of water transport satellite positioning systems c) attitude (a) 1. open to develop the system of communication management

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d) autonomy and responsibility (o)				
1. can independently design traffic co	ontrol				
24. Midterm assessments					
Name		Code	Share in final grade	Assessed learnin	ng outcomes
1. midterm test 2. homework		1. ZH 2. HF	1. 40% 2. 20%	1. t1,k1,a1,o1	
25. Exam assessments					
Name		Code	Share in final grade	Assessed learnin	ng outcomes
1. exam		1. V	1. 40%	1. t1,k1,a1,o1	
26. Conditions for obtaining signature / midterm grade				27. Final grade ir performance	n percentage of
Requirements: successful completion (min. 50%) of the midterm test, completing laboratory measurements, and submission of the homeworks.				_ Excellent 92-100% Good 79-91%	6
28. Attendance and participation requirements					
according to the rules of CoS		Satisfactory 67-78%	8%		
29. Late completion opportunities Pass 50-66%					
There is a retake option for the midte request till the end of delayed complete the request till the end of the request till the request t	Fail 0-49%				
30. Consultation opportunities					
at a time and in a form agreed with the teacher					
31. Validity of the subject datasheet starts from:					
01 September, 2025					

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BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS Faculty of Transportation Engineering and Vehicle Engineering						
1. Subject name Waterways and structures						
2 in Hungarian	Vízi utak és műtár	gyak		3. Programme code	k	
4. Subject code				5. Term role	4 sp	
6. Credits	4	7. Evaluation type	m	8. Form	with contact hours	
9. Weekly contact hours	1 lecture	2 practice	1 laboratory	10. Language	English	
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals	4 QUALITY EDUCATION 8 DECENT WORK AND ECONOMIC GROWTH 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE					
12. Working hours for fulfil	ling the requireme	nts of the subject			120 hours	
Contact hours	56 hours	seminars	14 hours	Homework	20 hours	
Reading written materials	0 hours	Midterm test preparation	30 hours	Exam preparation	0 hours	
13. Organisational unit in charge	Department of Tra	nsport Technology and	Economics			
14. Subject coordinator			15. Email address			
16department	Department of Tra	nsport Technology and	l Economics			
17. Lecturers						
18. Indicative prerequisites	, , 					
19. Aim of the subject						
The aim of the course is to p transport, with particular focu of major related facilities suc	rovide students with is on the types of wa h as canals, locks, a	a basic understanding aterways and shipping and ports.	of the key infrastruct routes, navigability re	ure elements required for quirements, and the struc	waterborne cture and operation	
20. Thematics of lectures						
The lectures provide a theoretical foundation in the classification, geometry, and navigability of natural and artificial waterways, as well as the structure and operational principles of key water transport infrastructure such as locks, canals, harbors, and turning basins. Emphasis is placed on sustainability, water management, and environmental considerations within the context of inland navigation systems.						
21. Thematics of practices						
During the practice sessions, students deepen their understanding of theoretical knowledge through the analysis of case studies, maps, engineering drawings, and basic design tasks. The exercises develop their ability to interpret technical documentation, organize information, and solve engineering problems. Students work in groups to evaluate existing structures and propose development concepts for water transport facilities.						
22. Thematics of laboratories						
The laboratory sessions aim to provide students with hands-on experience through the use of physical and digital models of hydraulic structures, as well as field measurement tools and evaluation techniques. Activities may include water flow analysis, canal modeling, estimation of navigability parameters, or demonstrations of hydraulic structure operation. Students collect and interpret measurement data and draw basic engineering conclusions.						
23. Subject learning outcomes (lowercase letters) and their connection to programme level learning outcomes (capital letters)						
The student a) knowledge (t) 1. Understands the types, ge 2. Has an overview of the str 3. Understands the role of wa b) skills (k) 1. Is able to interpret and and	ometric characterist ucture and basic op ater infrastructure wi alyze basic technica	ics, and navigability cla erational principles of v thin the broader transp I plans and documenta	assifications of waterv vater transport facilitie port system. tion related to waterw	vays. es (locks, canals, ports, e vays and structures.	tc.).	
 Identifies the functions and operational features of various water transport infrastructure elements. Applies basic design and dimensioning principles to simple hydraulic transport structures. 						

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c) attitude (a)

1. Demonstrates openness to engineering approaches related to the environmental and technical aspects of water transport and seeks safe and sustainable solutions.

d) autonomy and responsibility (o)

Recognizes the importance of water transport infrastructure in engineering decision-making and is able to apply fundamental design principles responsibly in basic engineering tasks.

24. Midterm assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
1. midterm test	1. ZH	1. 70%	1. t1,t2,t3,k1,o1			
2. team assignment	2. CSF	2. 30%	2. t2,t3,a1,o1			
25. Exam assessments						
Name	Code	Share in final grade	Assessed learning outcomes			
-	-	-	-			
26. Conditions for obtaining signature / midterm grac	27. Final grade in percentage of performance					
Successful (min. 50%) completion of the midterm tests a paper with a presentation.	Excellent 80-100%					
28. Attendance and participation requirements	Good 70-79%					
according to the rules of CoS	Satisfactory 60-69%					
29. Late completion opportunities	Fail 0-49%					
Second retake or delayed completion is only from one midterm requirement.						
30. Consultation opportunities						
at a time and in a form agreed with the teacher						
31. Validity of the subject datasheet starts from:						
01 September, 2025						