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

TRANSPORTATION ENGINEER BACHELOR TRAINING PROGRAMME

The training programme was adopted by the Senate by Decision № .../2024-2025. (VI.30.), in force for students starting as of Autumn for 2025/2026 academic year.

I.

TRAINING AND OUTCOME REQUIREMENTS

The training and outcome requirements for the training programme as a whole are set out in the Ministerial Communication (hereinafter referred to as the "KKK" or "KKK Communication"). The training programme contains both the requirements of the KKK and the *specific requirements of the curriculum of the training programme as actually implemented (where the KKK allows for deviations or sets limits) or supplemented by the curriculum of the training programme maintained by the Faculty of Transport Engineering and Vehicle Engineering*. (The numbering of each point and sub-point is the same as in the KKK.)

1. Basic characteristics of the training programme

1. The name of the bachelor training programme: Transportation Engineering

2. Level of qualification obtained in the bachelor training programme and indication of the qualification in the diploma:

- level of qualification: bachelor, abbreviaton: BSc
- classification: Transportation Engineer
- 3. Field of study: engineering
- 4. Programme duration is terms: 7 terms
- 5. Number of credits required to obtain the bachelor degree: 210 credits
- orientation of the training programme: balanced (40-60 percent) $>> 50\%^{1}$

- the number of credits allocated to the bachelor thesis: 15 credits

- the minimum number of credits to be allocated to the optional subjects: 10 credits >> *12 credits*

6. Classification of fields of study according to the uniform classification of fields of vocational education and training:

European Qualification Frame level: 6

Hungarian Qualification Frame level: 6

ISCED-F 2013 classification: 525/0716 Design and manufacturing of motor vehicles, ships and aircraft

7. Training objectives and professional competences of the bachelor training programme The aim of the training programme is to train transportation engineers capable of planning, preparing, operating and managing basic transportation, passenger and freight transport processes, carrying out the basic tasks of the related administrative and public authorities, and carrying out the basic tasks related to the selection, operation and maintenance of the means of these processes, including the infrastructure and the elements of the management and information technology system. They are prepared to continue their studies at master level.

7.1. The professional competences to be acquired

7.1.1. The Transportation Engineer's

a) knowledge

He/she

- has a comprehensive knowledge of the basic facts, directions and limits of the subject area of engineering.

- knows transport, passenger and goods transport processes, the ways in which they are carried out and the technical possibilities.

- knows the methods and means of assessing basic transport, passenger and goods

¹ Az orientáció százalékos értéke: a tantervi tantárgyak együttes gyakorlati és laboratóriumi gyakorlati óraszámának, valamint az összóraszámnak a hányadosa. (lásd KKK 1. melléklet 5. bek. c) pontja)

transport needs and practices.

- knows the operating principles and structural characteristics of vehicles and machinery suitable for transport, passenger and goods transport processes.

- knows the operation and maintenance systems of vehicles and mobile machinery serving transport, passenger and goods transport processes.

- knows the measurement procedures used in transport, their tools, instruments and measuring equipment.

- knows the requirements and standards of health, safety and fire protection in the transport sector and of environmental protection.

- knows of the basics, boundaries and requirements of logistics, management, environmental protection, quality assurance, information technology, law and economics, which are integrally related to the field of transport.

- knows learning, knowledge acquisition and data collection methods, their ethical limitations and problem solving techniques in the field of transport.

- knows computer communication, major software applications in the field.

- knows organisational, management and communication techniques.

b) skills

He/She is able to

- analyse at a basic level the disciplines that make up the knowledge system of the technical field, to formulate synthetically the interrelationships and to carry out adequate evaluations,

- apply the principles and methods of calculation and modelling of traffic and transport processes,

- interpret and characterise the elements of transport processes, their interrelationships, their role and their importance in the overall process,

- identify transport, passenger and freight transport needs, and determine the interrelationships,

- understand the transport, passenger and freight transport processes, how they are carried out, how they are technically implemented, managed and controlled,

- design a basic process appropriate to the function of the transport system, to select the technical elements and to manage the operation of the system.

- operate and maintain vehicles and mobile machinery serving the process, the management of control systems, environmental, economic and quality aspects.

- detect faults in the transport process and selecting the corrective actions to be taken,

- plan, organise and conduct independent learning,

- understand and use the literature, computer and library resources specific to the field of transport,

- apply the IT skills acquired to the solution of problems in the field of transport.

- use the knowledge in a creative way to manage effectively the resources of the workplace,

- communicate in a professionally appropriate manner, orally and in writing, in their mother tongue and in at least one foreign language, in accordance with their field of specialisation.

c) attitude

He/she

- assumes and authentically represents the social role of their profession and its fundamental relationship with the world.

- should also responsibly profess and represent the values of the engineering profession and be open to professionally informed critical comments.

- keeps abreast of legislative, technical, technological and administrative changes in the

field of transport.

- is open to learning about, accepting and authentically communicating professional and technological developments and innovations in the field of transport.

- endeavours to ensure that their continuous professional development in the field of transport is consistent with their professional objectives.

- should endeavour to carry out their tasks and make management decisions by listening to the opinions of their colleagues and, where possible, working with them.

- takes decisions in complex or unexpected situations, taking full account of legal and ethical standards.

- demonstrates a high level of respect for health and the environment.

- listens to, manages and supports the professional development of his/her staff;

- shares experience with colleagues to contribute to their development.

d) autonomy and responsibility

He/she

-makes independent, professionally sound decisions in unexpected decision-making situations,

- also cooperates responsibly with qualified professionals in other fields (primarily economic and legal) in the performance of the professional duties.

- identifies gaps in technology and process risks and takes the initiative to mitigate them,

- is aware of the legal, economic, safety, social, health and environmental consequences of the work and decisions,

- manages the work of the staff assigned following the supervisor's instruction and manages the operation of processes and vehicles,

- assesses the efficiency, effectiveness and safety of the work of subordinates.

8. Characteristics of the bachelor training programme

8.1. Professional characteristics

8.1.1. The disciplines and specialisations leading to the qualification, from which the degree is drawn:

- natural science knowledge 40-50 credits; >> 41 credits

- mathematics 16 credits

- technical chemistry 3 credits

mechanics, electrotechnics thermodynamics and fluid mechanics 22 credits
economic and social science knowledge 14-30 credits; >> 17 credits

- management and entrepreneurship economics 7 credits

- other economic and social science knowledge 10 credits

- transportation engineering professional knowledge 70-105 credits, of which >> 79 credits

- structure, equipments and operation of vehicles 10-25 credits, >> 13 credits

- transportation knowledge, technologies, infrastructure, economics 25-40 credits,

>> 26 credits

- informatics, vehicle control 10-25 credits, >> 11 credits

- specific professional fields of transportation, freight and passenger transport 25-50 credits. >> 29 credits

8.1.2. Taking into account the elective specialisations, specific knowledge can be acquired in areas of specialisation appropriate to the needs of the profession of transportation engineer: >>

- road transportation processes

- railway transportation processes

- air transportation processes

- water transportation processes

The specialisation recommended by the training institution within the training as a whole must be at least 40 credits. >> 41 credits

8.2. Requirements for the traineeship

The traineeship must last at least six weeks and must be organised in a work placement. The traineeship is a criterion requirement.

II. SPECIFIC CHARACTERISTICS OF THE TRAINING PROGRAMME

- 1. The comprehensive organisational unit responsible for the training programme Faculty of Transportation Engineering and Vehicle Engineering
- 2. The person responsible for the programme Dr. János TÓTH (lecturer ID: 71958323911)

3. Curricular requirements and prerequisite system:

3.1. Prerequisite of subject registering:

The system of prerequisites for the subjects expresses the interrelationship between the subjects. There is an indicative system of pre-requisites for the subjects, which characterises the depth of the links between the subjects.

In the absence of strong and weak prerequisites, the subject is not recommended for enrolment. In the case of co-requisite, a subject linked to a prerequisite may be taken concurrently with the subject it is building on in the same semester. The recommended prerequisite subject reflects a looser connection between the subjects, and the learning outcomes of the subsequent subject can be achieved with some additional time.

3.2. General conditions for choosing specialisations and modules and for taking up specialisation subjects:

Earn a minimum of 75 credits from the compulsory subjects of the curriculum (including the compulsory electives in economics and human scienness and the specialised compulsory electives).

3.3. General conditions for admission to the subject "Bachelor thesis" in all specialisations:

A minimum of 170 credits from compulsory and compulsory elective subjects, including a minimum of 16 credits from specialisation subjects, and the completion of a 6-week traineeship.

3.4. Advanced level subjects:

The Mathematics A1a and Mathematics A2a subjects can be fulfilled on advanced level.

3.5. Evaluation and assessment

The evaluation and assessment methods, procedures and rules are set out in the subject descriptions (subject datasheet) in force, in accordance with the current Code of Studies.

3.6. Term designated for student mobility:

The student has the possibility to participate in international student mobility in the term designated for this purpose in the recommended curriculum, provided that the conditions set out in the Code of Studies are met, the subjects completed in the framework of mobility will be recognised as being the subjects due for the term of the recommended curriculum which the student would have been entitled to take.

3.7. Conditions for obtaining the leaving certificate and for entering the final examination:

The conditions for obtaining a leaving certificate are set out in the Code of Studies, within the legal framework. Within this framework, it is necessary to fulfil all the following criteria:

Completion of all the subjects set out in the recommended curriculum, including the elective subjects (minimum 210 credits), all the curricular criteria (2 semesters of physical education, 6 weeks of traineeship) and the submission of the bachelor thesis.

3.8. Choice of subjects for the final examination, order of the final examination:

The final examination in front of the Final Examination Board consists of the defence of the bachelor thesis and an oral examination in three final examination subjects (or subject groups). The final examination subjects or subject groups shall be selected by the Department responsible for the specialisation. The subjects shall be chosen partly from the core professional curriculum and partly from the specialisation subject area, so that each subject is worth at least 3 credits and the total of the three subjects (groups) is worth at least 15 credits.

3.9. Recommended curriculum, compulsory and elective subjects, curriculum code:

The recommended curriculum is a distribution of the subjects and criteria requirements in the curriculum into terms that a student who wishes to progress at an average pace can follow by meeting the indicative prerequisites for the admission of all subjects, so that he/she can complete his/her study requirements within the programme duration specified in the training and outcome requirements; to be admitted and completed in the terms of training.

The compulsory elective subjects in economics and human sciences, the specialised compulsory elective subjects and the elective subjects set out in the curriculum and announced in the current term are available in the study system.

As part of the training programme, students must complete four major compulsory elective subjects. The student may choose the subjects at his/her discretion from among those announced in the current semester. The Faculty offers at least sixteen major compulsory elective subjects in the framework of the training programme. The current list of subjects is available on the Faculty website: https://transportation.bme.hu/

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The indicative subject prerequisites are displayed on the subject datasheets.

Code of the model curriculum in the study system: xxx

Recommended curriculum of the training programme

	l	П.		III.		IV.	V.		VI.	VII.
1 Mathematics A1a	TE90AX00	Mathematics A2a	TE90AX02	Mathematics A3k	Artificial intelligence		Labour safety	Computs	sory elective economics and human science	Major compulsory elective course 3.
2						SM		courses		SP
3				П	1 0 1	m 3 Al KJIT	1 0 1 m 3	AI ALRT		1 1 0 m 3 SZK
4				2 2 0 m 4 AI TTK	Control engineering		Major compulsory elective course 2.			Major compulsory elective course 4.
5	Π		Π	Fluid dynamics, thermodynamics and heat transfer 1.	1			SP		SP
6 4 2 0	e 6 Al TTK	4 2 0 e 6	AL TTK	, ,		INF	1 1 0 m 3	S7K		1 1 0 m 3 SZK
7 Technical chemistry	VEKTAK01	Electrotechnics - Electronics		Π	2 1 0	m 4 Al KJIT	Transportation information systems 1			Elective course 2
8	П			1 2 1 e 4 AL RHT	Major compulsory elective c	ourse 1.				
9 2 0 1	e 3 Al VBK			Material technology, vehicle maintanance	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	JM			GH	2 0 0 m 3 SZV
10 Basic theories of engineering	1			377	1 1 0	m 3 S7K		SM 4	4 0 m 10 KV GTK	Elective course 3
11	,		TT		Transport organisation		2 0 2 m 5	SZT KTKG Elective	course 1	
12		3 1 1 8 6	AL K.IIT	JM			Transport economics A			2 0 0 m 3 SZV
13		Basics of engineering mechanics	10 1011	2 0 2 e 5 SZT GIT				2	0 0 m 3 SZV	Elective course 4
14	RHT	Sacres et et gine et al.gine et a		Individual research		SP		KO Transpor	rt network planning	
15	TT KJIT				2 2 0	e 5 SZT KTK	2 2 0 m 4	SZT KTKG	in normality planting	2 0 0 m 3 SZV
16 2 2 2	m 7 Al VJJT		Π	2 1 0 m 3 SZT KTKG	Transport statistics		Integrated freight transport systems			
17 Programming	11 1 14 1441	220 e 5	AL V.LIT	Transport technology			anogrado a noight standport of storing		SM	
18		Visualization technologies						2	2 0 e 5 SZT KTKG	
10						SM		SP Transpor	rtation information systems 2	
20					1 2 1	m 5 SZT KTK	2 2 0 m 5	SZT KTKG	nation information systems 2.	
21			.IM		Transport automation A		Specialisation	OLI MINO		
22	INF	0 2 2 m 5 5	SZT VUIT	ко	Transport dutornation re	SM	opodulouidit		SM	BACHELOR THESIS
23 2 0 4	m 7 Al K.IIT	Introduction to transport economics		3 2 0 e 7 SZT KTKG	1 1 0	m 3 SZT KIIT		2	0 2 e 5 SZT KTKG	District of the order
24 Basics of transportation engin	neering			Management and husiness economics	Specialisation	111 0 OLT 11011		Manage	r training in transportation	
25	nooning		KO	interagement and business coortornes	opeoidiloddon			Manago	CH	
26		3 0 0 m 4 9	SZT KTKG	GH				0	2 0 m 3 SZT KTKG	
27		Transport tracks	OLT ININO	3 0 0 m 4 SZT KTKG				Specialis	adion	
20				Transport earlier A				opoolait		
20	KO		KO	SM		m	0			
30 3 2 0	m 7 SZT KTKG	2 1 0 m 4 9	SZT KTKG	2 1 0 m 3 S7T KTKG	2 2 3	m 7 SP	4 2 2 e 10	SP 2	1 0 m 4 SP	0 8 0 m 15 ÖP
21 Mathematics C1E (Elective o		Physical education	OLI KING		2 2 3	11 1 31	7 2 2 8 10	Trainag	r v m 4 or	0 0 0 11 15 0
32	Jourse 1.j	i nyoicai euricaion	KR TK					Gweeks		
22 0 2 0	m 3 AL TTK		INIX IIX	1				oweeks	U U S U KR	
Physical education										
i nyaicai euddalloll	• KR TK									
	3 NR IN									

- BK basic knowledge PK professional knowledge
- MA major compulsory elective course
- CE compulsory elective economics and human science course EC elective course
- SP specialization
- MI minor elective course
- CR criteria requirement
- term for student mobility

Recommended curriculum of specialisaitons

Road transportation processes specialisation

								Road tra	affic contr	ol]						
Ro	ads							2	1	1	е	5	SP	KJIT							
								Traffic e	ngineerir	ng											
	1	2	1	m	4	SP	KTKG								Road tra	ansport n	nanagem	nent			
Ro	oad tra	nsport in	formatic	3																	
	1	0	2	m	3	SP	KTKG	2	1	1	е	5	SP	KTKG	2	1	0	m	4	SP	KTKG

Railway transportation processes specialisation

2							Railway	automa	tics											
Rail trac	ks						2	1	1	е	5	SP	KJIT							
							Rail trar	nsport op	eration											
1	2	1	m	4	SP	KTKG								Rail trar	sport ma	nageme	nt			
Rail trar	nsport info	ormatics	8																	
1	0	2	m	3	SP	KTKG	2	1	1	е	5	SP	KTKG	2	1	0	m	4	SP	KTKG

Air transportation processes specialisation

							Control a	and com	municatio	on syster	ms of avi	ation								
Airspace	es and ae	erodrome	98																	
							2	1	2	е	6	SP	KJIT							
1	2	1	m	4	SP	KTKG	Flight op	eration						Air trans	port man	agemen	t			
Air trans	port infor	matics																		
1	0	2	m	3	SP	KTKG	2	1	0	е	4	SP	RHT	2	1	0	m	4	SP	KTKG

Water transportation processes specialisation

							Control	and com	municati	ion syster	ms of wa	iter transj	portation							
Waterwa	ays and s	tructure	3				2	1	1	е	5	SP	KJIT							
							Shippin	g operatio	on					_						
1	2	1	m	4	SP	KTKG								Shippin	g manag	ement				
Ship info	ormatics																			
1	0	2	m	3	SP	RHT	2	1	1	е	5	SP	RHT	2	1	0	m	4	SP	KTKG

III. SUBJECT DATASHEETS

The currently valid subject catalogue is available on the faculty website: https://transportation.bme.hu/