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

TRANSPORTATION ENGINEER MASTER 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 master training programme: Transportation Engineering
2. Level of qualification obtained in the master training programme and indication of the qualification in the diploma:
- level of qualification: master, abbreviaton: MSc
- classificaion: Transportation Engineer
3. Field of study: engineering
4. Training programmes accepted as prerequisites for entry to the master programme
4.1. Full credit may be awarded for: the transportation engineer bachelor training programme.
4.2. In addition, the following training programmes may be taken into account upon completion of the credits specified in point 9.3: from the technical field of study, the bachelor degree in vehicle engineering, logistics engineering, mechanical engineering, mechatronic engineering, safety engineering, military and safety engineering, civil engineering, light industrial engineering and BProf vehicle engineering, from the field of study in informatics, the bachelor degree in computer engineering.
5. Programme duration is terms: 4 terms
6. Number of credits required to obtain the master degree: 120 credits
- orientation of the training programme: balanced (40-60 percent) >> ***49%***[1]
- the number of credits allocated to the master thesis: 30 credits
- the minimum number of credits to be allocated to the optional subjects: 6 credits >> ***6 credits***
7. Classification of fields of study according to the uniform classification of fields of vocational education and training:
European Qualification Frame level: 7
Hungarian Qualification Frame level: 7
ISCED-F 2013 classification: 525/0716 ***Design and manufacturing of motor vehicles, ships and aircraft***
8. Training objectives and professional competences of the master training programme
The aim of the training programme is to train transportation engineers who are capable of analyzing, planning, organizing, and managing transportation and traffic processes and systems in an economical, systems-oriented manner, while taking into account the requirements of traffic safety, environmental protection, resource management, and international trends. Graduates will be able to perform related administrative and regulatory tasks, as well as select and operate vehicles and equipment that form and

[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)

support transportation and traffic systems, including elements of infrastructure, control systems, and information technology systems. They are prepared to pursue studies at doctoral level.

8.1. The professional competences to be acquired

8.1.1. The Transportation Engineer's

a) knowledge

He/she

- understands and applies the general and specific mathematical, natural and social science principles, rules, correlations, and procedures required for professional work in the field of transportation engineering.
- possesses comprehensive knowledge of global social and economic processes.
- is familiar with and understands the characteristics and areas of application of solutions used in the fields of transportation and logistics.
- has knowledge of measurement theory and instrumentation related to transportation and logistics.
- is familiar with and proficient in using information and communication technologies relevant to transportation and logistics.
- knows the tools and methods of computer modelling and simulation applied in transportation and logistics.
- understands the methodology and toolset for planning and researching transportation and logistics processes.
- is familiar with widely applicable problem-solving techniques required for research or scientific work.
- knows the organizational tools and methods related to leadership and the legal regulations necessary for professional practice.
- understands the specific methods and technologies related to the chosen specialization.

b) skills

He/She

- is capable of applying acquired general and specific mathematical, natural and social science principles, rules, correlations, and procedures to solve problems arising in the field of engineering.
- is able to examine and analyse methods used in transportation and logistics, and to evaluate and document the results of such examinations.
- is capable of processing, organizing, and analysing data collected during the implementation of transportation and logistics systems and processes, and of drawing conclusions from them.
- can identify the interrelationships and mechanisms of transportation and logistics systems and their constituent processes, and evaluate and manage them using a systems-based approach.
- is capable of creative participation in solving research and development tasks related to transportation and logistics.
- can apply integrated knowledge from transportation and logistics processes, vehicles implementing those processes, process theory, industrial production, and related fields such as electronics and information technology.
- is capable of creative problem-solving and flexible handling of complex tasks in the field of transportation.
- is capable of globally designing complex systems based on a systems-oriented and process-oriented way of thinking.
- is capable of complex planning and management of the use of technical, economic, environmental, and human resources.

- is able to apply and further develop the procedures, models, and information technologies used in the design, organization, and implementation of transportation and logistics systems and processes.
- is capable of performing condition assessments, developing evaluations and proposals based on them, and planning, organizing, and managing the development of complex transportation and logistics systems at a high level, depending on the chosen specialization.
- is capable of undertaking leadership tasks after gaining sufficient practical experience.
- is capable of conducting publications and negotiations in their professional field in their native language and at least one foreign language.
- is capable of enriching the knowledge base of their field with original ideas.

c) attitude

He/she

- is open and receptive to learning about, accepting, and credibly communicating professional and technological developments and innovations in the field of transportation and logistics.
- embraces the professional and ethical values associated with the engineering profession.
- strives to participate in the development of new methods and tools related to transportation and logistics.
- has a deep sense of professional commitment.
- seeks to observe and enforce the ethical principles of work and organizational culture, as well as quality standards.
- strives to enforce the requirements of sustainability, environmental awareness, health protection, and energy efficiency in the field of transportation.
- aims to perform their work based on a systems-oriented and process-focused way of thinking, applying a complex approach.
- sStrives to continuously develop both their own and their colleagues' knowledge through self-directed and further professional training.
- seeks to acquire a broad and comprehensive general knowledge and education.
- is committed to diversity and value-based thinking.

d) autonomy and responsibility

He/she

- acts proactively in solving professional tasks and independently selects and applies relevant problem-solving methods.
- makes decisions independently and with full responsibility, consulting with representatives of other fields (primarily legal, economic, energy, and environmental) as needed.
- demonstrates responsibility in matters of sustainability, health protection, and environmental awareness.
- takes into account and applies the principles of environmental protection, quality assurance, consumer protection, product liability, equal access, workplace health and safety, as well as the basic regulations of engineering, economic, and legal frameworks, and engineering ethics in decision-making,
- takes responsibility for the activities and work of subordinates, as well as for the processes under their supervision.

9. Characteristics of the master training programme

9.1. Professional characteristics

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

- natural science knowledge 20-35 credits; >> ***20 credits***

- mathematical techniques 6 credits
- informatic knowledge 4 credits
- electronic and control theory knowledge 6 credits
- other compulsory elective knowledge 4 credits

- economic and social science knowledge 10-20 credits; >> ***13 credits***
- management and economics knowledge 7 credits
- other economic and social science knowledge 6 credits
- transportation engineering professional knowledge 20-40 credits, of which >> ***27 credits***
  - transport automation, informatics 5-15 credits, >> ***5 credits***
  - transport operation, intelligent transport systems 5-15 credits, >> ***10 credits***
- specific professional fields of transportation 10-25 credits. >> ***12 credits***

9.1.2. 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: >>

- air traffic management
- transport automation
- transport engineering management
- transport systems
- freight forwarding

The specialisation recommended by the training institution within the training as a whole including the master thesis be 40-60 credits. >> ***54 credits***

9.2. Requirements for the traineeship

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

9.3. Minimum admission requirements to the master training programme for holders of degrees specified in Section 4.2

9.3.1. For applicants holding a degree as specified in Section 4.2 — except for those with a BProf degree in vehicle engineering as defined in Section 4.2 — admission to the master programme requires that the student has obtained at least 40 credits out of the 70 credits specified below during their undergraduate studies:

- natural sciences knowledge (mathematics, chemistry and materials science, mechanics, thermodynamics and fluid mechanics, electrical engineering): 20 credits
- economic and human sciences knowledge (economics and management, environmental protection, quality assurance, occupational safety, social sciences): 10 credits
- field-specific knowledge (structure, components, and operation of vehicles; transportation knowledge, technologies, infrastructure, economics; informatics; vehicle control): 40 credits

Any missing credits from the above fields must be obtained in accordance with the study and examination regulations of the higher education institution during the master's programme.

9.3.2. For students with a BProf degree in vehicle engineering, the minimum number of credits required for admission to the master programme is 60 credits from the following fields:

- natural sciences knowledge (mathematics, physics, fluid mechanics): 10 credits
- economic and human sciences knowledge: 2 credits
- field-specific knowledge (transportation knowledge, technologies, infrastructure, transport economics; informatics; traffic control): 48 credits

In order to obtain the master degree, the student must acquire the full 60 credits in the

specified fields concurrently with the master level education, within the duration of the training programme, and in accordance with the code of studies of the higher education institution.

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:
There are no specific conditions for choosing specialisation and for taking up specialisation subjects.

3.3. General conditions for admission to the subjects "Master thesis" in all specialisations:
The prerequisite for enrollment in the Master thesis 1. course are the completion of compulsory courses covering all the basic natural scientific knowledge in the recommended curriculum and the collection of a minimum of 56 credits.
The prerequisite for enrollment in the Master thesis 2. course are the completion of compulsory courses covering all the basic natural scientific knowledge included in the recommended curriculum and the collection of a minimum of 84 credits. The Master thesis 1. course can be enrolled simultaneously as corequisite, in which case the above cumulative acquired credits must be achieved by completing another subjects according to the recommended curriculum. A further condition is the completion of the 4-week traineeship in case of full time master study.

3.4. 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.

3.5. 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.

3.6. 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 120 credits), all the curricular criteria (4 weeks of traineeship) and the submission of the master thesis.

3.7. 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.

3.8. 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 one 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 eight 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 (start in spring)

1./spring	2./autumn	3./spring	4./autumn
Intelligens transportation systems 2 0 2 m 5 SZT KTKG	Transport operation BMEKOKKMsK2001-00 2 2 0 e 5 SZT KTKG	Project management in transportation 2 0 0 m 3 SZT KTKG	Compulsory elective economics and human science course 2. 2 0 0 m 3 KV GTK
Decision making methods 3 1 0 m 6 SZT KTKG	Transport informatics 2 0 2 e 5 SZT KTKG	Major compulsory elective course 1 1 0 m 3 SZT	Elective course 1. 2 0 0 m 3 SZV
Passenger transportation systems 2 2 0 e 5 SZT KTKG	Traffic flow 2 1 0 m 4 SZT KTKG	Compulsory elective economics and human science course 1. 2 0 0 m 3 KV GTK	Elective course 2. 2 0 0 m 3 SZV
Transport economics M 1 1 0 e 4 SZT KTKG	Transport safety M 2 1 0 m 4 SZT KTKG	Specialisation 2 2 1 1 em 6 SP	Specialisation 3 2 1 1 em 6 SP
Transport automation M 3 2 0 m 6 SZT KJIT	Specialisation 1 4 3 1 eem 12 SP	Master thesis 1. 0 8 0 m 15 OP	Master thesis 2. 0 8 0 m 15 OP
Compulsory elective natural science knowledge 3 0 0 m 4 KV TTK		Traineeship 4weeks 0 0 s 0 KR	

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

Recommended curriculum of the training programme (start in autumn)

	1./autumn	2./spring	3./autumn	4./spring
1	Transport operation	Intelligens transportation systems	Major compulsory elective course	Project management in transportation
2	BMEKOKKMsK2001-00			
3			1 1 0 m 3 SZT	2 0 0 m 3 SZT KTKG
4			Compulsory elective economics and human science	Compulsory elective economics and human science
5	2 2 0 e 5 SZT KTKG	2 0 2 m 5 SZT KTKG	course 1.	course 2.
6	Transport informatics	Decision making methods	2 0 0 m 3 KV GTK	2 0 0 m 3 KV GTK
7			Elective course 1.	Elective course 2.
8				
9			2 0 0 m 3 SZV	2 0 0 m 3 SZV
10	2 0 2 e 5 SZT KTKG		Specialisation 3	Transport automation M
11	Traffic flow	3 1 0 m 6 SZT KTKG		
12		Passenger transportation systems		
13				
14	2 1 0 m 4 SZT KTKG			
15	Transport safety M		m	
16		2 2 0 e 5 SZT KTKG	2 1 1 m 6 SP	3 2 0 m 6 SZT KJIT
17		Transport economics M	Master thesis 1.	Master thesis 2.
18	2 1 0 m 4 SZT KTKG			
19	Specialisation 1			
20		1 1 0 e 4 SZT KTKG		
21		Compulsory elective natural science knowledge		
22				
23				
24		3 0 0 m 4 KV TTK		
25		Specialisation 2		
26				
27	e			
28	e			
29	m	e		
30	4 3 1 m 12 SP	2 1 1 m 6 SP	0 8 0 m 15 ÖP	0 8 0 m 15 ÖP
31		Traineeship		
32		4weeks 0 0 s 0 KR		

BK	basic knowledge
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MA	major compulsory elective course
CE	compulsory elective economics and natural science course
EC	elective course
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	term for student mobility

Recommended curriculum of specialisations (in case of the subjects marked with „<>” the recommended term of registration can be changed)

Air traffic management specialisation

Safety in air traffic control 1 1 0 m 3 SP KJIT	Communications, Navigation and Surveillance (CNS) 2 1 1 0 e 3 SP KTKG	Air Traffic Management case study 0 2 0 m 3 SP RHT
Air Traffic Control 2 0 2 m 6 SP RHT	Air Traffic Management (ATM) 1 0 1 m 3 SP RHT	Meteorology 2 0 0 m 3 SP RHT
Communications, Navigation and Surveillance (CNS) 1 1 1 0 m 3 SP KJIT		

Transport automation specialisation

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

Transport engineering management specialisation

Strategic policy instruments in transportation 2 1 1 e 6 SP KTKG	Financial techniques in transportation 2 0 2 e 6 SP KTKG	Management of transport and logistic services <> 2 2 0 m 6 SP KTKG
Transport infrastructure management BMEKOKKMsK1C01-00 <> 1 1 0 m 3 SP KTKG		
Human resource management in transportation <> 1 0 1 m 3 SP KTKG		

Transport systems specialisation

Traffic modelling 1 0 3 e 6 SP KTKG	City logistics 2 2 0 e 6 SP ALRT	Environmental effects of transport <> 2 2 0 m 6 SP KTKG
Electromobility <> 1 1 0 m 3 SP KTKG		
Smart city BMEKOKKMsK1A01-00 <> 2 0 0 m 3 SP KTKG		

Freight forwarding specialisation

Freight forwarding management 1.		2	0	2	e	6	SP	KTKG
Freight forwarding marketing		1	0	1	m	3	SP	KTKG
Supply chain operation control	<>	2	0	0	m	3	SP	ALRT
Trade, financial and accounting techniques		1	0	1	m	3	SP	KTKG
Packaging technology	<>	0	1	1	m	3	SP	ALRT
Freight forwarding management 2.	<>	2	0	2	e	6	SP	KTKG

III.
SUBJECT DATASHEETS

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