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

Subject datasheet

1. Subject name	**Components of logistics automation**				
2. … in Hungarian	Logisztikai automatizálás komponensei			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	15 hours
Reading written materials	25 hours	**Midterm test preparation**	20 hours	**Exam preparation**	44 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bohács Gábor	**15. Email address**	bohacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bohács Gábor, Dr. Rinkács Angéla, Dr. Rózsa Zoltán		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

The aim of the course is to familiarize students with current systems for automating intralogistics systems, and to gain practical experience in PLC-level programming of systems through laboratory sessions.

20. Thematics of lectures

Steps in the development of logistics automation, as well as modern control principles characteristic of automated systems. Basic concepts of the field, automation levels and conditions of material handling systems. Characteristics and application technology issues of sensors used in material handling systems. General characteristics and control issues of movement executing elements and actuators used in material handling systems. Principles of implementation of automated work and movement cycles, algorithmic description methods. PLC structure, functional units. Principles of programming of PLC systems. Principle of program editing, ladder diagram, function block diagram, structured text programming. Fundamentals of human-machine interfacs and identification issues found in systems.

21. Thematics of practices

-

22. Thematics of laboratories

Demonstrations of sensors, actuators and executive bodies on automated sample systems built in the departmental laboratory. Use of a PC programming system required for PLC programming. Introduction to PLC programming. PLC programming sample examples. Writing a PLC program for one of the elements of the departmental laboratory's automation sample system. Learning to program PLCs with a computer is done through several simpler intralogistics application examples.

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

The student

a) knowledge (t)

1. knows the components of logistics automation (T1,T2,T9)
2. knows the characteristics of PLC programming (T3,T4,T5)
3. knows the structure and trends of logistics automation systems (T6,T9)

b) skills (k)

1. is able to determine the structure of an automated logistics system and the components required for a given task (K1,K6,K7,K10,K11)
2. is able to program PLCs (K7,K12,K13)

c) attitude (a)

1. is open to using the components of logistics automation (A1, A3)
2. strives to learn the methodology and tools required for solutions and to use them routinely (A1, A3, A4, A8, A9)
3. strives to the maximum of his/her abilities to complete his/her studies at the highest possible level, acquiring in-depth and independent knowledge (A2, A3, A4, A6, A7, A8, A9, A10)

4. works accurately and error-free, adhering to the rules of the applicable tools (A1, A2, A5, A7)
5. cooperates with instructors and teammates in solving complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. is responsible for design problems and makes independent suggestions (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions made during design tasks (O1, O2, O3, O4, O5)
3. uses a systems engineering approach in his thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test 2. programming task	1. ZH 2. HF	1. 20% 2. 20%	1. t1-t3,k1,k2,a1-a5,o1-o3 2. t1-t3,k1,k2,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 60%	1. t1-t3,k1,k2,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

Completed and accepted programming task, midterm test wit at least 50% result.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Demand planning and inventory management**				
2. … in Hungarian	Kereslet- és készlettervezés			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	20 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	30 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bóna Krisztián	**15. Email address**	bona.krisztian@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bóna Krisztián, Dr. Sárdi Dávid Lajos		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

Presentation of the statistical data analysis and mathematical modelling tools used in the field of demand planning and inventory planning, as well as their algorithmic background, methods of IT implementation of the models and procedures used.

20. Thematics of lectures

The concept, operation and actors of supply (value creating) chains. Sales & operations planning. Methodology of the assortment analytics, several purchasing strategies in the material supply. The basic concepts of the demand planning process, data preparation and preprocessing. The forecasting model identification process, preparation of identification, several identification tests. Application of simple forecasting models. The realizations of the Box-Jenkins models. The parameter optimization of forecasting models and prediction. Fine tuning, measurement techniques of forecast accuracy. The basics of inventory process measurement, interpretation of inventory planning and control. Dispositional concepts and basic inventory control strategies. Deterministic approach - optimization the cost of inventories. The EOQ thinking, the main versions of EOQ models. Stochastic approach - cost-based thinking in inventory planning. Stochastic approach - service level and reliability in inventory planning.

21. Thematics of practices

-

22. Thematics of laboratories

Methods for the IT implementation of procedures for assortment analysis. IT implementations of data management solutions and algorithms for the preparation of data for demand- and inventory planning. Methods for the IT implementation of test functions for identification tests. IT solutions for the realisation of tests used in the identification of prediction models. Realizations of algorithms for simple statistical forecasting models. Realizations of algorithms for Box-Jenkins statistical forecasting models. Realisations of indicators and algorithmic solutions for the evaluation of forecasting models. Practical application of software for the analysis of time series data. Practicing of methods for calculating indicators used in measuring the performance of inventory control systems. Implementations of simple inventory control systems. Development and implementation of deterministic inventory control models. Development and implementation of stochastic inventory control models.

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

The student

a) knowledge (t)

1. knows the methods of statistical analysis of logistics time series (T1, T2, T6, T9)
2. knows the steps of data preparation, methods of data cleaning and data aggregation (T4, T5, T9)
3. knows the correlation functions to be used in the analysis of time series and be able to apply them in a model (T4, T5, T6, T9)
4. knows forecasting models, know the tools for parameter optimisation (T1, T2, T6, T9)
5. has a comprehensive knowledge of statistical indicators and error calculation methods that allow the selection of appropriate models (T4, T5, T6, T9)
6. knowledge of the characteristics of deterministic inventory models, methods of constructing cost models (T4, T5, T6, T9)

7. knows the characteristics of stochastic inventory models, methods of calculating optimal parameters (T4, T5, T6, T9)

b) skills (k)

1. is able to interpret the demand and inventory planning process in a model (K1, K4, K11, K13)
2. is able to identify the relationships between demand and inventory planning models and to construct the process (K2, K7, K9, K10)
3. can make forecasts using known models and know the tools for parameter optimisation (K2, K7, K9, K10, K13)
4. can independently set up a deterministic cost model and determine its optimal parameters in a model (K2, K7, K9, K10, K13)
5. can apply deterministic inventory models and calculate their optimal parameters (K2, K7, K9, K10, K13)
6. is able to apply stochastic stock models and calculate their optimal parameters (K2, K7, K9, K10, K13)

c) attitude (a)

1. is open to the use of mathematical and information technology tools (A1, A3)
2. seeks to learn and routinely use the methodology and tools needed to solve problems (A1, A3, A4, A8, A9)
3. strives to the best of his/her ability to complete his/her studies to the highest possible standard, acquiring in-depth knowledge and the ability to create independently (A2, A3, A4, A6, A7, A8, A9, A10)
4. works accurately and without errors, respecting the rules of the applicable tools (A1, A2, A5, A7)
5. collaborates with teachers and team members to solve complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. makes responsible and independent proposals for design problems (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions taken in the course of planning tasks (O1, O2, O3, O4, O5)
3. uses a systems engineering approach to thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test 2. homework 3. simulation game	1. ZH 2. HF 3. SIM	1. 17,5% 2. 17,5% 3. 15%	1. t1-t7,k1-k6,a1-a5,o1-o3 2. t1-t7,k1-k6,a1-a5,o1-o3 3. t1-t7,k1-k6,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 50%	1. t1-t7,k1-k6,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level, completion of the laboratory tasks, completion of the simulation game.

27. Final grade in percentage of performance

Excellent 85-100%
Good 70-85%
Satisfactory 60-70%
Pass 50-60%
Fail 0-50%

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Freight forwarding management 1.**				
2. … in Hungarian	Szállítmányozási menedzsment 1.			**3. Programme code**	KL
4. Subject code				**5. Term | role**	**1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	8 hours	**Homework**	32 hours
Reading written materials	34 hours	**Midterm test preparation**	30 hours	**Exam preparation**	20 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator	Dr. Mészáros Ferenc	**15. Email address**	meszaros.ferenc@kjk.bme.hu
16. …department	Department of Transport Technology and Economics		
17. Lecturers	Dr. Duleba Szabolcs, Dr. Mészáros Ferenc		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Aim of the subject

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

20. Thematics of lectures

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

21. Thematics of practices

-

22. Thematics of laboratories

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

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

The student

a) knowledge (t)

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

b) skills (k)

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

c) attitude (a)

1. strives for completeness in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant towards members of his/her team (L:A2,A4,A5,A7,A8,A9,A10)
2. is open to new and innovative ideas and research, is self-critical of the tasks assigned to him/her, and takes full responsibility for sustainability (L:A1,A3,A6)

d) autonomy and responsibility (o)

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

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

24. Midterm assessments

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

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. oral exam	1. V	1. 40%	1. t1,t2,t3,t4,k1,k2,k3,k4,a1,a2,o1,o2

26. Conditions for obtaining signature / midterm grade

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

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

27. Final grade in percentage of performance

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

Subject datasheet

1. Subject name	**Freight forwarding management 2.**				
2. … in Hungarian	Szállítmányozási menedzsment 2.			**3. Programme code**	KL
4. Subject code				**5. Term | role**	**2/3 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	8 hours	**Homework**	32 hours
Reading written materials	34 hours	**Midterm test preparation**	30 hours	**Exam preparation**	20 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator	Dr. Mészáros Ferenc	**15. Email address**	meszaros.ferenc@kjk.bme.hu
16. …department	Department of Transport Technology and Economics		
17. Lecturers	Dr. Duleba Szabolcs, Dr. Mészáros Ferenc		

18. Indicative prerequisites	Freight forwarding management 1. (co-requisite), - - -, - - -

19. Aim of the subject

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

20. Thematics of lectures

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

21. Thematics of practices

-

22. Thematics of laboratories

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

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

The student

a) knowledge (t)

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

b) skills (k)

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

c) attitude (a)

1. strives for completeness in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant towards members of his/her team (L:A2,A4,A5,A7,A8,A9,A10)

2. is open to new and innovative ideas and research, is self-critical of the tasks assigned to him/her, and takes full responsibility for sustainability (L:A1,A3,A6)

d) autonomy and responsibility (o)

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

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

24. Midterm assessments

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

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. oral exam	1. V	1. 40%	1. t1,t2,t3,t4,k1,k2,k3,k4,a1,a2,o1,o2

26. Conditions for obtaining signature / midterm grade

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

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

27. Final grade in percentage of performance

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

Subject datasheet

1. Subject name	**Freight forwarding marketing**				
2. … in Hungarian	Szállítmányozási marketing			**3. Programme code**	KL
4. Subject code				**5. Term | role**	**3/2 | sp**
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					
12. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	10 hours	**Homework**	25 hours
Reading written materials	12 hours	**Midterm test preparation**	15 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator	Dr. Kővári Botond	**15. Email address**	kovari.botond@kjk.bme.hu
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 market processes and customer habits.

20. Thematics of lectures

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

21. Thematics of practices

-

22. Thematics of laboratories

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

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

The student

a) knowledge (t)

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

b) skills (k)

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

c) attitude (a)

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

d) autonomy and responsibility (o)

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

24. Midterm assessments

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

25. 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% 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 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
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Freight transporting control**				
2. … in Hungarian	Szállításirányítás			**3. Programme code**	L
4. Subject code				**5. Term | role**	**3 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	14 hours	**Midterm test preparation**	0 hours	**Exam preparation**	40 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Kovács Gábor	**15. Email address**	kovacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Kovács Gábor, Bakos András		
18. Indicative prerequisites	Planning of logistics networks (suggested), - - -, - - -		

19. Aim of the subject

To familiarize students with transportation control systems, as well as the relevant mathematical procedures and IT tools of transportation planning.

20. Thematics of lectures

The components of the transport logistics control systems. Summary of GIS basics. Operational control problems and tasks of the transport logistics systems. Mathematical modelling techniques, decision supporting of transport logistics control systems. The mathematical model of transportation networks. The shortest path search methods. The exact and the provisional planning. Modelling of routes: direct routes, collecting and distributing routes. The traveling salesman problem (TSP) and the vehicle routing problem (VRP). Soft computing methods. The IT architecture of the freight control systems. The mobile devices. The connection between the freight exchanges and the transport logistics control systems.

21. Thematics of practices

-

22. Thematics of laboratories

Practicing the basics of geoinformatics, route planning software. The algorithmizing of mathematical modeling methods used in operational route planning e.g. CVRPTW. Preparing the semester work.

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

The student

a) knowledge (t)

1. knowledge of GIS basics (T4)
2. knowledge of relevant graph theory basics (T1, T2)
3. knowledge of TSP and VRP problems and methods of solving them (T6, T9)
4. knowledge of transport management information systems (T5)

b) skills (k)

1. able to identify transport modeling problems and model them (K1, K2)
2. able to solve the emerging transport control tasks by selecting and applying appropriate solution methods and tools/softwares (K4, K7, K9, K10, K11, K13)

c) attitude (a)

1. strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors (A1, A2, A3, A4, A5, A6, A7, A8, A9, A10)

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task	1. F	1. 50%	1. t1-t4,k1,k2,a1,o1

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written and oral exam	1. V	1. 50%	1. t1-t4,k1,k2,a1,o1

26. Conditions for obtaining signature / midterm grade

Completion of the semester task at least 50% level.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

A semester task once can be resubmitted by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Intelligent logistics applications**				
2. … in Hungarian	Intelligens logisztikai alkalmazások			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	20 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	30 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bohács Gábor	**15. Email address**	bohacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bohács Gábor, Dr. Rinkács Angéla, Dr. Rózsa Zoltán		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

The objective of the course is to familiarize students with intelligent solutions that can be applied in logistics systems and to enable them to choose the right solution in practical life. Within this, it discusses in detail the applicability of modern neural network and fuzzy logic-based systems. The course also deals with machine vision: the extraction of high-level image descriptors from lower-level image features. It also deals with the logistical applicability of mobile robots.

20. Thematics of lectures

Development of artificial intelligence methods. Theoretical foundations and application areas of neural networks. Application of neural networks in logistics. Theoretical foundations and application of fuzzy logic in logistics. Theoretical foundations and application of machine vision in intelligent logistics systems. Theoretical foundations and application of mobile robots in logistics systems. Examples of the implementation of theory into practical solutions.

21. Thematics of practices

-

22. Thematics of laboratories

Computer labs, in which the methods learned in the lectures are tested in the available software environment. Some of the labs specifically reflect on what was said in the lectures and present examples. In addition, we also use the opportunity of the labs to complete the calculation and programming tasks necessary for individual mid-term assignments.

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

The student

a) knowledge (t)

1. Knows the systematic approaches to the construction and operation of intelligent logistics systems. (T1,T6,T9)
2. Knows an intelligent method applicable to a given task in logistics and a possible software solution for it. (T4,T5)
3. Understands the theoretical and practical elements of related disciplines that influence the development of intelligent machines in logistics. (T2,T9)

b) skills (k)

1. Able to formulate the advantages and disadvantages of intelligent logistics solutions (K4,K6,K7)
2. Able to perform basic tests related to the evaluation of systems (K2,K11,K12)
3. Determines the components of intelligent systems, their characteristics and impact (K1,K5,K9,K10,K13)

c) attitude (a)

1. is open to the practical application of new methods emerging in the field of intelligent systems (A1)
2. strives to the maximum of his abilities to complete his studies at the highest possible level, acquiring in-depth and independent knowledge (A2, A3, A4, A5, A6, A7, A9, A10)
3. cooperates with instructors and teammates in solving complex problems (A8, A10)

d) autonomy and responsibility (o)

1. is responsible for design problems and makes independent suggestions (O2, O3, O4, O5)
2. uses a systems engineering approach in the thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test 2. semester task	1. ZH 2. F	1. 25% 2. 25%	1. t1-t3,k1-k3,a1-a3,o1,o2 2. t1-t3,k1-k3,a1-a3,o1,o2

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 50%	1. t1-t3,k1-k3,a1-a3,o1,o2

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. 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
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Lean management**				
2. … in Hungarian	Lean menedzsment			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | k**
6. Credits	**6**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	31 hours	**Homework**	31 hours
Reading written materials	31 hours	**Midterm test preparation**	31 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Sztrapkovics Balázs	**15. Email address**	balazs.sztrapkovics@logisztika.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Sztrapkovics Balázs, Bakos András		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Aim of the subject

Skill level knowledge of lean management and related deeper thinking methodologies (FMEA, Six Sigma, Ergonomics)

20. Thematics of lectures

Introducing the continuous improvement methods. Teamwork, the establishment of a suggestion system, the importance, and techniques of motivating the employee. Creativity techniques, advantages and disadvantages of each technique. Problem-finding tools, failure analysis methods application in practice, defining the required datas for each method. The bases of standardization, the steps to implement standards in the company, PDCA and SDCA cycles. The zero failure concept. The elimination of the failures (Jidoka, Poka-Yoke). Production leveling methods in lean management, mathematical formulas to apply Heijunka in the production. Process improvement techniques, and methods, the schedule of the Kaizen events. The importance of the lead time, Value Stream mapping, element symbols and steps. The bases of ergonomy. The main ergonomy principles durint cell designing. The methods of REBA analysis. Intorducing Just in time and Just in Sequence methods, and it's impacts tot he supply chain. The main goal and principles of Six Sigma method, the mathemathical and statistical background. The connection between lean and six sigma.

21. Thematics of practices

Application of the methods and techniques which was presented in the lecture. Introducing case studies, and also apply the methods during workshops. The preparation of the solution of the homework, consultations about the homework, and making the presentations, and rating the 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. In-depth knowledge of Lean analysis and design methodologies (T2, T6)
2. Mastery of Six Sigma and defect analysis methodologies (T8)

b) skills (k)

1. Able to apply lean methods and analytical tools appropriately (K10, K12, K14)
2. Able to perform in-depth analysis of manufacturing defects and rejects using statistical methodologies (K1, K2, K4, K7)

c) attitude (a)

1. endeavour, to the best of their ability, to carry out their studies to the highest possible standard, acquiring in-depth knowledge capable of independent work, accurately and without error, following the rules of the applicable tools, in cooperation with their teachers (A1, A2, A3, A4, A5, A6, A7, A8, A9, A10)

d) autonomy and responsibility (o)

1. feels responsible for setting an example to his/her peers by the quality of his/her work and by respecting ethical standards, applying the knowledge acquired in the subject with responsibility (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task 2. midterm test	1. F 2. ZH	1. 50% 2. 50%	1. t1,t2,k1,k2,a1,o1 2. t1,t2,k1,k2,a1,o1

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level.

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of delayed completion week.

27. Final grade in percentage of performance

0%-49% fail
50%-56% pass
57%-64% satisfactory
65%-74% good
75%-100% excellent

30. Consultation opportunities

Scheduled class times and at a time and in a format agreed with the instructor.

31. Validity of the subject datasheet starts from:

01 September, 2025

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

Subject datasheet

1. Subject name	**Logistics automation design**				
2. … in Hungarian	Logisztikai automatizálás tervezése			**3. Programme code**	L
4. Subject code				**5. Term | role**	**3 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	35 hours
Reading written materials	25 hours	**Midterm test preparation**	0 hours	**Exam preparation**	44 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bohács Gábor	**15. Email address**	bohacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bohács Gábor, Dr. Rinkács Angéla, Dr. Rózsa Zoltán		
18. Indicative prerequisites	Components of logistics automation (suggested), - - -, - - -		

19. Aim of the subject

The aim of the course is to familiarize students with the design aspects and steps, methods and background of the requirements of logistics automation systems. In addition, the aim is to provide an overview of simulation support for design.

20. Thematics of lectures

Design of warehouse automation systems (safety technology, sensors, actuators). Design of driverless forklift systems, navigation systems, safety technology. Design of automated conveyor systems, sensors, safety technology. Systems for tracking and material flow control automation. Analysis of sustainability aspects of logistics automation.

21. Thematics of practices

-

22. Thematics of laboratories

Computer labs, in which the methods learned in the lectures are tested. During the labs, longer problems are also solved, which must be submitted, this will be part of the assessment. Support for the design of automated logistics systems with simulation.

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

The student

a) knowledge (t)

1. knows the components of logistics automation (T1,T2,T9)
2. knows the design requirements of logistics automation (T4,T5)
3. knows the structure and trends of logistics automation systems (T6,T9)

b) skills (k)

1. is able to determine the structure of an automated logistics system and the components required for a given task (K6,K7,K8,K9,K10,K11)
2. is able to apply the relevant design methods and background materials (K7,K12,K13)

c) attitude (a)

1. is open to using logistics automation components in the system (A1, A3)
2. strives to learn the methodology and tools required for solutions and to use them routinely (A1, A3, A4, A8, A9)
3. strives to the maximum of his abilities to complete his studies at the highest possible level, acquiring in-depth knowledge capable of independent creation (A2, A3, A4, A6, A7, A8, A9, A10)
4. works accurately and error-free, adhering to the rules of the applicable tools (A1, A2, A5, A7)
5. cooperates with instructors and teammates in solving complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. is responsible for design problems and makes independent suggestions (O1, O2, O3, O4, O5)

2. takes responsibility for the consequences of decisions made during design tasks (O1, O2, O3, O4, O5)
3. uses a systems engineering approach in his thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task 2. semester task	1. F1 2. F2	1. 25% 2. 25%	1. t1-t3,k1,k2,a1-a5,o1-o3 2. t1-t3,k1,k2,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 50 %	1. t1-t3,k1,k2,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. 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
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Logistics controlling**				
2. … in Hungarian	Logisztikai kontrolling			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | k**
6. Credits	**6**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	42 hours	**Homework**	0 hours
Reading written materials	38 hours	**Midterm test preparation**	44 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator	Dr. Duleba Szabolcs	**15. Email address**	duleba.szabolcs@kjk.bme.hu
16. …department	Department of Transport Technology and Economics		
17. Lecturers	Dr. Duleba Szabolcs		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Aim of the subject

Common approach of technological and economic processes in controlling

20. Thematics of lectures

Creating and applying operative and strategic models for corporate logistics. Determining factors of logistics activities and their financial and accounting impact on economic and technological processes of the company. Tracking performance throughout the company by identifying performance objects companied with their analysis. Measuring performance levels by KPI. Standard definition and data system along the logistics chain. Characteristics of the aggregated information evaluation and analysis. Within the frames of the subject, based on case studies and practical considerations, possible logistics objects are overviewed, moreover their possible measures are determined and thus the students are enabled to create a complex calculation model to cover financial and technological issues of the economics of the company. The subject also sheds light on the business analysis of the logistics or supply chain by general cost analysis and gross profit calculations of the product/service units of companies operating in arbitrary sectors. Moreover, based on the introduced controlling models, the students will be capable of analyzing the sources of profit and loss in the company applying logical reason-effect considerations.

21. Thematics of practices

Calculations related to transportation processes and their costs, including the calculation of customs duties. Warehousing and inventory management calculations taking into account technical and economic indicators. Company-level capacity and utilization calculations. Calculations of logistics return on investment, ROA, ROI, ROE based on company case studies. Creation and application of multi-level cost allocation models on practical examples. Activity-based costing, Activity Based Costing, and its calculation solutions. Supply chain-based cost models and their applications through case studies.

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 understands the characteristics of solutions applied in the field of logistics controlling, knows the processes of the field. (T2)
2. Knows and understands the information and communication techniques related to logistics controlling. (T3)
3. Knows the methods and tools related to management, as well as the necessary legislation, in accordance with the strategic analytical function of controlling. (T9)

b) skills (k)

1. In case of an emerging logistics controlling problem, the student is able to apply the learned general and specific mathematical methods (K1)
2. The student is able to plan, organize, manage and control logistics systems and processes (K3,K10)

3. The student is able to ensure the quality of logistics controlling systems and processes, perform measurement and process control tasks (K12)

c) attitude (a)

1. Strives for completeness in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant towards members of his/her team (A2,A9,A10)

2. Is open to new and innovative ideas and research, is self-critical of the tasks assigned to him/her, and takes full responsibility for sustainability (A1,A4,A6)

d) autonomy and responsibility (o)

1.In addition to narrow professional criteria, ensures sustainability in the use of his/her knowledge, is able to self-monitor and correct errors independently, while taking into account the professional opinion of others (O3,O4)

2. Makes responsible decisions in his/her chosen field of competence on economic issues and formulates independent proposals to solve the challenges identified (O2)

24. Midterm assessments

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

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

The successful (min. 50%) completion of each midterm test

28. Attendance and participation requirements

according to the rules of CoS

29. Late completion opportunities

midterm tests retake can be repeated till end of delayed completion period

27. Final grade in percentage of performance

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

Subject datasheet

1. Subject name	**Planning of logistics information systems**				
2. … in Hungarian	Logisztikai információs rendszerek tervezése			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | k**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Form**	**with contact hours**
9. Weekly contact hours	**1 lecture**	**0 practice**	**3 laboratory**	**10. Language**	**English**
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Lénárt Balázs	**15. Email address**	balazs.lenart@logisztika.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Lénárt Balázs, Dr. Kovács Gábor		

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

19. Aim of the subject

Students gain knowledge of information management planning tasks essential in logistics developments.

20. Thematics of lectures

Information management in logistics, general logistics softwares. General methodologies for information system design. Steps of software implementation, requirements, documentation, critical failure factors. Standard system development methodologies: waterfall model, SSADM, Agile, Scrum, Kanban. Business intelligence, continous improvement.

21. Thematics of practices

-

22. Thematics of laboratories

Preparation of an information management system plan for a logistics system development task within the framework of a laboratory session (project task).

Understanding data integration requirements during system integration, data exchange, and an overview of standard data exchange files (XML, JSON). Service oriented architecture and web services.

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

The student

a) knowledge (t)

1. knowledge of information systems design methodologies (T1, T2, T4)
2. knowledge of data integration tools typically used in logistics applications (T6)

b) skills (k)

1. is able to understand the tasks arising during logistics developments (K3, K7, K10)
2. is able to clusterize the tasks and breakdown into logistically relevant functions (K2, K6, K8)
3. is able to prepare a detailed specification of the functions using methodologies learned (K1, K9, K13)
4. is able to apply standard methodologies during the design process (K1, K10, K13)

c) attitude (a)

1. strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors (A1, A2, A3, A4, A5, A6, A7, A8, A9, A10)

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task 2. midterm test	1. F 2. ZH	1. 70% 2. 30%	1. t1,t2,k1-k4,a1,o1 2. t1,t2,k1-k4,a1,o1

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level.

27. Final grade in percentage of performance

Excellent 80-100%
Good 70-80%
Satisfactory 60-70%
Pass 50-60%
Fail 0-50%

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Planning of logistics networks**				
2. … in Hungarian	Logisztikai hálózatok tervezése			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | k**
6. Credits	**6**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Kovács Gábor	**15. Email address**	kovacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Kovács Gábor, Bakos András		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

To familiarize students with the architecture, operation, strategic planning, and optimization options of extralogistics networks.

20. Thematics of lectures

Determination of the supply chain networks, strategic and operational problems in the freight transport systems. The driving and the delivery performance. Specific problems in the planning of the supply chain networks. Mathematical modelling of the supply chain network topology. Evaluation techniques of of the static structure of the supply chain network. Evaluation techniques of the operational properties and performance parameters of the supply chain networks. Manifestation of the logistics cost. Introduction to the transportation problem. The approximation methods and the basic solutions. Optimal solutions of the transportation problem. Introduction to facility location problem. Classification of the mathematical solutions and methodologies. Mathematical models of the one-stage (zone) facility location problems. Mathematical models of the multi-stage (zone) facility location problems. Estimation techniques of the mileage, and its applications in the facility location problems. The operation of the multi-stage inventory networks. Application of the distribution resource planning (DRP) in the supply chain networks planning.

21. Thematics of practices

Application of the modeling, network planning tool described in the lectures through practical examples, and preparation of the solution of the semester work (evaluation, centralization, multi-facility location and allocation problem, strategic route planning).

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. knowledge of network planning and network assessment basics (T1, T2, T5)
2. knowledge of the assignment / distribution problem and how to solve it (T6)
3. knowledge of centre searching problems and solutions (T6)
4. knowledge of network optimization at the strategic level (T6)

b) skills (k)

1. ability to evaluate logistics networks (K1, K2, K7, K8, K9, K10, K13)
2. able to strategically optimize logistics networks (K1, K2, K7, K8, K9, K10, K13)

c) attitude (a)

1. strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors (A1, A2, A3, A4, A5, A6, A7, A8, A9, A10)

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task 2. midterm test	1. F 2. ZH	1. 60% 2. 40%	1. t1-t4,k1,k2,a1,o1 2. t1-t4,k1,k2,a1,o1

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Planning of plant logistics systems**				
2. … in Hungarian	Üzemi logisztikai rendszerek tervezése			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | k**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	14 hours	**Midterm test preparation**	0 hours	**Exam preparation**	40 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bóna Krisztián	**15. Email address**	bona.krisztian@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bóna Krisztián, Bertalan Marcell		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

Presentation of the methodological background, modelling options and designing toolkit used in the logistics planning of plant infrastructures as physical realisations of value-creating systems, and practicing the presented methods through sample excersises.

20. Thematics of lectures

Material handling machines and equipment used in plant logistics. Material flow characteristics of intralogistics systems, performance and reliability of material handling systems used in plant logisics. Methods used in examination the operational indicators of material handling systems used in plant logistics. Modelling of the material flow system in the intralogistics, as a queuing system. The planning process and methodology of the intralogistics systems. The process of the facilities layout planning. The basic concepts, and selection methods of the spatial layout. The typical models of the linear facility layout planning. The typical models of the quadratic facility layout planning. The detailed facility layout desing. Typical models and applications of production supply systems. Specific planning and calibrating tasks in the material flow systems.

21. Thematics of practices

Solving sample excesises related to the calculation of material flow characteristics in a plant. Practise the application of methods for the investigation of plant material flow systems. Solving practical examples related to modelling of intralogistics processes as queueing systems. Practise the selection of basic types of internal facility layout of objects. Solving sample excersises of linear internal layout planning models. Solving sample excersises of quadratic internal layout planning models. Solving sample exercises of detailed internal facility layout design. Analizing use cases of models used in production supply systems.

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 characteristics of the development of logistics systems in production plants, and the process of logistics planning in production plants (T6, T8)
2. knows the characteristic indicators of intralogistics networks (T3)
3. knows the design processes for the internal layout of the plant (T2, T8)
4. knows the typical types of object layouts and models (T5, T6)
5. has a comprehensive knowledge of approximate and optimisation methods for solving facility layout design problems (T1, T5, T6)
6. is familiar with the main parameters and guidelines influencing detailed layout design of production plants (T2, T8)
7. is familiar with the characteristics of mathematical modelling methods applicable to the design of mass servicing systems and material flow systems (T1, T5, T6)

8. is familiar with specific system design and system sizing methods applicable to material handling systems consisting of intermittent and continuous material handling machines (T5, T6)
9. knowledge of lean principles applicable to the design of plant logistics systems (T8)

b) skills (k)

1. is able to interpret objects used in value creation systems in a model-like way (K4, K7, K10)
2. is able to interpret the intralogistic network of objects (K2, K6, K8)
3. is able to decide on a typical topology to be used when setting up objects and to select a conceptual layout design method that can be assigned to the topology (K1, K9, K13)
4. is able to apply approximation and optimisation methods to facility layout design problems (K1, K10, K13)
5. is able to model material flow systems as mass servicing systems (K1, K10, K13)
6. is able to apply simulation systems and models in the design of material flow systems (K1, K10, K13)

c) attitude (a)

1. is open to the use of mathematical and information technology tools (A1, A3)
2. seeks to learn and routinely use the methodology and tools needed to solve problems (A1, A3, A4, A8, A9)
3. strives to the best of his/her ability to complete his/her studies to the highest possible standard, acquiring in-depth knowledge and the ability to create independently (A2, A3, A4, A6, A7, A8, A9, A10)
4. works accurately and without errors, respecting the rules of the applicable tools (A1, A2, A5, A7)
5. collaborates with teachers and team members to solve complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. makes responsible and independent proposals for design problems (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions taken in the course of planning tasks (O1, O2, O3, O4, O5)
3. uses a systems engineering approach to thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. first midterm task 2. second midterm task	1. F1 2. F2	1. 25% 2. 25%	1. t1-t9,k1-k6,a1-a5,o1-o3 2. t1-t9,k1-k6,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written and oral exam	1. V	1. 50%	1. t1-t9,k1-k6,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

Completion of midterm tasks, each at a minimum of 50%.

27. Final grade in percentage of performance

Excellent 87.5-100%
Good 75-87.5%
Satisfactory 62.5-75%
Pass 50-62.5%
Fail 0-50%

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

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

30. Consultation opportunities

Scheduled class times and at a time and in a format agreed with the instructor.

31. Validity of the subject datasheet starts from:

01 September, 2025

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

Subject datasheet

1. Subject name	**Planning of warehousing systems**				
2. … in Hungarian	Raktározási rendszerek tervezése			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | k**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	14 hours	**Midterm test preparation**	0 hours	**Exam preparation**	40 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Bóna Krisztián	**15. Email address**	bona.krisztian@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Bóna Krisztián, Dr. Sztrapkovics Balázs		

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

19. Aim of the subject

Presentation of the methodological background, modelling options and designing toolkit used in the logistics planning of conventional and high-bay warehouse infrastructures, and practicing the presented methods through sample excersises.

20. Thematics of lectures

System components and processes of warehousing systems. Site infrastructure issues, and transport connections. Packed goods storage technologies and the applied material handling technologies. Planning process and methods of warehouse logistics systems. Defining the main parameters of pallet racking shelves, operating and desingning principles. Characterization and operational processes of conventional warehousing systems and its components. Planning of storage area of conventional storage systems. Characterization and operational processes of very narrow-aisle (high-bay) warehousing systems and its components. Planning of storage area of very narrow-aisle (high-bay) systems. Planning principles and methods of goods preparation areas in cases of conventional and high-bay warehouses. The main properties of order picking processes and warehouses. Planning of order picking systems. Documentation of warehouse system planning process.

21. Thematics of practices

Data analysis methods for generating input data for warehouse system planning. Excersises in the application of procedures for planning and sizing a site logistics system. Analysis of cases related to the selecting of packed goods storage technologies and the selecting of the material handling system used in servicing of the system. Exercise of the procedures used in the definig of technological parameters for selective pallet racking. Solving sample excersies related to the planning of conventional storage areas with selective pallet racking system. Solving sample excersies related to the planning of narrow aisle storage areas with selective pallet racking system. Analysis of the methods to be used in the planning of goods layout in the storage area. Exercise in the application of methods related to the planning of goods preparation areas, analysis of the conventional and high-bay warehouse cases. Practicing of planning and sizing methods for order picking systems. Practicing of methods in calculating indicators to be used in the classification of variants of warehouse system plans.

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 characteristics of the development of warehousing systems, and the process of designing warehousing systems (T6, T8)
2. knows the characteristic indicators describing the operation of warehousing systems (T3)
3. is familiar with the design processes for the construction of storage and goods preparation areas (T2, T8)
4. knows the storage and material handling equipment used in warehousing systems and the related standards (T2, T8)
5. has a comprehensive knowledge of methods for solving internal warehouse layout design problems (T1, T5, T6)
6. knowledge of methods and procedures for the design of order picking systems (T2, T6)

7. is familiar with the characteristics of mathematical modelling methods used in the planning of mass servicing systems and material flow systems (T1, T5, T6)
8. is familiar with specific system planning and system sizing methods related to the design of warehouse material handling systems (T5, T6)
9. is familiar with lean principles applicable to the planning of warehousing systems (T8)

b) skills (k)

1. is able to select and integrate the necessary technical components of a warehousing system (K4, K6, K7, K10)
2. is able to apply a system and process-oriented approach to the planning of a warehousing system (K2, K6, K8)
3. is able to identify the ideal topologies to be used in the planning of a warehousing system and to select the system planning methods to be used (K1, K9, K13)
4. is able to apply the methods required to solve warehouse system planning problems (K1, K10, K13)
5. is able to model warehouse material flow systems as mass servicing systems (K1, K10, K13)
6. is able to use simulation systems and models in the planning of warehouse material flow systems (K1, K10, K13)

c) attitude (a)

1. is open to the use of mathematical and information technology tools (A1, A3)
2. seeks to learn and routinely use the methodology and tools needed to solve problems (A1, A3, A4, A8, A9)
3. strives to the best of his/her ability to complete his/her studies to the highest possible standard, acquiring in-depth knowledge and the ability to create independently (A2, A3, A4, A6, A7, A8, A9, A10)
4. works accurately and without errors, respecting the rules of the applicable tools (A1, A2, A5, A7)
5. collaborates with teachers and team members to solve complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. makes responsible and independent proposals for design problems (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions taken in the course of planning tasks (O1, O2, O3, O4, O5)
3. uses a systems engineering approach to thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester planning task	1. F	1. 50%	1. t1-t9,k1-k6,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written and oral exam	1. V	1. 50%	1. t1-t9,k1-k6,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

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

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

A semester task once can be resubmitted by the end of 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 UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Subject datasheet

1. Subject name	**Process planning**				
2. … in Hungarian	Folyamattervezés			**3. Programme code**	L
4. Subject code				**5. Term | role**	**1/2 | k**
6. Credits	**6**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	50 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Material Handling and Logistics Systems		
14. Subject coordinator	Dr. Kovács Gábor	**15. Email address**	kovacs.gabor@kjk.bme.hu
16. …department	Department of Material Handling and Logistics Systems		
17. Lecturers	Dr. Kovács Gábor, Bakos András		
18. Indicative prerequisites	- - -, - - -, - - -		

19. Aim of the subject

To familiarize students with formalized methods for describing logistics processes and logistics process planning.

20. Thematics of lectures

Interpretation of the process, parts, contacts, activities, events and processes. Standard methods for the description of the processes. Process Charting Techniques. Process Description levels. Top-down and bottom-up modeling. Standard process description languages. Standard Operating Procedure. Cross-Functional Flowchart. Petri net. Event Driven Process Chain (EPC). Business Process Modeling Notation (BPMN). Integrated Definition Methods (IDEF). Unified Modeling Language (UML). System Modeling Language (SysML). Yet Another Workflow Language (YAWL). Hybrid modeling. Business Process Reengineering (BPR). Executable languages (BPEL). Logistics processes modelled by using the standard languages: goal-oriented application.

21. Thematics of practices

Exercising process exploration, process description languages (SOP, EPC, BPMN, IDEF, BPEL) and process planning techniques (BPR) through examples. Preparation of the semester work.

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. knowledge of process modeling basics (T1, T2, T5)
2. knowledge of process description languages included in the course description (T6)

b) skills (k)

1. able to model processes using standard methods based on written and oral descriptions (K1, K4, K7)
2. able to identify process errors and redesign processes based on these (K8, K9, K10, K12, K14)

c) attitude (a)

1. strive to maximize their abilities to make their studies at the highest possible level, with a profound and independent knowledge, accurate and error-free, in compliance with the rules of the applicable tools, in collaboration with the instructors (A1, A2, A3, A4, A5, A6, A7, A8, A9, A10)

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes

1. semester task 2. midterm test	1. F 2. ZH	1. 60% 2. 40%	1. t1,t2,k1,k2,a1,o1 2. t1,t2,k1,k2,a1,o1

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

Completion of each the semester task and the midterm at least 50% level.

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and the semester task can be retaken once by the end of delayed completion week.

27. Final grade in percentage of performance

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

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

Subject datasheet

1. Subject name	**Production planning and control**				
2. … in Hungarian	Termelésprogramozás			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | sp**
6. Credits	**6**	**7. Evaluation type**	**e**	**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					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	14 hours	**Homework**	30 hours
Reading written materials	20 hours	**Midterm test preparation**	20 hours	**Exam preparation**	40 hours
13. Organisational unit in charge	Department of Material Handling and Logistics Systems				
14. Subject coordinator	Bertalan Marcell	**15. Email address**	bertalan.marcell@kjk.bme.hu		
16. …department	Department of Material Handling and Logistics Systems				
17. Lecturers	Bertalan Marcell, Dr. Rinkács Angéla				
18. Indicative prerequisites	- - -, - - -, - - -				

19. Aim of the subject

Introducing students to the field of work organization, the key indicators and tools of production systems, network planning and production planning methods, as well as deterministic and stochastic production scheduling techniques.

20. Thematics of lectures

The concepts of calendar, effective, work schedule and productive time bases. The concepts of capacity and capacity utilisation. Push & pull approaches. The process of forward and backward scheduling using CPM and PERT methods. Definition of capacity utilisation index. Calculation of open and hidden reserves. Extensive and intensive methods to increase capacity utilisation. Typical finished product structures, bill of materials (BOM). Interpretation of technological and production lead times. Methodology of multi-level hierarchical production planning and its relation to the enterprise planning system. Aggregate production planning, the master production schedule (MPS). Single and multi-machine, deterministic and stochastic production scheduling cases.

21. Thematics of practices

-

22. Thematics of laboratories

Practical application of the work organization and production planning methods presented in the lectures through sample problems. Introduction to software solutions applicable in decision support. Planning and visualization of production projects using Gantt charts. Solving linear and nonlinear programming problems, as well as integer and dynamic programming tasks.

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

The student

a) knowledge (t)

1. is familiar with the fundamental relationships involved in organizing value-creating processes (T1, T2)
2. is familiar with the main characteristics and indicators of value-creating processes (T1, T2, T3)
3. is familiar with production system structures and their logistical characteristics, as well as technological relationships (T1, T2, T3, T6)
4. is familiar with the levels and motivations of production planning and control (T1, T2, T3, T5, T6)
5. is familiar with the basic principles of scheduling methods used in production planning (T1, T2, T6)
6. is familiar with the main single-machine deterministic and stochastic scheduling procedures (T1, T2, T5, T6)
7. is familiar with the main multi-machine deterministic and stochastic scheduling procedures (T1, T2, T5, T6)

b) skills (k)

1. capable of abstractly defining and formalizing the value-creating process, as well as analyzing it (K1, K2, K4, K7, K9, K11, K13)
2. capable of interpreting the production planning process in a model-based manner (K1, K2, K4, K6, K7, K9, K10, K11, K13)
3. capable of applying deterministic and stochastic scheduling procedures (K1, K4, K7, K10, K13)

c) attitude (a)

1. open to using mathematical and information technology tools (A1, A3, A7)
2. strives to select and apply correct modeling methods in their work (A1, A3, A4, A5, A7, A9)
3. strives to learn and routinely use the methodology and toolset required for solutions (A1, A3, A4, A6, A9)
4. works accurately and error-free while adhering to the rules of applicable tools (A1, A2, A6, A7, A8)
5. collaborates with instructors and team members to solve complex problems (A2, A4, A5, A7, A8, A10)

d) autonomy and responsibility (o)

1. makes responsible and independent proposals for planning problems (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions made during planning tasks (O1, O2, O3, O4, O5)
3. applies a systems-based engineering approach in their thinking (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. midterm test	1. ZH	1. 20%	1. t1-t7,k1-k3,a1-a5,o1-o3
2. semester task interim milestone	2. RT	2. 0%	2. t1-t7,k1-k3,a1-a5,o1-o3
3. semester task	3. F	3. 30%	3. t1-t7,k1-k3,a1-a5,o1-o3

25. Exam assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. written exam	1. V	1. 50%	1. t1-t7,k1-k3,a1-a5,o1-o3

26. Conditions for obtaining signature / midterm grade

Completion of semester task and midterm test, each at a minimum of 50%, status presentation of the semester task at the midterm milestone.

27. Final grade in percentage of performance

Excellent 87.5-100%
Good 75-87.5%
Satisfactory 62.5-75%
Pass 50-62.5%
Fail 0-50%

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test can be retaken once by the end of delayed completion week. The interim progress milestone can be completed late but cannot be resubmitted. The semester task cannot be completed late due to its presentation-based nature during class; but a one-time opportunity for resubmission is provided.

30. Consultation opportunities

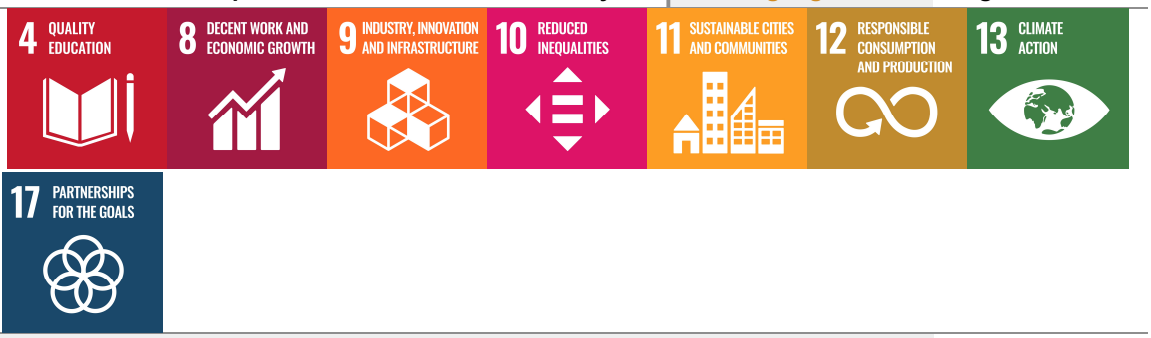
At a time and in a format agreed with the teacher.

31. Validity of the subject datasheet starts from:

01 September, 2025

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

Subject datasheet

1. Subject name	**R&D in logistics**				
2. … in Hungarian	Logisztikai K+F			**3. Programme code**	L
4. Subject code				**5. Term | role**	**3 | k**
6. Credits	**4**	**7. Evaluation type**	**m**	**8. Form**	**with contact hours**
9. Weekly contact hours	**0 lecture**	**0 practice**	**4 laboratory**	**10. Language**	**English**
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals					
12. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	14 hours	**Homework**	40 hours
Reading written materials	10 hours	**Midterm test preparation**	0 hours	**Exam preparation**	0 hours
13. Organisational unit in charge	Department of Material Handling and Logistics Systems				
14. Subject coordinator	Dr. Bóna Krisztián	**15. Email address**	bona.krisztian@kjk.bme.hu		
16. …department	Department of Material Handling and Logistics Systems				
17. Lecturers	Dr. Bóna Krisztián				
18. Indicative prerequisites	- - -, - - -, - - -				

19. Aim of the subject

The aim of the course is to introduce logistics engineering students to the tasks related to research and development activities that drive logistics innovations, and to the methodological approaches of research and development activities in the context of the implementation of an own research project.

20. Thematics of lectures

-

21. Thematics of practices

-

22. Thematics of laboratories

Define a research project with a logistics focus. Formulation of research questions and hypotheses. Methodologies to be used in state-of-the-art research. Practising the use of search tools in research. Approaches to systematising state-of-the-art. The role of gap-analysis, formulation of novelty content. Methodology of co-creation, the role of teamwork in research. The role of experimental tools, laboratory tests, experiments. Methods for testing hypotheses. Pretyping and prototyping. Documentation of research and development activities. Patent issues.

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

The student

a) knowledge (t)

1. has a good understanding of the technologies that will shape the future of logistics and the future challenges of logistics (T1, T2)
2. knows the methods of defining research project tasks and the importance of logistics innovations (T1, T2, T7)
3. understand the potential of information technologies for research and development work (T4)
4. is competent in the use of experimental tools and measurement techniques in research and development (T3)
5. is competent in the use of advanced data processing, data analysis, modelling and simulation technologies in support of research and development work (T5, T6)
6. is competent in group brainstorming methods and problem-solving techniques for scientific creative work (T7)

b) skills (k)

1. can apply knowledge acquired in logistics and related fields to complex tasks (K1, K6)
2. proactively contribute to solving logistics challenges and contribute ideas to the development of the field (K5, K7)

3. contributes creatively to the development of new logistics solutions (K16)
4. applies advanced data processing, analysis, modelling and simulation technologies to solve complex problems (K2, K10)
5. is able to develop methodological solutions applied in solving logistics problems (K2, K10)
6. can perform documentation tasks in logistics research and development (K2, K15)
7. be able to communicate the results of research and development projects in writing and orally, including in a foreign language (K15)

c) attitude (a)

1. strives to the best of his/her ability to complete his/her studies to the highest possible standard, acquiring in-depth knowledge and the ability to create independently (A2, A3, A4, A6, A7, A8, A9, A10)
2. able to work accurately and without error, respecting the rules of the applicable tools (A1, A2, A5, A7)
3. able to collaborate with teachers and team members to solve complex problems (A5, A8, A9, A10)

d) autonomy and responsibility (o)

1. take responsibility for the quality of the work and the ethical standards that set an example for the classmates, using the knowledge acquired during the course (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. semester task	1. F	1. 100%	1. t1-t6,k1-k7,a1-a3,o1

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

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

27. Final grade in percentage of performance

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

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

Subject datasheet

1. Subject name	**Simulation planning**				
2. … in Hungarian	Szimulációs tervezés			**3. Programme code**	L
4. Subject code				**5. Term | role**	**2/1 | k**
6. Credits	**6**	**7. Evaluation type**	**m**	**8. Form**	**with contact hours**
9. Weekly contact hours	**1 lecture**	**0 practice**	**3 laboratory**	**10. Language**	**English**
11. SDG Learning outcomes' contribution to EU/UN Sustainable Development Goals					
12. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	56 hours	**Preparation for seminars**	60 hours	**Homework**	0 hours
Reading written materials	24 hours	**Midterm test preparation**	40 hours	**Exam preparation**	0 hours
13. Organisational unit in charge	Department of Material Handling and Logistics Systems				
14. Subject coordinator	Bertalan Marcell	**15. Email address**	bertalan.marcell@kjk.bme.hu		
16. …department	Department of Material Handling and Logistics Systems				
17. Lecturers	Bertalan Marcell, Dr. Bohács Gábor				
18. Indicative prerequisites	- - -, - - -, - - -				

19. Aim of the subject

To familiarize students with the mathematical and computational foundations, tools, and methods of simulation planning, as well as their practical application in modeling, analyzing, and optimizing logistics systems.

20. Thematics of lectures

Types of models and mathematical foundations of model building. Stochastic and deterministic processes and their state characteristics in logistics. The system of inputs, outputs, parameters, and state variables. Queuing systems. The concept and mathematical background of computer simulation. Introduction to modeling and simulation tools and their application possibilities in the planning, analysis, and optimization of logistics systems. Verification and validation of simulation. Overview of optimization algorithms and methods in logistics systems, with special emphasis on simulation-supported optimization techniques and simulator-optimizer integration possibilities.

21. Thematics of practices

-

22. Thematics of laboratories

Practical laboratory exercises based on the theoretical material of the course, where students acquire skills in model building, parameterization, and the use of simulation tools, partly under instructor guidance and partly through independent work.

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

The student

a) knowledge (t)

1. understands the theoretical foundations of stochastic and deterministic processes and the application of their state characteristics in logistics systems. (T1, T2, T5, T6)
2. understands the mathematical foundations of model building, including input-output parameters, state variables, and the operation of queuing systems. (T1, T2, T5, T6)
3. knows the main types of models and simulation tools. (T1, T2, T5, T6)
4. understands the verification and validation methods of computer simulations and their practical application in logistics planning problems. (T1, T2, T5, T6)
5. knows simulation-supported optimization techniques. (T1, T2, T5, T6)
6. understands the integration possibilities of simulator-optimizer systems, including real-time data processing mechanisms. (T1, T2, T5, T6)

b) skills (k)

1. capable of designing and validating simulation models of complex logistics systems, integrated with optimization algorithms. (K1, K2, K4, K7, K8, K9, K10, K14)
2. capable of applying real-time data processing and simulator-optimizer systems. (K1, K2, K4, K7, K8, K9, K10, K14)

c) attitude (a)

1. open to using mathematical and information technology tools. (A1, A3, A7)
2. strives to select and apply correct modeling methods in their work. (A1, A3, A4, A5, A7, A9)
3. strives to learn and routinely use the methodology and toolset required for solutions. (A1, A3, A4, A6, A9)
4. works accurately and error-free while adhering to the rules of applicable tools. (A1, A2, A6, A7, A8)
5. applies a critical approach to evaluating simulation results. (A1, A2, A5, A6, A7, A8)
6. strives for accuracy and transparency of data used in modeling processes. (A1, A2, A5, A6, A7, A8)
7. collaborates with instructors and team members to solve complex problems. (A2, A4, A5, A7, A8, A10)

d) autonomy and responsibility (o)

1. makes responsible and independent proposals for planning problems. (O1, O2, O3, O4, O5)
2. takes responsibility for the consequences of decisions made during planning tasks. (O1, O2, O3, O4, O5)
3. applies a systems-based engineering approach in their thinking. (O1, O2, O3, O4, O5)

24. Midterm assessments

Name	Code	Share in final grade	Assessed learning outcomes
1. first midterm test	1. ZH1	1. 40%	1. t1-t6,k1,k2,a1-a7,o1-o3
2. second midterm test	2. ZH2	2. 20%	2. t1-t6,k1,k2,a1-a7,o1-o3
3. first laboratory task	3. L1	3. 10%	3. t1-t6,k1,k2,a1-a7,o1-o3
4. second laboratory task	4. L2	4. 10%	4. t1-t6,k1,k2,a1-a7,o1-o3
5. third laboratory task	5. L3	5. 10%	5. t1-t6,k1,k2,a1-a7,o1-o3
6. fourth laboratory task	6. L4	6. 10%	6. t1-t6,k1,k2,a1-a7,o1-o3

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

The student must achieve at least 30% on each midterm separately, at least 50% of the total combined score of the two midterms, and must have completed at least three out of the four mandatory laboratory sessions.

27. Final grade in percentage of performance

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

28. Attendance and participation requirements

According to the rules of CoS.

29. Late completion opportunities

The midterm test and one laboratory task can be retaken once by the end of delayed completion week.

30. Consultation opportunities

At a time and in a format 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

Subject datasheet

1. Subject name	**Trade, financial and accounting techniques**				
2. … in Hungarian	Kereskedelmi, pénzügyi és számviteli technikák			**3. Programme code**	KL
4. Subject code				**5. Term | role**	**3/2 | sp**
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					
12. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	0 hours
Reading written materials	24 hours	**Midterm test preparation**	30 hours	**Exam preparation**	0 hours

13. Organisational unit in charge	Department of Transport Technology and Economics		
14. Subject coordinator	Dr. Mészáros Ferenc	**15. Email address**	meszaros.ferenc@kjk.bme.hu
16. …department	Department of Transport Technology and Economics		
17. Lecturers	Dr. Mészáros Ferenc		

18. Indicative prerequisites

- - -,
- - -,
- - -

19. Aim of the subject

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

20. Thematics of lectures

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

21. Thematics of practices

-

22. Thematics of laboratories

Solving financing and accounding tasks of freight forwarding on computer.

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

The student

a) knowledge (t)

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

b) skills (k)

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

c) attitude (a)

1. strives for completeness in the acquisition of knowledge, cooperates with the teacher and fellow students, is empathetic and tolerant towards members of his/her team (L:A2,A4,A5,A7,A8,A9,A10)
2. is open to new and innovative ideas and research, is self-critical of the tasks assigned to him/her, and takes full responsibility for sustainability (L:A1,A3,A6)

d) autonomy and responsibility (o)

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

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

24. Midterm assessments

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

25. Exam assessments

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

26. Conditions for obtaining signature / midterm grade

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

27. Final grade in percentage of performance

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 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