Budapest University of Technology and Economics

Faculty of Transportation Engineering and Vehicle Engineering

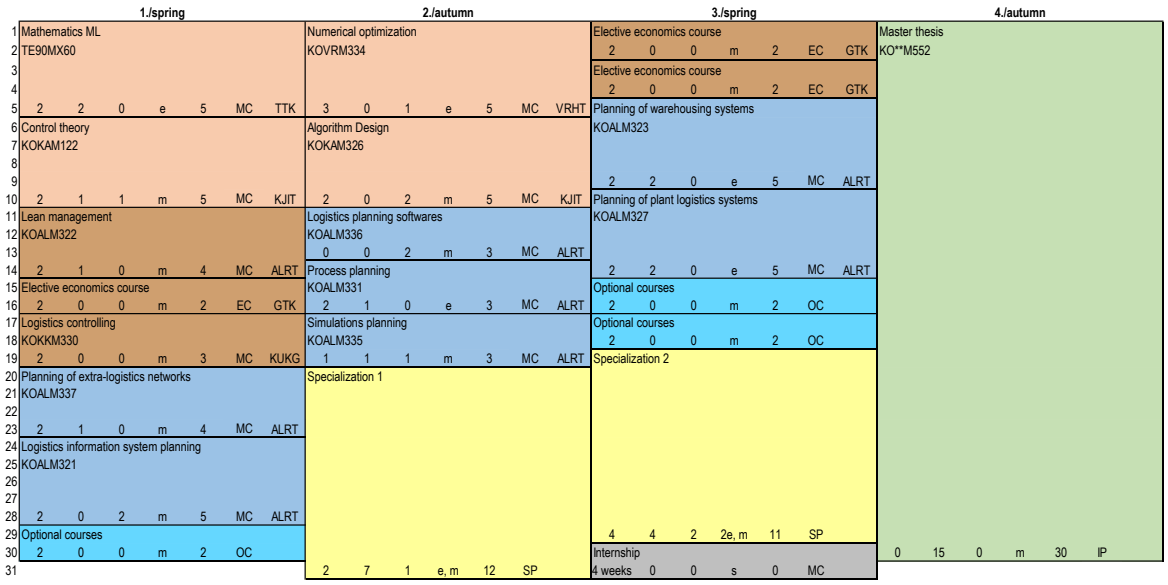
MSc in Logistics Engineering

Curriculum

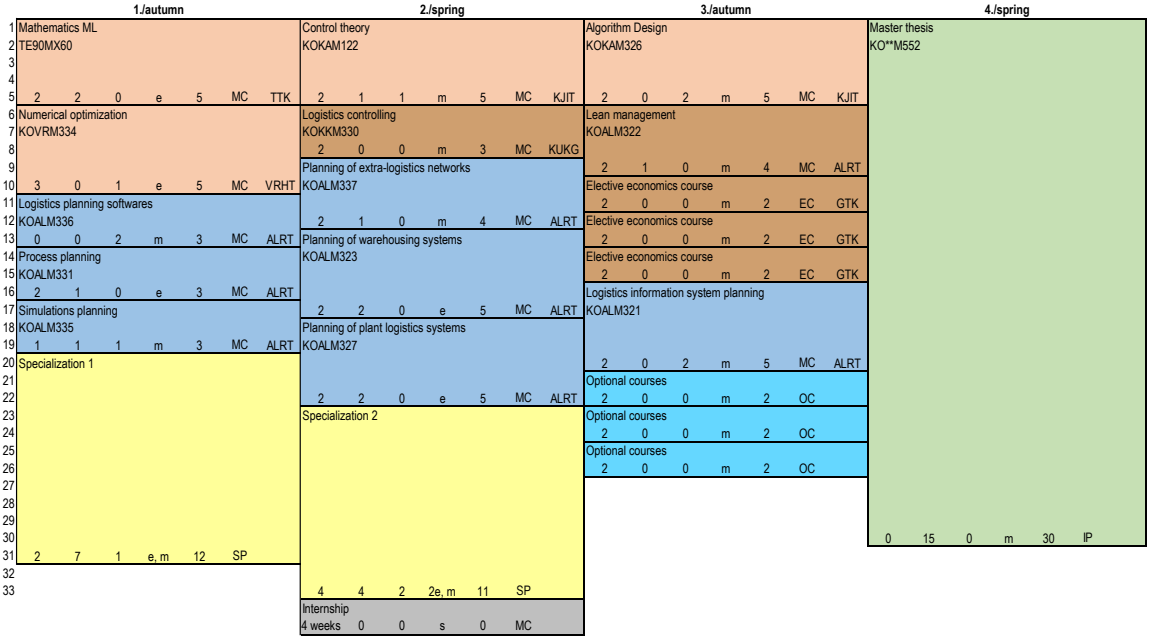
Valid from September 2018

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

Logistics Engineering Master Programme start in February



Logistics Engineering Master Programme start in September



Specializations

Corporate logistics and operations planning specialization

Demand planning and inventory management KOALM328	2	1	1	e	5	SP ALRT
Enterprise logistics project 1 KOALM344	0	6	0	m	7	SP ALRT
Control of transport logistics KOALM341	2	0	1	e	3	SP ALRT
Production planning & scheduling KOALM329	2	0	1	e	4	SP ALRT
Enterprise logistics project 2 KOALM345	0	4	0	m	4	SP ALRT

Technical logistics specialization

Automation of logistics systems KOALM325	2	0	2	e	5	SP ALRT
Technical logistics project 1 KOALM333	0	6	0	m	7	SP ALRT
Construction of logistics machinery KOALM324	2	1	0	e	3	SP ALRT
Integrated material flow systems KOALM332	2	1	0	e	4	SP ALRT
Technical logistics project 2 KOALM340	0	4	0	m	4	SP ALRT

Freight forwarding management specialization

Trade, Financial, Accounting Techniques KOKKM138	1	1	1	e	3	SP KUKG
Forwarding Management 1 KOKKM132	2	2	0	e	5	SP KUKG
Forwarding project 1 KOKKM338	0	3	0	m	4	SP KUKG
Forwarding marketing KOKKM135	1	0	2	m	4	SP KUKG
Forwarding Management 2 KOKKM133	3	1	1	e	5	SP KUKG
Forwarding project 2 KOKKM342	0	2	0	m	2	SP KUKG

Course description explanation

1. Subject name	official name of the subject
2. Subject name in Hungarian	official name of the subject in Hungarian
3. Role	role of the subject in the curriculum, mc - mandatory; sp - specialization; ec – elective; oc – optional
4. Code	Neptun code of the subject (with BME prefix)
5. Evaluation type	type of academic performance assessment, e – exam grade; m - mid-term grade; s – signature
6. Credits	credit value of the subject
7. Weekly contact hours	number of weekly (term-based) teaching hours for students by lecture, practice and lab
8. Curriculum	master programs related to the subject,: A - Autonomous Vehicle Control Engineering J - Vehicle Engineering K - Transportation Engineering L - Logistics Engineering
9. Working hours for fulfilling the requirements of the subject	contact hours – personal appearance at classes in a university preparation for seminars – preparation at home for the classes homework – preparation of homework and other assignments for the classes reading written materials – reviewing and understanding the taken lessons at home midterm preparation – recommended preparation time at home for the midterm test during the semester exam preparation – recommended preparation time at home for the exam
10. Department	name of responsible department for managing the subject
11. Responsible lecturer	name of the person in charge of the subject (subject coordinator)
12. Lecturers	name of all lecturers of the subject
13. Prerequisites	predefined criteria for registering the subject
14. Desciption of lectures	detailed content of the lecture type course
15. Description of practices	detailed content of the practice type course
16. Description of laboratory practices	detailed content of the laboratory practice type course
17. Learning outcomes	results to achieve at the end of the learning process, grouped by competence
18. Requirements	requirements for passing the subject, aspects of performance evaluation, way to determine a grade (obtain a signature)
19. Retake and delayed completion	opportunity for repeat/retake and delayed completion
20. Learning materials	notes, textbooks, suggested literature, recommended learning support materials in printed or electronic form

Curriculum Supplement

All questions and conditions that regulate the study progress should be defined in this Supplement to the Curriculum. Thus, the Curriculum Supplement (curriculum appendix) contains **the system of subject prerequisites**, the rules for the selecting specializations, the description of the conditions for the **preparation of the Master thesis and the final examination**, as well as the order of the final exam.

The subject prerequisite system expresses the connections between the subjects:
- In the absence of a *strong* or a *weak* prerequisite, it is not possible to enroll in the subject, and no exceptions can be given, as it reflects the professional conditions of effective education. In the case of *co-requisite* subjects (simultaneous enrollment of two subjects in prerequisite connection), if the subject having a co-requisite subject is not fulfilled in the given semester, consequently the co-requisite subject also cannot be completed in that semester.
- In the absence of the *recommended* prerequisite, the course can be enrolled, but it should be noted that the course is preferably assumes knowledge from the recommended prerequisite subject.

1. *The specific subject prerequisites are included in the subject datasheets.*

2. *There are no general rules for the selection of specialization and for specialization subjects.*

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

Completion of mandatory and elective economic courses in the recommended curriculum and the collection of a minimum of 90 credits credits from the recommended curriculum and completion of a 4-week internship in case full-time course.

4. *Criteria for taking the final examination:*

Completion of all subjects included in the recommended curriculum, including optional subjects (all together at least 120 credits), submitting the Master thesis and, in the case of a full-time master study, fulfillment of all criterion requirements in the curriculum (4 weeks of internship).

5. *Final examination order:*

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

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

Subject description

1. Subject name	**Algorithm Design**				
2. Subject name in Hungarian	Algoritmusok tervezése			**3. Role**	mc
4. Code	**KOKAM326**	**5. Evaluation type**	**m**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	18 hours	**Homework**	30 hours
Reading written materials	34 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Control for Transportation and Vehicle Systems
11. Responsible lecturer	Dr. Bécsi Tamás
12. Lecturers	Dr. Bécsi Tamás

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Algorithm design. Numerical complexity. The O notation. Efficiency, calculation, and memory requirements for algorithms. Algorithm descriptive tools: flowchart, structogram, pseudo code. Elements of structured programming, its relationship with the design of algorithms. In addition, the methods of designing algorithms and their optimization are presented. The theoretical background of the subject is illustrated with examples from the field of logistics. Algorithm design paradigms: algorithm reduction, divide-and-conquer, dynamic programming, "greedy" algorithm, backtracking, etc. Designing data structures from an algorithmic point of view. Lists, tree structure, graphs. Sorting, searching algorithms. Route Choice and Traveling Salesman problems.

15. Description of practices

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16. Description of laboratory practices

In the course of laboratory tasks the implementation questions of the theoretical material of the lecture are presented. In addition, students implement algorithms in a development environment of their own choice.

17. Learning outcomes

a) Knowledge:

- Knows the concept of numerical complexity.
- Knows different basic algorithm design approaches.
- Knows basic data structures.

b) Skills:

- Can independently evaluate the complexity of an algorithm.
- Can design algorithms for well-defined tasks.

c) Attitude:

- Is interested in modern IT solutions.
- Capable of algorithmic thinking that can be applied in other areas.

d) Autonomy and responsibility:

- Is able to consult in a team in algorithmic and programming tasks, to make independent decisions.

18. Requirements, way to determine a grade (obtain a signature)

Two midterm exams. The final grade is the rounded average of the exams.

19. Retake and delayed completion

One midterm exam can be retried in the delayed completion period.

20. Learning materials

Lecture Notes

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

Subject description

1. Subject name	**Automation of logistics systems**				
2. Subject name in Hungarian	Logisztikai rendszerek automatizációja			**3. Role**	sp
4. Code	**KOALM325**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	18 hours	**Homework**	40 hours
Reading written materials	22 hours	**Midterm preparation**	4 hours	**Exam preparation**	10 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bohács Gábor
12. Lecturers	Gáspár Dániel, Szabó Péter

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

In the course, we will systemise the company's process control, SCADA and control systems. Among others operational conditions of PLC control systems (multiple controllers), possible solutions, and communication implementation. Getting to know the communication protocols and interfaces commonly used in industry. Within the course it is in automated systems, special attention is paid to discussing the application possibilities of sensors and actuators to include operational principles and features. In addition, the process of constructing and designing a process algorithm is discussed based on a known task. Finally, determining the possible connection points of the system elements (people, machines, identification, and quality control) completes the discussed fields.

15. Description of practices

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16. Description of laboratory practices

Demonstration of sensors, actuators in an automated demonstrational systems built in the laboratory of the department, recording of sensor characteristics under laboratory conditions. Testing network data communication methods and performing complex management tasks of automated demonstrational systems built in the laboratory of the department.

17. Learning outcomes

a) Knowledge:

- Knowledge of system components in logistics systems control.
- Knowledge of system control architectures of logistics systems control.

b) Skills:

- Ability to apply the above knowledge and related professional knowledge in the design of new equipment / components.

c) Attitude:

- Strives to provide with the best knowledge and skills to work with the instructors.

d) Autonomy and responsibility:

- In the use of the acquired knowledge the student carries out independent, responsible engineering work.

18. Requirements, way to determine a grade (obtain a signature)

The end semester signature depends on the submission of the satisfactory home assignments, satisfactory midterm test and the acceptance of the lab records. The final grade is calculated as: 20% - midterm test, 15-15% of the homeworks and 50% of the written exam, which can be corrected orally by the students if necessary.

19. Retake and delayed completion

The homeworks' final submission and the midterm test both can be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Construction of logistics machinery**				
2. Subject name in Hungarian	Logisztikai gépek tervezése			**3. Role**	sp
4. Code	**KOALM324**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	8 hours	**Homework**	9 hours
Reading written materials	10 hours	**Midterm preparation**	6 hours	**Exam preparation**	15 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bohács Gábor
12. Lecturers	Odonics Boglárka, Győrváry Zsolt

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Crane installation analysis. Crane automation tasks, technical system engineering issues. Forklift operation features, construction and stability issues. Work cycles of storage and retrieval machines, dimensioning questions. Overhead monorail systems operating characteristics. Constructional questions for lifting tables. Operational characteristics of roller conveyors. Conveyors drive power requirements. Operational characteristics of belt conveyor, screw conveyors, bucket elevators, swing and vibrational material handling machines.

15. Description of practices

During the practices examples related to the learnt machines and systems are presented and discussed.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:
- Knowledge of equipment that makes up logistics systems.
- Knowledge of equipment design relationships.

b) Skills:
- Ability to apply the above knowledge and related professional knowledge in the design of new equipment / components.

c) Attitude:
- Strives to provide with the best knowledge and skills to work with the instructors.

d) Autonomy and responsibility:
- In the use of the acquired knowledge the student carries out independent, responsible engineering work.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the signature is to fulfill the homework and one midterm test. The homework (30%), the test (20%) and the exam result (50%) are included in the final grade.

19. Retake and delayed completion

The homework's final submission and the midterm test can both be resubmitted once each.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Control of transport logistics**				
2. Subject name in Hungarian	Szállításirányítás			**3. Role**	sp
4. Code	**KOALM341**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**0 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	0 hours	**Homework**	29 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	19 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Kovács Gábor
12. Lecturers	Dr. Kovács Gábor, Bakos András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

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16. Description of laboratory practices

Practicing the algorithmizing of mathematical modeling methods used in operational route planning through small tasks. Practicing route planning software. Preparing the homework.

17. Learning outcomes

a) Knowledge:

- Knowledge of GIS basics.
- Knowledge of relevant graph theory basics.
- Knowledge of TSP and VRP problems and methods of solving them.
- Knowledge of transport management information systems.

b) Skills:

- Able to identify transport modeling problems and model them.
- Able to solve the emerging transport management tasks by selecting and applying appropriate solution methods and tools.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

1 homework (weights: 25% for the part-performance check, 25% for the final submission) of each at least 50% performance is the condition of signature, exam (weight: 50%)

19. Retake and delayed completion

The part-performance check and the final submission can both be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Control theory**				
2. Subject name in Hungarian	Irányításelmélet ML			**3. Role**	mc
4. Code	**KOKAM122**	**5. Evaluation type**	**m**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	15 hours	**Homework**	0 hours
Reading written materials	52 hours	**Midterm preparation**	27 hours	**Exam preparation**	0 hours

10. Department	Department of Control for Transportation and Vehicle Systems
11. Responsible lecturer	Dr. Gáspár Péter
12. Lecturers	Dr. Gáspár Péter

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Introduction. Recap on the basic concepts of control theory and stability theory (stability conditions, stability of closed loop systems). State space theory (state space representations and properties, transformations). Continuous state space of linear time-variant dynamic systems. Control in state space. State feedback design. Optimal controls. Linear Quadratic Controller Design (LQR). Computer controlled systems. Designing discrete controls. Observability, controllability properties. Stability. State estimation. Kalman filtering. Problems from different means of transport :road, air, logistics. Presentation of design tasks through vehicle, transport and logistic examples. Computer-oriented control theory tasks. Outlook (introductory, problematic). Postmodern techniques. Predictive controls. Error detection and importance in transport. MIMO systems. Nonlinear systems.

15. Description of practices

Implementation of the methods learned during the lectures.

16. Description of laboratory practices

Implementation of the methods learned during the lectures.

17. Learning outcomes

a) Knowledge:

- Knows the basic dynamic system modeling paradigms, their mathematical background.
- Knows the time and frequency range description of linear time-variant systems.
- Knows the principles of regulation, their quantitative and qualitative criteria.
- Is familiar with various simple feedback control methods.
- Knows the basics of modern control theory, the principles of quadratic regulation. Knows the methods of filter design.

b) Skills:

- Capable of modeling of a specified system.
- Is able to independently design a specific system model.
- Is able to apply the estimation design methods independently.
- Is able to handle the most common control design softwares.

c) Attitude:

- Is interested in a mathematical solution to control problems.
- Endeavor to effectively apply the word technology knowledge through practical problems. Acquires system-level thinking.

d) Autonomy and responsibility:

- Can independently provide quality and quantity parameters for a system's performance, enabling them to make decisions about system redesign.
- Can independently describe a particular system, use the appropriate mathematical formalisms.
- Is able to make decisions on the appropriate methods of solving the control task.

18. Requirements, way to determine a grade (obtain a signature)

Two midsemester exams, which are the prerequisite of the midterm grade. The final grade depends on the results of midsemester exams (with 50-50% weight).

19. Retake and delayed completion

Both midterm exams can be retried once.

20. Learning materials

Lecture Notes, Kailath: Linear Systems, Prentice Hall

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

Subject description

1. Subject name	**Demand planning and inventory management**				
2. Subject name in Hungarian	Kereslet és készlettervezés			**3. Role**	sp
4. Code	**KOALM328**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	15 hours	**Homework**	40 hours
Reading written materials	18 hours	**Midterm preparation**	6 hours	**Exam preparation**	15 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bóna Krisztián
12. Lecturers	Dr. Bóna Krisztián, Sárdi Dávid

13. Prerequisites	-(-)- ; -(-)-; -(-)-

14. Description of lectures

The basic process of the demand planning. Defining and classification of the main input data of the demand planning, the data minig and the data preprocessing task. Mathematical modeling possibilities in the demand planning process. The statistical identification of the suitable mathematical models for the forecasting, the detection of the main statistical properties of the time series, identification of the trend process and the seasonality. Application of the identified forecasting models, parameter optimisation and prediction of the time series. The importance and several methods of the fine tuning in the demand planning. The key performance indicators of the demand planning, the interpretation and measurement of the forecast errors and accuraccy indicators. The basic process of the inventory planning. The necessary input data set of the inventory planning, data preprocessing. The definition and application of the inventory control systems. Mathematical modeling possibilities in the inventory planning process. Application of statistical methods and simulation tools for the investigation of the inventory processes. The interpretation of the specific costs, the service level and the reliability in the inventory planning. Defining and application of the deterministic and stochastic inventory models. Selecting of suitable inventory models for the implementation, optimisation of inventory control parameters, integration of the results into the inventory control systems. Measurement of demand and inventory planning efficiency. Specific planning tools regarding to the demand and inventory planning in the ERP systems. Specific resource planning areas in the enterprise logistics, the sales and operations planning process. The role of inventory and demand planning in the S&OP process.

15. Description of practices

Practicing the demand and inventory planning techniques where presented in the lectures, through numerical examples. Preparation of homework.

16. Description of laboratory practices

Realization of demand and inventory planning examples within a computer lab.

17. Learning outcomes

a) Knowledge:

- Knowledge of statistical methods for logistics time series investigation and knowledge of specific distribution types.
- Knowledge of data preparation steps, data cleansing and aggregation techniques.
- Knowledge of time series specific correlation functions.
- Knowledge of forecasting models and parameter optimisation techniques.
- The student knows the method of model selection by calculating specific errors.
- The student knows the particularity of deterministic inventory models, has knowledge of building deterministic inventory models.
- Knowledge of stochastic inventory models and optimal parameter calculation.

b) Skills:

- Can apply the demand and inventory planning process in modelling approach.
- Ability of recognition the connection between demand and inventory models, ability of building process structure.
- The student is capable creating forecasts with know models, has knowledge of parameter optimisation.
- The student is capable to create deterministic cost models independently.
- Ability of application deterministic inventory models, calculation optimal parameters.
- Ability of application stochastic inventory models, calculation optimal parameters.

c) Attitude:

- Student is opened to use math and information technology tools.
- Endeavor to understand and routinely use the methodology and tools required to solve the problems.

d) Autonomy and responsibility:

- Makes responsible and independent suggestions for planning problems.
- Takes responsibilities for the consequences of decisions made during the planning process.

- Uses system approach.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the signature is to fulfill the homework and one midterm test. The homework (20%), the test (30%) and the exam result (50%) are included in the final grade.

19. Retake and delayed completion

The test can be retake one time until the last day of the semester. At the delayed submission period only the test or the homework can be perform.

20. Learning materials

Students can download the learning materials in pdf format from Moodle.

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

Subject description

1. Subject name	**Enterprise logistics project 1**				
2. Subject name in Hungarian	Vállalati logisztikai projekt 1			**3. Role**	sp
4. Code	**KOALM344**	**5. Evaluation type**	**m**	**6. Credits**	**7**
7. Weekly contact hours	**0 lecture**	**7 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**210 hours**
Contact hours	98 hours	**Preparation for seminars**	28 hours	**Homework**	70 hours
Reading written materials	14 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Bakos András
12. Lecturers	Bakos András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

Within the framework of the course, project groups can be formed from the students. The students or the groups are led by mentors. The project topics may include: operations management, complex project tasks, R&D tasks, based on the interests of student's.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of logistics related topic so a choice can be made for elaborating one.
- Knowledge of the chosen logistics topic by wuantitative and qualitative indicators.
- Knowledge of research basics.
- Knowledge of project management skills.

b) Skills:

- Able to process a selected logistics topic individually and in a group.
- Able to get to know the chosen logistics topic, critically evaluate it and find the gaps.
- Able to identify future development and research directions in the selected logistics topic.
- Able to use project management skills in a groupwork.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

5 part-performance checks to the mentor (10-10%), 1 documentation (30%), 1 presentation (20%).

19. Retake and delayed completion

The documentation can be resubmitted once and the presentation can be reheld once. The part-performance checks cannot be retaken.

20. Learning materials

Related national and international scientific literature.

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

Subject description

1. Subject name	**Enterprise logistics project 2**				
2. Subject name in Hungarian	Vállalati logisztikai projekt 2			**3. Role**	sp
4. Code	**KOALM345**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**0 lecture**	**4 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	16 hours	**Homework**	40 hours
Reading written materials	8 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Bakos András
12. Lecturers	Bakos András

13. Prerequisites	Enterprise logistics project 1 (KOALM344), strong; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

As the continuation of the Enterprise logistics project - , the students or project groups get operations management tasks, complex project tasks or R&D tasks, based on the interests of student's. The task can be the continuation of what are launched in Enterprise logistics project - , however, a new task also can be started. During the contact hours, the students consult with their mentors, moreover, each week brief report is held. The students present the problems and the suggested solutions, they practice the techniques of discussion, argumentation, and persuasion. The primary objective of the course is to continue, explain and apply (in lieu of this, to start a new) topic that started in Enterprise Logistics Project 1 for a logistics problem. In the exercises, project-centered consultation, reporting and ongoing evaluation of their work are carried out with students.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of logistics topic so a choice can be made for elaborating one.
- Knowledge of the chosen logistics related topic.

b) Skills:

- Able to get acquainted with the chosen topic and its literature.
- Able to further the chosen topic, apply research and development on it.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

2 part-performance checks to the mentor (25-25%), 1 documentation (30%), 1 presentation (20%).

19. Retake and delayed completion

The documentation can be resubmitted once and the presentation can be reheld once. The part-performance checks cannot be retaken.

20. Learning materials

Related national and international scientific literature.

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

Subject description

1. Subject name	**Forwarding Management 1**				
2. Subject name in Hungarian	Szállítmányozási menedzsment 1			**3. Role**	sp
4. Code	**KOKKM132**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**KL**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	8 hours	**Homework**	30 hours
Reading written materials	24 hours	**Midterm preparation**	12 hours	**Exam preparation**	20 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Mészáros Ferenc
12. Lecturers	Dr. Mészáros Ferenc, Dr. Duleba Szabolcs

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

Students prepare and submit case study reports on current freight forwarding topics.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- The student is familiar with the basic legal system of freight forwarding.

b) Skills:

- The student is able to recognize and apply the legal rules for freight forwarding tasks.

c) Attitude:

- The student strives for completeness in the acquisition of knowledge, co-operates with the teacher and other students, is open towards new and innovative ideas, researches, and uses information technology and computing tools for its work.

d) Autonomy and responsibility:

- The student is sensitive towards the environmental and social aspects of freight forwarding, asks for professional opinions of others, makes responsible decisions in organising the freight forwarding tasks, manages the challenges responsibly.

18. Requirements, way to determine a grade (obtain a signature)

Requirements for signature: fulfilment of the two midterms, report and submission (in approx. 10 pages) of a special topic within freight forwarding. There is a verbal examination at the end of the semester. Weights of requirements in final mark: reporting activity (20%), average of midterms (30%), verbal examination (50%).

19. Retake and delayed completion

There are retakes from 1st and 2nd midterms, the written report can be delayed completed and presented till end of delayed completion period.

20. Learning materials

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

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

Subject description

1. Subject name	**Forwarding Management 2**				
2. Subject name in Hungarian	Szállítmányozási menedzsment 2			**3. Role**	sp
4. Code	**KOKKM133**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**3 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**KL**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	12 hours	**Homework**	30 hours
Reading written materials	6 hours	**Midterm preparation**	12 hours	**Exam preparation**	20 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Mészáros Ferenc
12. Lecturers	Dr. Mészáros Ferenc, Dr. Duleba Szabolcs

13. Prerequisites	Forwarding Management 1 (KOKKM132), strong; -(-)-; -(-)-

14. Description 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.

15. Description of practices

Students prepare and submit case study reports on current freight forwarding topics.

16. Description of laboratory practices

Calculation tasks for the individual case studies.

17. Learning outcomes

a) Knowledge:

- The student is familiar with the mode-specific legal system of freight forwarding.

b) Skills:

- The student is able to recognize and apply the mode-specific legal rules for freight forwarding tasks.

c) Attitude:

- The student strives for completeness in the acquisition of knowledge, co-operates with the teacher and other students, is open towards new and innovative ideas, researches, and uses information technology and computing tools for its work.

d) Autonomy and responsibility:

- The student is sensitive towards the environmental and social aspects of freight forwarding, asks for professional opinions of others, makes responsible decisions in organising the freight forwarding tasks, manages the challenges responsibly.

18. Requirements, way to determine a grade (obtain a signature)

Requirements for signature: fulfilment of the two midterms, report and submission (in approx. 10 pages) of a special topic within freight forwarding. There is a verbal examination at the end of the semester. Weights of requirements in final mark: reporting activity (20%), average of midterms (30%), verbal examination (50%).

19. Retake and delayed completion

There are retakes from 1st and 2nd midterms, the written report can be delayed completed and presented till end of delayed completion period.

20. Learning materials

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

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

Subject description

1. Subject name	**Forwarding marketing**				
2. Subject name in Hungarian	Szállítmányozási marketing			**3. Role**	sp
4. Code	**KOKKM135**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**1 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**KL**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	16 hours	**Homework**	20 hours
Reading written materials	36 hours	**Midterm preparation**	6 hours	**Exam preparation**	0 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Kővári Botond
12. Lecturers	Dr. Kővári Botond

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

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16. Description of laboratory practices

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

17. Learning outcomes

a) Knowledge:

- Familiar with marketing strategy of a company, business plan.

b) Skills:

- Ability to analyse a market, make a product mix analysis.

c) Attitude:

- Strive to acquire the highest level of system approach.

d) Autonomy and responsibility:

- Responsible applies of acquired knowledge in individual or in team work.

18. Requirements, way to determine a grade (obtain a signature)

Requirements for the midterm mark: fulfilment of one midterm test, report and submission (in approx. 10 pages) of a special topic within business planning. Weights of requirements in final mark: midterm test (60%), report and submission (40%).

19. Retake and delayed completion

Second test possibility for those not present on the test, possibility of delayed deadline for homework.

20. Learning materials

Suggested books and papers.

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

Subject description

1. Subject name	**Forwarding project 1**				
2. Subject name in Hungarian	Szállítmányozási projekt 1			**3. Role**	sp
4. Code	**KOKKM338**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**0 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	0 hours	**Homework**	42 hours
Reading written materials	36 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Török Ádám
12. Lecturers	Dr. Török Ádám

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

Recognition and identification of problems of freight forwarding companies through programming examples. Collecting and solving practical problems in logistics using programming methods. Separate preparation and presentation of sample tasks related to business organization problems using presentation techniques. Get to know new and innovative ideas and research.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge: p
- Problematic and modeling of freight forwarding companies.

b) Skills:
- Collecting and solving problems with programming methods.

c) Attitude:
- Getting to know new and innovative ideas and research.

d) Autonomy and responsibility:
- Self-discovery of business organization problems.

18. Requirements, way to determine a grade (obtain a signature)

During the semester 7 small tasks will be published and evaluated. The criterion for the completion of the subject is the acceptance of all small tasks. The semester mark is the average of the marks received for small tasks.

19. Retake and delayed completion

Three small tasks can be delayed completed.

20. Learning materials

Related national and international scientific literature.

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

Subject description

1. Subject name	**Forwarding project 2**				
2. Subject name in Hungarian	Szállítmányozási projekt 2			**3. Role**	sp
4. Code	**KOKKM342**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	0 hours	**Homework**	28 hours
Reading written materials	4 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Török Ádám
12. Lecturers	Dr. Török Ádám

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

Recognition and identification of problems of freight forwarding companies through programming examples. Collecting and solving practical problems in logistics using programming methods. Separate preparation and presentation of sample tasks related to business organization problems using presentation techniques. Get to know new and innovative ideas and research.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Problematic and modeling of freight forwarding companies.

b) Skills:

- Collecting and solving problems with programming methods.

c) Attitude:

- Getting to know new and innovative ideas and research.

d) Autonomy and responsibility:

- Self-discovery of business organization problems.

18. Requirements, way to determine a grade (obtain a signature)

During the semester 7 small tasks will be published and evaluated. The criterion for the completion of the subject is the acceptance of all small tasks. The semester mark is the average of the marks received for small tasks.

19. Retake and delayed completion

Three small tasks can be delayed completed.

20. Learning materials

Related national and international scientific literature.

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

Subject description

1. Subject name	**Integrated material flow systems**				
2. Subject name in Hungarian	Integrált anyagmozgató rendszerek			**3. Role**	sp
4. Code	**KOALM332**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	8 hours	**Homework**	19 hours
Reading written materials	36 hours	**Midterm preparation**	0 hours	**Exam preparation**	15 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bohács Gábor
12. Lecturers	Gáspár Dániel, Szabó Péter, Odonics Boglárka

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Basics of production automation. Basics and typical equipment of material handling. An overview of typical production system structures, a description of the construction of equipment relevant for material handling. Formulation of integrated material handling functions. Automation of integrated material handling systems. Application of robots for material handling tasks. Special grippers and sensors. In addition to the lectures, an excursion to relevant company will be organized.

15. Description of practices

During the practices examples related to the learnt machines and systems are presented and discussed.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of special integrated material handling systems.
- Knowledge of the applicability of material handling components.

b) Skills:

- He is able to assess solutions to a certain problem.
- Capable of creating optimal structures from the assessed components.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

Requirements of signature: 1 homework (25% for the part-performance check, 25% for the final submission). Exam (50%).

19. Retake and delayed completion

The part-performance check and the final submission can both be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Lean management**				
2. Subject name in Hungarian	Lean menedzsment			**3. Role**	mc
4. Code	**KOALM322**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	8 hours	**Homework**	30 hours
Reading written materials	28 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bóna Krisztián
12. Lecturers	Sztrapkovics Balázs

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description 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 presenta

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Overview Lean Tools, Techniques & House of Lean.
- Knowledge of failure mode analysis and problem solving mehtods.
- Knowledge of value stream mapping.
- Knowledge of pull production material supply methods

b) Skills:

- Analysis of the processes by lean tools.
- Planning and developing pull based production systems
- Application of complex quality management methods

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the complete the subject is to fulfill the homework and two midterm test. The homework (20%), and the tests (40%-40%) are included in the final grade.

19. Retake and delayed completion

Each midterm test can be retaken once, or one of the tests can be retaken twice if the homework and the other test is OK.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Logistics controlling**				
2. Subject name in Hungarian	Logisztikai kontrolling			**3. Role**	mc
4. Code	**KOKKM330**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	12 hours
Reading written materials	30 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Duleba Szabolcs
12. Lecturers	Dr. Duleba Szabolcs

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- The student is familiar with the position and role of logistics controlling within the organisation.
- Capable of identifying cost types, cost cenres and cost objects as well as earning objects.
- Making distinction between direct and indirect costs of logistics activities.
- Familiar with the elements of strategic and operative logistics controlling.
- Familiar with the objectives and tools of Balanced Score Card (BSC).
- Knows the basic theory and prosecution of Activity Based Costing (ABC).
- Familiar with the theory and practice of supply chain controlling.
- Knows the difference of logistics controlling systems between the logistics service providers and the non-logistics specified companies and the different controlling mechanisms.

b) Skills:

- The student is capable of logistics controlling calculations based on data gained from the accounting system.
- Of logistics efficiency calculations based on carried or measures technological data.
- Of handling simultaneously technological and economic data.
- Of executing unit cost and cost contribution calculations aiding strategic and operational decision making and economic analysis within the frames of the company.
- Of creating and setting up a Balanced Score Card system in an arbitrary company.
- Of Activity Based Costing calculations and analysis.
- Of supporting outsourcing decision making by logistics controlling analysis.
- Of supporting divesture decision by controlling calculations.
- Of executing Business Process Reengineering (BPR) analysis both in theory and practice.
- Of creating and controlling supply chain controlling systems and intervene if necessary.

c) Attitude:

- Strives to perform at his/her best by using all skills in order to execute his/her studies at the highest possible level and highest reachable quality, aquiring as much knowledge as possible.
- During his/her studies he/she cooperates with the professor and with the fellow students.

- Continously striving to enhance his/her knowledge also out of the frames of the lectures in order to expand and deepen the knowledge obtained in the classes.
- Strives to get familiar with the necessary tools and devices for solving the required tasks in the subject and applies them routinely.
- Strives the accurate, precise and flawless problem solving and calculation.

d) Autonomy and responsibility:

- Feels to be responsible for being an example by striving to study at the highest quaity giving his/her best in and out of the classes and by keeping all ethical norms.
- Applying the knowledge aquired in the frames of the subject with responsibility considering the boundaries of relevance of the obtained knowledge.
- Remains opened for the relevant critical observations and comments.
- Accepting the frames of the cooperation, dependently from the situation capable of working alone or as a member of a team during the classes or in doing the homework.

18. Requirements, way to determine a grade (obtain a signature)

2 midterm tests, 1 homework, 1 presentation. The final grade is the average of the two midterm tests, and the submission and presentation of the homework.

19. Retake and delayed completion

Midterm test correction possibility for those not present on one of the tests. Homework and presentation cannot be delayed completed.

20. Learning materials

Ppt. slides; Bokor Zoltán: Logisztikai rendszerek működtetése, Department publication.

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

Subject description

1. Subject name	**Logistics information system planning**				
2. Subject name in Hungarian	Logisztikai információs rendszerek tervezése			**3. Role**	mc
4. Code	**KOALM321**	**5. Evaluation type**	**m**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	18 hours	**Homework**	30 hours
Reading written materials	34 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Tokodi Jenő
12. Lecturers	Dr. Tokodi Jenő, Lénárt Balázs

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Traditional and integrated logistics supply chain. The ERP systems. Functional operating model of ERP systems. WEB-based structure of the ERP systems. The NetWeaver technology. The Enterprise Portal. Logistics expectations of the companies. Logistics services of EIS Cockpit. Data Warehouse with the APO. Development of adaptive logistics network. Advanced Planning & Optimization. The Oracle data management. The ABAP/4 runtime environment. Demand & Supply Network Planning. Heuristic & Capable-To-Match Methods. Detailed Scheduling Planning Board. Multi-level problem solving with order pegging. Production Scheduling. Business Scenarios. Periodic Repostings. Cost Center. Planning Goals. Idea of SRM. System landscape, release information. Purchasing with SRM. Organisational structure. Master data. Connections to catalogs. Administration. Source, BI units, Source system creation and connection BW objects overwiew (Infoobjects, Infocubes, DSO …) Data Loading process: Extraction and Transformation. BEx reporting overview: Query Design, Broadcasts, Reporting. Introduction to SAP HANA: the HANA Architecture. Solution Manager: SAP HANA. BW with In-Memory-Appliance.

15. Description of practices

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16. Description of laboratory practices

Data scheme: XML, XSD, XSLT, EDI, AS1,2, X12, process desription, query design (BPMN, BPEL). SOA, web services, interfaces, ESB (Enterprise Service Bus), Orchestrating. T-SQL (tranzaction SQL. Creating master data: items, customers, vendors. Item master data: item groups, units of measure, item valuation - serial numbers. Steps & automation in sales & procurements processes. Bin location. Accounting process: incoming & outgoing payments. Banking. Basics of Controlling. Enterprise Data Warehouse: BI, risk management, KPI calculation. Work in SAP B1: reporting, BI views, analysing the customer & vendor management, choosing the highest account partners, optimisation of bin location. Company case studies.

17. Learning outcomes

a) Knowledge:

- Knowledge of the structure and functions of ERP systems. Knowledge of the formats and protocols in enterprise data communication. Knowledge of the information IT representation of general logistics process procedures.
- Knowledge of the BI reporting. Knowledge of the basic logistics transactions in user level.
- Knowledge of runtime and development environment in ERP transactions.

b) Skills:

- Can design logistics IT systems application by the above mentioned knowledge and the additional professional knowledge.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

As homework: successfull solving the SAP Learning HUB at least 3 test min. 50% , 2 pcs of midterm test (weight: 50% - 50%).

19. Retake and delayed completion

1-1 repeat of midterm tests.

20. Learning materials

SAP B1 Logistics dedicated eLearning for University Appliance Program in August 20- Sales & Purchasing & Accounting. SH & SAP Learning HUB eLearning (moodle system). SAP B1 installed version in University Appliance Program.

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

Subject description

1. Subject name	**Logistics planning softwares**				
2. Subject name in Hungarian	Szoftverek a logisztikai tervezésben			**3. Role**	mc
4. Code	**KOALM336**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**0 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	14 hours	**Homework**	36 hours
Reading written materials	12 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Tokodi Jenő
12. Lecturers	Sztrapkovics Balázs

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

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16. Description of laboratory practices

The main groups of softwares which is used in logistics planning. Description of drawing software required for design. Presentation of softwares which supporting visualization and representation. Description of data analysis and table based applications. The main elements of logistics designing, and the standard symbols of them. Intorducing some project management supporting softwares. Practice the application of the described softwares through lesson exercises and the homeworks. The course is held in computer lab sessions.

17. Learning outcomes

a) Knowledge:

- User level knowledge of process mapping softwares.
- User level knowledge of data analysis softwares.
- User level knowledge of designing softwares.

b) Skills:

- Knowledge of softwares required for logistics engineering work.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

Successful delivery of the two home assignments is required to complete the subject. The two home assignments (50-50%) are included in the final grade.

19. Retake and delayed completion

Both homeworks can be replaced once by the specified deadline.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Mathematics ML**				
2. Subject name in Hungarian	Matematika M1 logisztikai mérnököknek			**3. Role**	mc
4. Code	**TE90MX60**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	28 hours	**Homework**	0 hours
Reading written materials	37 hours	**Midterm preparation**	4 hours	**Exam preparation**	25 hours

10. Department	Institute of Mathematics
11. Responsible lecturer	Dr. Sági Gábor
12. Lecturers	Dr. Sági Gábor, Dr. Kiss Sándor

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Basic concepts of graph theory. Euler Roads, Euler Circles. Hamiltonian Roads and Hamiltonian Circles, Necessary Conditions for Their Existence: The maximum number of components generated after deleting points. Sufficient conditions: Dirac and Ore's theorems. The problem of finding the shortest way (as a practical problem). Width traversing, solving the shortest path in unweighted cases. The weighted case, Dijkstra, Ford, Floyd algorithms. Network flow tasks (as practical problems). Cuts and capacities. Correction Path, Ford-Fulkerson theorem, Edmonds-Karp theorem, full-fledged lemma. Menger of the maximum number of edge-off paths running between the vertices. The resource assignment problem (as a practical problem). Pair graphs and chromatic number concept, paired graphs with odd long circles. Moho coloring. Couples, maximum or total pairing concept. Searching for maximal pairs in paired graphs: Correction Paths, König's theorem about the relationship between maximum pairing and minimum clamping point dimensions. Tutte's theorem (proving necessity, proof of sufficiency is optional; it depends on the time available) .The mapping task (as a "practical" problem). Dual, graphical graph of graphs. Estimates of chromatic numbers: maximum degree, maximum clique size, Mycielski construction. Plane, spherical, spatial (as a practical problem). Stereographic projection. Euler's polyhedron theorem. Chromatic numbers of planar graphs (example 3-chromatic plane graph, 6-color theorem, 5-color theorem). Event Algebra, Probability Algebra, Probability Variables, Law of Big Numbers, Central Border Distribution. Stochastic processes. Markov chains, Markov processes. Special stochastic processes for characterizing technical systems: Poisson process, recursive process, semi-Markov process. Wiener-Hinchin pairs, ergodicity.

15. Description of practices

Application of theoretical knowledge through different tasks.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- The student acquires the basics of graph theory and the theory of stochastic processes. Knows the basic concepts of these areas and the basic (mathematical) items related to them.
- Knows some of the methods of solving problems with graphical and stochastic processes inspired by applications.
- Is aware of the techniques associated with the computerization of these methods and their effectiveness and limits of applicability.

b) Skills:

- In the mathematical models he is familiar with, he can accurately orient and communicate with these models.
- Is able to get acquainted with similar models, problems and methods, which are known in the literature but are not included in the curriculum, with independent work.
- Some practical problems are able to create a graph theory or stochastic model. Recognizes that the problem (inspired by engineering practice) can be easily solved by the learned methods.
- Is able to formulate accurate questions in the field of graph theory and stochastic problems in the personal interest of IT and mathematical experts; is able to interpret the answers of these experts.

c) Attitude:

- Continuously cooperates with the instructor and actively participates in the processing of the study material.
- Open to mathematical modeling, precise, logical thinking.
- Seeks to synthesize the knowledge acquired during the course with the knowledge and competences of other subjects.
- Open for communication with other scientists (mathematicians, informatics).
- Strives for accurate, error-free task solving.

d) Autonomy and responsibility:

- Uses the learned methods independently.

- In the practical application of your knowledge, you choose the appropriate mathematical models with great care. He is aware of the nature and the magnitude of the decisions made in the calculation of these models. He is responsible for selecting, calculating, and relying on these models.

18. Requirements, way to determine a grade (obtain a signature)

Requirements for signature: two successful midterm tests. The final grade is the result of the exam.

19. Retake and delayed completion

Both midterm exams can be retried once.

20. Learning materials

Katona Gyula., Recski András., Szabó Csaba., A számítástudomány alapjai (in Hungarian), Typotex Kft., 2002
Szász Gábor, Matematika III (in Hungarian), Tankönyvkiadó, Budapest, 1989
Michelberger Pál, Szeidl László, Várlaki Péter, Alkalmazott folyamatstatis

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

Subject description

1. Subject name	**Numerical optimization**				
2. Subject name in Hungarian	Numerikus optimalizálás			**3. Role**	mc
4. Code	**KOVRM334**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**3 lecture**	**0 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	13 hours	**Homework**	28 hours
Reading written materials	38 hours	**Midterm preparation**	0 hours	**Exam preparation**	15 hours

10. Department	Department of Aeronautics, Naval Architecture and Railway Vehicles
11. Responsible lecturer	Dr. Rohács József
12. Lecturers	Dr. Bicsák György

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Introduction: scope of lectures, content and requirements. System analysis, model generation, modelling and simulation. General models, simplifications. Source of errors, model types and solution possibilities. Analytic, geometric and numerical solutions. Functions, vectors, matrices, basic operations. Classical and floating-point error-calculation. Sensitivity and numerical stability. Investigation of solution technics. Representing the solutions, evaluation. Solution of system of equations. Single variable, non-linear equations. Successive approximation, Newton iteration and secant method. Solution of polynomial equation. Horner method and Newton-method. Numerical solution of linear system of equations. Gauss-elimination and LU decomposition. Numerical solution of Eigenvalue problem. Extremum problems, optimization. Linear programming, transforming to standard form. Simplex method, dual simplex method. Optimization of non-linear functions. Non-linear programming. Sensitivity analysis, multipurpose linear programming. Goal and object dependent optimisation. Optimisation by using soft-computing techniques. Gradient method. Examining specific cases, optimization tasks in logistics systems and processes. Fundamentals of game theory. Functions, series of functions, approximation. Taylor series, MacLaurin series, Fourier series. Polynomial-interpolation, Newton, Lagrange and Hermite interpolation. Application of Splines. Generating curves and surfaces with using Splines. Bezier polynomials, NURBS surfaces. Approximation, Chebyshev and Padé approximation. Harmonical analysis, fast Fourier transformation (FFT). Numerical differentiation, integration. Approximation of derivatives using finite difference method. Approximation of derivatives using Lagrange and Newton interpolation formulas. Numerical integration, general quadrature formula. Trapezoidal and Simpson formula. Romberg iteration. Initial value problems, ordinary differential equations. Explicit formulas: Euler method, 4th order Runge-Kutta method. Implicit formulas, predictor-corrector methods. Approximation of partial differential equations. Boundary conditions, finite difference method, finite volume method, finite element method. Stochastic process modelling. System input data generation. Monte-Carlo simulation.

15. Description of practices

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16. Description of laboratory practices

MATLAB application of the introduced methods.

17. Learning outcomes

a) Knowledge:

- Knowing the fundamentals of numerical approximation methods used in engineering instead of analytic algorithms.
- Knowing to find and apply the most suitable numerical method for a certain problem.

b) Skills:

- Can implement different algorithms to a programming language and to find the best approximation method for a given mathematical problem.

c) Attitude:

- Interested, responsive.

d) Autonomy and responsibility:

- Can work individually and in teamwork.

18. Requirements, way to determine a grade (obtain a signature)

2 midterm exams from the theoretical part, 50 points / exam. 1 project work for a group of 4-5 students, for n*100 points (n is the number of students). The points can be divided between the group members according to their wish. Grade calculation: summing all the points, the total points gives the final grade as follows:

- 0 – 79 - 1;
- 80 – 109 - 2;
- 110 – 139 - 3;

- 140 – 169 - 4;
- 170 – 5

19. Retake and delayed completion

Because of the point-collection system, no minimum points are determined for the midterm exams or for the project work. The retake possibilities are the following: on the replacement week the 1st midterm exam, or the 2nd midterm exam can be tried again for 50 points, or a combined 1st+2nd midterm exam retake for 100 points.

20. Learning materials

Examples, documents and training materials, given out during lectures, presentations.
György Bicsák, Dávid Sziroczák, Aaron Latty: Numerical Methods
Ramin S. Esfandiari: Numerical methods for engineers and scientists using MATLAB, ISBN 978-1-4665-8570-6
Erwin Kreyszig: Advanced engineering mathematics, 10th edition, ISBN 978-0-470-45836-5

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

Subject description

1. Subject name	**Planning of extra-logistics networks**				
2. Subject name in Hungarian	Extralogisztikai rendszerek tervezése			**3. Role**	mc
4. Code	**KOALM337**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	0 hours	**Homework**	44 hours
Reading written materials	0 hours	**Midterm preparation**	34 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Kovács Gábor
12. Lecturers	Dr. Kovács Gábor, Bakos András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

Application of the modeling, network planning tool described in the lectures through practical examples, and preparation of the solution of the homework.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of network planning and network assessment basics.
- Knowledge of the assignment / distribution problem and how to solve it.
- Knowledge of centre searching problems and solutions.
- Knowledge of network optimization at the strategic level.

b) Skills:

- Ability to evaluate logistics networks.
- Able to strategically optimize logistics networks.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

1 homework (weights: 25% for the part-performance check, 25% for the final submission), 2 tests (weights: 25-25%).

19. Retake and delayed completion

The part-performance check and the final submission can both be resubmitted once. Both tests can be retaken once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Planning of plant logistics systems**				
2. Subject name in Hungarian	Üzemi logisztikai rendszerek tervezése			**3. Role**	mc
4. Code	**KOALM327**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	12 hours	**Homework**	40 hours
Reading written materials	16 hours	**Midterm preparation**	6 hours	**Exam preparation**	20 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bóna Krisztián
12. Lecturers	Dr. Bóna Krisztián, Bertalan Marcell

13. Prerequisites	Process planing (KOALM331), strong; Logistics planning softwares (KOALM336), strong; Simulations planning (KOALM335), weak

14. Description of lectures

The specific properties and planning process of intralogistics systems in case of plant facilities. The main steps and tasks of intralogistics planning. How to create a logistics system plan in case of a plant logistics system. The facility layout planning techniques and methods, the systematic facility layout planning. The applied specific facility layout topologies and the mathematical modelling approaches of the theoretical facility layout planning problems. The models of the value creating objects, modelling the single, workshop, group and line based intralogistics networks, supporting the decisions regarding to the spatial layout. Choosing the theoretical layout planning models regarding to the previous decided spatial layouts. Defining of the linear and the quadratic facility layout planning problems. The main heuristic and optimization methods and algorithms for solving the linear and quadratic facility layout planning problems. Defining the main staps of the detailed facility layout design. The material flow system architecture in a plant. The planning steps of the material flow systems in a plant. The methodology of material flow system planning, the main heuristic and optimization modells. Analitical queueing theory models and simulation methods in the planning of facility logistics systems. Specific system planning and sizing task regarding to the application of the continuous and discontinuous operated material handling machines. Integration of the basic arguments of lean philosophy in the planning process.

15. Description of practices

Practical application of the planning techniques and methods presented on the lectures through a complex facility layout planning homework, preparation of the individual facility layout planning tasks.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of the planning process and specialties in the development of the intralogistics system.
- Knowledge of the main KPIs of the intralogistics system.
- Knowledge of the individual, linear, group-based, and workshop-based topologies and models.
- The student has comprehensive knowledge of the approximation and optimization methods for solving linear and quadratic layout planning tasks.
- Knowledge of the detailed plant layout planning methodologies.
- The student knows the application of the analytical queuing models that can be used in material flow system planning.
- Knowledge of the specific system planning and system sizing methods that can be used in material flow systems.
- Knowledge of the application of lean philosophy that can be used in the planning processes.

b) Skills:

- Can apply the modelling approach.
- Can interpret the intralogistics network of the production objects.
- Can decide the right topology of the objects and able to select the theoretical layout planning method for this topology.
- Can apply the approximation and optimization methods of the linear and quadratic layout planning tasks.
- The student is capable of modeling material flow systems using analytical queuing theory.
- Able to use simulation systems and models in planning material flow systems.

c) Attitude:

- Student is opened to use math and information technology tools.
- Endeavor to understand and routinely use the methodology and tools required to solve the problems.

d) Autonomy and responsibility:

- Makes responsible and independent suggestions for planning problems.
- Take responsibilities for the consequences of decisions made during the planning process.

- Uses systemic approach.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the signature is to fulfill the homework and one midterm test. The homework (30%), the test (20%) and the exam result (50%) are included in the final grade.

19. Retake and delayed completion

The midterm test, the part-performance check and the final submission can both be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Planning of warehousing systems**				
2. Subject name in Hungarian	Raktározási rendszerek tervezése			**3. Role**	mc
4. Code	**KOALM323**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	56 hours	**Preparation for seminars**	12 hours	**Homework**	40 hours
Reading written materials	16 hours	**Midterm preparation**	6 hours	**Exam preparation**	20 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bóna Krisztián
12. Lecturers	Dr. Bóna Krisztián, Sztrapkovics Balázs, Puskás Eszter

13. Prerequisites	Process planing (KOALM331), strong; Logistics planning softwares (KOALM336), strong; Simulations planning (KOALM335), weak

14. Description of lectures

The main material flows and processes in a warehouse. Specific logistics system planning methodology of warehousing systems. The typical logistics technology variations of storing. Planning of transporting connections and loading technology. Planning the dimensions of loading bays, and the goods preparation areas of warehouses. The order picking methods and systems. The technology of order picking. Planning of the order picking process. Planning the topology and layout of storage systems in case of a traditional warehousing system. Planning the topology and layout of storage systems in case of a very-narrow-aisle (VNA) system. The sizing tasks regarding to the applied storage equipments. How to create a logistics system plan of a warehousing technology.

15. Description of practices

Description of the practical task of planning a manual, material handling machine supported and a high bay warehousing system including the operational areas.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of the loading processes, and specific form of the transportation connections.
- Knowledge of the goods preparation processes and technologies.
- Knowledge of the storage technologies.
- Knowledge of the packet goods based warehousing systems.
- Knowledge of the system sizing methodologies.
- Knowledge of order picking methods, aspects of choosing optimal order picking method.

b) Skills:

- Can design warehousing systems application by the above mentioned knowledge and the additional professional knowledge.

c) Attitude:

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

d) Autonomy and responsibility:

- Takes 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.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the signature is to fulfill the homework and one midterm test. The homework (30%), the test (20%) and the exam result (50%) are included in the final grade.

19. Retake and delayed completion

The midterm test, the part-performance check and the final submission can both be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Process planning**				
2. Subject name in Hungarian	Folyamattervezés			**3. Role**	mc
4. Code	**KOALM331**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	0 hours	**Homework**	29 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	19 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Kovács Gábor
12. Lecturers	Dr. Kovács Gábor, Bakos András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

Exercising process description languages (SOP, EPC, BPMN) and process planning techniques (BPR) through examples. Preparation of homework.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of process modeling basics.
- Knowledge of process descriptive languages.

b) skills:

- Modeling processes with standard methods based on written and oral naive descriptions.
- Able to detect process failures and re-design processes based on them.

c) attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

1 homework (weights: 25% for the part-performance check, 25% for the final submission) of each at least 50% performance is the condition of signature, exam (weight: 50%).

19. Retake and delayed completion

The part-performance check and the final submission can both be resubmitted once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Production planning & scheduling**				
2. Subject name in Hungarian	Termelésprogramozás			**3. Role**	sp
4. Code	**KOALM329**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**0 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	11 hours	**Homework**	30 hours
Reading written materials	23 hours	**Midterm preparation**	4 hours	**Exam preparation**	10 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Tokodi Jenő
12. Lecturers	Dr. Tokodi Jenő, Nagyné Csóti Beáta

13. Prerequisites	Demand planning and inventory management (KOALM328), weak; -(-)-; -(-)-

14. Description of lectures

Definition of calendar, useful, duty list and productive time basis. Definition and utilization of production capacity. Push & pull approaches. Forward and backward scheduling. Calculation of capacity utilization index. Involving open reserves in production. Extensive and intensive methods for increasing capacity utilation. Connections of PP module. Manufacturing planning and execution. Basic data of PP module. Master data in PP module: BOM, Routing, material allocation. Sales and operations planning: SOP. MRP: Forward and backward scheduling. Production cycle.

15. Description of practices

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16. Description of laboratory practices

Routing operation sequences. Sales and operations planning steps. Product grouping. The planning table. Make-to-stock production. Planning with/withoout final assembly. Calculating BOM and Route. Application of SAP PP module with case studies. Linear and non-linear program solutions. Strategic, tactic and operative control of production. Master production scheduling. Role of forcasting in MRP systems. Shop floor control. Gantt-diagrams, routing and network projection in MS Project environment. Case study solution for each student in MS Project and SAP B1 Production system.

17. Learning outcomes

a) Knowledge:

- Knowledge of the procedure of creating a production plan.
- Knowledge of the database of BOM list and routing.
- Knowledge of the Gantt-diagram representation in practical circumstance.
- Knowledge of the practical application of MS Project environment.
- Knowledge of the linear nonlinear, complete programming tasks, dynamic algorithm of production programs in practical circumstance.
- Knowledge of the MRP I.-II.-III. methodology.

b) Skills:

- Can design IT systems of production application by the above mentioned knowledge and the additional professional knowledge.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

For signature: successfull solving the SAP Learning HUB at least 4 test min. 50 % , 1 pcs of midterm test (20% weight), 1 pcs homework (30% weight), exam (50% weight).

19. Retake and delayed completion

1 retake of midterm test, home work closing 1 week later.

20. Learning materials

Wayne L.Winston: Operation Research. Thomson/Brooks/Cole 200- Planning of logistics information systems: production planning. SAP B1 Logistics dedicated eLearning for University Appliance Program in August 20- SH & SAP Learning HUB eLearning (moodle system). MS Project system.

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

Subject description

1. Subject name	**Simulations planning**				
2. Subject name in Hungarian	Szimulációs tervezés			**3. Role**	mc
4. Code	**KOALM335**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**1 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	13 hours	**Homework**	15 hours
Reading written materials	8 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bóna Krisztián
12. Lecturers	Dr. Bóna Krisztián, Dr. Bohács Gábor, Bakos András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

The types of modells, the basics and mathematical rudiments of modelling. Stochastic and deterministic processes, and the main process properties. The definition of computer based simulation modelling and the application in the logistics system planning. Verification and validation. Queueing theory. Simulation algorithms and programming. Simulation and optimization, simulation based optimization methods. The simulation softwares and simulators. Application of simulation based optimization methods in logistics. Application of artificial intelligence in specific logistics optimization problems. Development of simulation systems and models in intra- and extra logistics systems.

15. Description of practices

Practicing the tasks related to modeling and parameterization, described in the lectures, through individual tasks, and preparation of the homework.

16. Description of laboratory practices

Practicing the use of simulation techniques, simulators and simulation systems presented in the lectures within the framework of computer labs, through examples developed in the exercises, as well as the preparation of the homework.

17. Learning outcomes

a) Knowledge:

- Knowledge of modeling and simulation basics.
- Knowledge of the typical features of simulation softwares.
- Knowledge of the simulation's relationship with optimization and with artificial intelligence.

b) Skills:

- Ability to model logistics systems with analytical and simulation techniques.
- Ability to evaluate logistics systems with analytical and simulation tools.
- Ability to use simulation software or apply basic programming skills to simulation tasks.
- Ability to design logistics systems with simulation.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

The requirement of the complete the subject is to fulfill the homework and two midterm test. The homework (30%), and the tests (35-35%) are included in the final grade.

19. Retake and delayed completion

The homework can be resubmitted once. Both tests can be retaken once.

20. Learning materials

Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Technical logistics project 1**				
2. Subject name in Hungarian	Műszaki logisztikai projekt 1			**3. Role**	sp
4. Code	**KOALM333**	**5. Evaluation type**	**m**	**6. Credits**	**7**
7. Weekly contact hours	**0 lecture**	**6 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**210 hours**
Contact hours	84 hours	**Preparation for seminars**	28 hours	**Homework**	70 hours
Reading written materials	28 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bohács Gábor
12. Lecturers	Gáspár Dániel, Szabó Péter, Dr. Rinkács Angéla, Odonics Boglárka

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

Within the framework of the course, students get acquainted with the design problems of the major engineering areas and the applied software. During the practices, group related tasks are solved and presented after regular consultations at the end of the semester. In the exercises, project-centered consultation, reporting and ongoing evaluation of their work are carried out with students.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of materials handling systems projects in terms of structure and activities.

b) Skills:

- He is able to assess solutions to a certain problem.
- Capable of implementing his work in the framework of a project.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

1 homework (50% for the final presentation, 50% for the documentation).

19. Retake and delayed completion

The presentation and the documents submission can both be resubmitted once.

20. Learning materials

Materials on specific issues, plus former case studies. Students can download the subject notes in pdf format via Moodle.

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

Subject description

1. Subject name	**Technical logistics project 2**				
2. Subject name in Hungarian	Műszaki logisztikai projekt 2			**3. Role**	sp
4. Code	**KOALM340**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**0 lecture**	**4 practice**	**0 lab**	**8. Curriculum**	**L**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	16 hours	**Homework**	40 hours
Reading written materials	8 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Bohács Gábor
12. Lecturers	Dr. Bohács Gábor, Gáspár Dániel, Szabó Péter, Dr. Rinkács Angéla, Odonics Boglárka

13. Prerequisites	Technikal logistics project 2 (KOALM333), strong; -(-)-; -(-)-

14. Description of lectures

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15. Description of practices

Within the framework of the course, project groups are formed from the students, which groups are assigned to the mentors of the department. A project team can consist of up to four people. Project groups receive complex project tasks on technical logistics or R & D tasks, or they can choose for themselves based on their field of interest. During contact hours, students consult with the mentor instructor responsible for the project and briefly report on the progress of the project every week. Problems are raised and presented, solutions are presented. In the exercises, project-centered consultation, reporting and ongoing evaluation of their work are carried out with students.

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knowledge of the chosen topic in technical logistics.
- Knowledge of research methodology basics.

b) Skills:

- Able to achieve developments in the chosen technical logistics topic, from applied research aspect.

c) Attitude:

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

d) Autonomy and responsibility:

- 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.

18. Requirements, way to determine a grade (obtain a signature)

1 homework (50% for the final presentation, 50% for the documentation).

19. Retake and delayed completion

The final submission can be resubmitted once.

20. Learning materials

Related national and international scientific literature.

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

Subject description

1. Subject name	**Trade, Financial, Accounting Techniques**				
2. Subject name in Hungarian	Kereskedelmi, pénzügyi és számviteli technikák			**3. Role**	sp
4. Code	**KOKKM138**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**1 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**KL**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	8 hours	**Homework**	0 hours
Reading written materials	16 hours	**Midterm preparation**	12 hours	**Exam preparation**	12 hours

10. Department	Department of Transport Technology and Economics
11. Responsible lecturer	Dr. Mészáros Ferenc
12. Lecturers	Dr. Mészáros Ferenc

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description 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.

15. Description of practices

Solving financing and accounding tasks of freight forwarding.

16. Description of laboratory practices

Elaboration of seminar tasks on computer.

17. Learning outcomes

a) Knowledge:

- The student is familiar with the rules of internal and external trade in freight forwarding, the macro-financial framework for companies and the basic accounting rules.

b) Skills:

- The student is able to select the appropriate commercial solutions, recognizes the opportunities offered by financial transactions, and interprets the outputs of the corporate accounting system.

c) Attitude:

- The student strives for completeness in the acquisition of knowledge, co-operates with the teacher and other students, is open to new and innovative ideas, researches, and uses information technology and computing tools for its work.

d) Autonomy and responsibility:

- The student makes responsible decisions in the preparation and proceeding of commercial transactions, asks for professional opinions of others in its work, and manages the challenges responsibly.

18. Requirements, way to determine a grade (obtain a signature)

Requirements for signature: fulfilment of three midterms. There is a written examination at the end of the semester. Weights of requirements in final mark: average of midterms (50%), verbal examination (50%).

19. Retake and delayed completion

There are retakes from each midterms, they can be delayed completed till end of delayed completion period.

20. Learning materials

Bokor, Zoltán; Mészáros, Ferenc; Batta, Gábor (2016) Introduction to Finance (in Hungarian). Course book, BME Dept. of Transport Technology and Economics
Bokor, Zoltán; Csarejs, Angelika (2016) Introduction to Accounting (in Hungarian). Course book, BME Dept. of Transport Technology and Economics
Bokor, Zoltán (2010) Introduction to Foreign Trade (in Hungarian). Course book, BME Dept. of Transport Technology and Economics

List of offered elective economics courses

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

Subject description

1. Subject name	**Argumentation, Negotiation and Persuasion**				
2. Subject name in Hungarian	Érvelés, tárgyalás, meggyőzés			**3. Role**	ec
4. Code	**GT41MS01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	24 hours	**Exam preparation**	0 hours

10. Department	Department of Philosophy and History of Science
11. Responsible lecturer	Dr. Láng Benedek István
12. Lecturers	Szabó Krisztina

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

During the course of Argumentation, Negotiation,Persusion, students can acquire the basic theoretical and practical knowledge of all three subjects. In the persuasion-technical block we examine the techniques, psychological assumptions and social significance of manipulation, influence and persuasion. The lessons will be about rational decision-making processes, inter-group conflicts, norm-tracking and group thinking from the point of view of social psychology. Students will become familiar with the concepts of dissonance theories, perception, remembrance, framing, social categorization and attitude change through everyday examples and case studies, so they will be able to recognize and correctly interpret the relevant processes of the media and advertising industry. During the argumentation technique we discuss the peculiarities of the various types of disputes, especially the rational discussion. Students can develop their reasoning, discussion, and lecture skills by analyzing real-world dialogues, video details and personal examples, using the toolbox of logic to be able to stand their place in both the argument and rhetoric of work and private life. In negotiation techniques, we discuss the basic types and strategies of negotiation, the pitfalls of negotiating situations, and the proposed ways of avoiding them. During the lessons, the theory is put into practice through case studies and small group exercises, simulating real negotiating situations, where students can sharply "test, improve their negotiating skills, and thus prepare for the challenges of the labor market."

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the widely used problem-solving techniques for research or scientific work.
- Knows the management tools and methods related to management, and the legislation needed to practice the profession.

b) Skills:

- Being able to design and manage the use of technical, economic, environmental, and human resources.

c) Attitude

- Being open and responsive to the knowledge and acceptance of professional, technological development and innovation in the field, and to the provision of authentic mediation.
- Seeks to adhere to and adhere to the ethical principles of work and organizational culture, and to compliance with quality requirements.

d) Autonomy and responsibility:

- Takes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental), with full responsibility.
- Being responsible for sustainability, health and environmental awareness.
- Decisions take into account the principles and principles of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulations, and engineering.

18. Requirements, way to determine a grade (obtain a signature)

To complete the course, 2 midterm tests must be written during the semester. Type of midterms: multiple choice test and essay. 1st midterm: max. 40 points available. 2nd midterm: max. 60 points available. So a total of 100 points can be collected from the two midterms. Student can earn extra points for midterm scores as follows: Visiting lectures is not a must, there is no catalog, but anyone who enters and enriches the lesson with the sessions of the curriculum has an extra point, which is recorded at the end of each hour. It is important that students have to come and write down their points after every hour. You cannot enter a point backwards. If students send links, advertisements, a few paragraph analyzes, etc. to the curriculum, we can also reward them with extra points. Plus points can be earned no later than the last hour, then no longer.

19. Retake and delayed completion

Up to one of the 2 midterm tests can be replaced or improved during the delayed completion period.

20. Learning materials

https://www.filozofia.bme.hu/

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

Subject description

1. Subject name	**Economic Analysis of Technological Processes**				
2. Subject name in Hungarian	Műszaki folyamatok közgazdasági elemzése			**3. Role**	ec
4. Code	**GT30MS02**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	0 hours	**Homework**	0 hours
Reading written materials	20 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Economics
11. Responsible lecturer	Dr. Major Iván
12. Lecturers	Dr. Vigh László

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

In everyday practice - unfortunately - a technical and economic solution to a problem they are looking separately, in extreme cases, the experts of the two areas do not understand each other's language. The object In this context, we are trying to link these two disciplines, primarily from the economic point of view. In doing so, several technical processes (production, innovation, raw material management (costs), etc.) from an economic point of view, we show the relevant economic aspects. In addition, we examine the market environment of companies, which has a decisive impact on product sales and revenue. Our goal is for future engineers to recognize the economic elements of their activities, which will certainly make the acceptance of their products easier.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the role of the production process, the cost of technology.
- Knows the benefits of capacity utilization and economies of scale.
- Knows the market environment of companies and its impact on production and sales activities.
- Knows the relationship between technology and market structures.
- Knows the potential and benefits of technological innovation, innovation in the markets.

b) Skills:

- Ability to design, organize and conduct independent learning.
- Is able to apply the general and specific economics principles, rules, relationships, procedures in solving problems in the technical field.
- Is capable of complex planning and management of the use of technical and economic resources.
- Is able to identify the external market environment and its changes.
- Is able to analyze and evaluate market opportunities.
- Is able to theoretically base economic decisions.

c) Attitude:

- Collaborates with the instructor and student fellows to expand knowledge.
- Expands your knowledge through continuous knowledge.
- Open to the use of information technology tools.
- Seek to understand the economic tools needed to solve technical problems.
- Strives for accurate and error-free task solving.

d) Autonomy and responsibility:

- Openly accepts well-founded critical remarks.
- Independently performs the analysis of economic problems, the evaluation of related tools.
- Openly accept well-founded critical remarks.
- Uses his systemic approach in his thinking.

18. Requirements, way to determine a grade (obtain a signature)

Learning outcomes are assessed on the basis of two mid-term tests: a complex, written assessment of knowledge, skills, attitudes, and independence and responsibility types of the subject in the form of midterm tests. The tests are on the one hand test questions, which are the interpretation of certain concepts and the connection between them, as well as the calculation tasks, which examine the problem-solving-ability. The topic of tests is determined by the lecturer, the available working time is 45 minutes/test. A prerequisite for obtaining a midterm grade is that the student does not have to make a replacement in the case of half of the midterm tests (i.e. one student has to reach at least 40% from one midterm test). If the student does not participate in any of the midterm tests, the course will be assessed as "Not fulfilled" (based on Code of Studies). 50-50% of the results of the two midterm test scores are counted in the final grade.

19. Retake and delayed completion

Midterm tests can be replaced once during the term. In the delayed completion period, according to the Code of Studies, the midterm tests may be supplemented by the paying a delayed completion fee.

20. Learning materials

http://kgt.bme.hu/

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

Subject description

1. Subject name	**Investments**				
2. Subject name in Hungarian	Befektetések			**3. Role**	ec
4. Code	**GT35M004**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	24 hours	**Exam preparation**	0 hours

10. Department	Department of Finance
11. Responsible lecturer	Dr. Bethlendi András
12. Lecturers	Póra András

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

The main objective of the course is to familiarize students with: the operation of stock markets, stock exchanges, institutions and indexes on the market, the basic theoretical background of stock analysis, its main methods, and the main portfolio management strategies. During the semester, emphasis will be placed on the methodology of fundamental stock analysis.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the widely used problem-solving techniques for research or scientific work.
- Knows the management tools and methods related to management, and the legislation needed to practice the profession.

b) Skills:

- Being able to design and manage the use of technical, economic, environmental, and human resources.

c) Attitude:

- Being open and responsive to the knowledge and acceptance of professional, technological development and innovation in the field, and to the provision of authentic mediation.
- Seeks to adhere to and adhere to the ethical principles of work and organizational culture, and to compliance with quality requirements.

d) Autonomy and responsibilit:

- Takes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental), with full responsibility.
- Being responsible for sustainability, health and environmental awareness.
- Decisions take into account the principles and principles of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulations, and engineering.

18. Requirements, way to determine a grade (obtain a signature)

1st midterm test from the first quarter. 2nd midterm test from the second quarter. All midterm test are 45 minutes long for 50 points; Multiple choice tests and calculation tasks.

19. Retake and delayed completion

Both midterm test can be rewritten by once.

20. Learning materials

http://www.finance.bme.hu/

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

Subject description

1. Subject name	**Leadership and Applied Management Psychology**				
2. Subject name in Hungarian	Alkalmazott vezetéspszichológia			**3. Role**	ec
4. Code	**GT52MS01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	0 hours	**Homework**	32 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Ergonomics and Psychology
11. Responsible lecturer	Dr. Répáczki Rita
12. Lecturers	Dr. Hámornik Balázs Péter

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

The aim of the subject is to develop practical skills in addition to the theoretical knowledge of leadership psychology. Within this, the issues of the process of managerial maturity, the managerial personality, the role and the role are also elaborated. The aim is also to develop practical skills, the importance of which is important for effective leadership.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the widely used problem-solving techniques for research or scientific work.
- Knows the management tools and methods related to management, and the legislation needed to practice the profession.

b) Skills:

- Being able to design and manage the use of technical, economic, environmental, and human resources.

c) Attitude:

- Being open and responsive to the knowledge and acceptance of professional, technological development and innovation in the field, and to the provision of authentic mediation.
- Seeks to adhere to and adhere to the ethical principles of work and organizational culture, and to compliance with quality requirements.

d) Autonomy and responsibility:

- Takes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental), with full responsibility.
- Being responsible for sustainability, health and environmental awareness.
- Decisions take into account the principles and principles of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulations, and engineering.

18. Requirements, way to determine a grade (obtain a signature)

Participation in 70% of the lessons, preparation of two individual reports.

19. Retake and delayed completion

According to Code of Studies.

20. Learning materials

http://www.erg.bme.hu/

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

Subject description

1. Subject name	**Managerial Accounting**				
2. Subject name in Hungarian	Vezetői számvitel			**3. Role**	ec
4. Code	**GT35M005**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	0 hours	**Homework**	12 hours
Reading written materials	0 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Finance
11. Responsible lecturer	Dr. Böcskei Elvira
12. Lecturers	Dr. Böcskei Elvira

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Systematic, practice-oriented acquisition of close and contact topics in managerial accounting from theoretical and methodological knowledge of traditional cost management and responsible management accounting to new approaches.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the widely used problem-solving techniques for research or scientific work.
- Knows the management tools and methods related to management, and the legislation needed to practice the profession.

b) Skills:

- Being able to design and manage the use of technical, economic, environmental, and human resources.

c) Attitude:

- Being open and responsive to the knowledge and acceptance of professional, technological development and innovation in the field, and to the provision of authentic mediation.
- Seeks to adhere to and adhere to the ethical principles of work and organizational culture, and to compliance with quality requirements.

d) Autonomy and responsibility:

- Takes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental), with full responsibility.
- Being responsible for sustainability, health and environmental awareness.
- Decisions take into account the principles and principles of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulations, and engineering.

18. Requirements, way to determine a grade (obtain a signature)

Semester tasks:

1. A midterm grade can be obtained with a substantial mid-term job, which means that students will attend 70% of the lecture, and the lesson tasks received at the moodle will be solved on the day of the lecture, no later than midnight. (The hourly tasks allow you to reach 15 * 4 = 60 points, this is already sufficient. You can upload individual and group standalone tasks in the moodle until the deadline for each task. (You can also get 60 points for independent tasks that can be added in full. for points earned from hourly work if it reaches or exceeds 40 points The marks of the semester's performance that can be assessed in this way will be added to Neptune by end of last but one week and students will be exempt from writing in their home.
2. If during the semester you are unable or unwilling to obtain the task in the manner described in point 1, you can complete the subject with a successful solution of at least 50% on a midterm test what is located on the moodle interface. In this case, a midterm grade can be improved by one grade from the acquired intermediate points.

19. Retake and delayed completion

The midterm can be rewritten once.

20. Learning materials

http://www.finance.bme.hu/

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

Subject description

1. Subject name	**Quality Management**				
2. Subject name in Hungarian	Minőségmenedzsment			**3. Role**	ec
4. Code	**GT20M002**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	4 hours	**Homework**	12 hours
Reading written materials	0 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Management and Corporate Economics
11. Responsible lecturer	Dr. Kövesi János
12. Lecturers	Dr. Topár József, Erdei János

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Within the framework of the subject, students will become familiar with current issues and methods of developing quality management systems. They get an overview of the quality philosophies applied in the production sectors and the basics of quality management methods that support their implementation.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- Knows the widely used problem-solving techniques for research or scientific work.
- Knows the management tools and methods related to management, and the legislation needed to practice the profession.

b) Skills:

- Being able to design and manage the use of technical, economic, environmental, and human resources.

c) Attitude:

- Being open and responsive to the knowledge and acceptance of professional, technological development and innovation in the field, and to the provision of authentic mediation.
- Seeks to adhere to and adhere to the ethical principles of work and organizational culture, and to compliance with quality requirements.

d) Autonomy and responsibility:

- Takes decisions carefully, in consultation with representatives of other fields of expertise (primarily legal, economic, energy and environmental), with full responsibility.
- Being responsible for sustainability, health and environmental awareness.
- Decisions take into account the principles and principles of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulations, and engineering.

18. Requirements, way to determine a grade (obtain a signature)

The subject ends with a mid-term grade. 80% of the grade will be determined by the results of the midterm tests held in the semester and 20% by the group or individual task result. Information about the task will be published on the presentations and on the briefings available on the website. The task is mandatory. Without this, the requirements of the subject cannot be met. The task must be submitted electronically (by e-mail) by the deadline set by the lecturer. Midterm test are 50-50 point each, task is with a maximum of 20 points. Criteria: a minimum of 45 points from the two midterms and a minimum of 18 points on each midterm test, submission of the task. Final grade: sum of midterm scores * 0.8 + task score.

19. Retake and delayed completion

Midterms can be rewritten during the delayed completion period in accordance with the regulations of Code of Studies. There is no possibility to delayed complete the semester task.

20. Learning materials

http://mvt.bme.hu/

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

Subject description

1. Subject name	**Social and Visual Communication**				
2. Subject name in Hungarian	Társadalmi és vizuális kommunikáció			**3. Role**	ec
4. Code	**GT43MS02**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	24 hours	**Exam preparation**	0 hours

10. Department	Department of Sociology and Communication
11. Responsible lecturer	Dr. Bárány Tibor
12. Lecturers	Dr. Szabó Levente

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

It is impossible to communicate! And it is impossible to communicate… The general and social framework of communication. What is communication? Possible definitions, concepts. Disaster images. Representations in the media. Communication as an exchange of information. The information that is unlikely ... And the disorder that increases the information? Shannon's model. Communication as reporting property. Information you didn't want to inform? Communicative pictures? Barnlund's model. Communication as interaction. The group is above all… Illusion that consensus is emerging? Newcomb's model. Communication as participation. The ingenious stupid ants. Participation in incomprehensible group communication. Horányi's theory. Communicated. The user of the device is communicating, revolutionizing the pegasus and arbitrary symbols. Code and social systems. Politics, science, economy, art speak different languages? The institutional reality. When money is not in the tree. Image theory, perception theory. Why is the image effective? What are visual illusions about? The formation of writing. From pictorial representation to no-show signs. The agents of social communication. Rational roles and irrational individuality? A summary of social communication.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- He / she knows all the important elements of the concept of social science, understands the relationships that underlie the scientific interpretation of society and social communication.
- You know and understand the operating mechanisms of social phenomena and subsystems studied by communication and media science.

b) Skills:

- Is able to compare the basic theories and concepts of social communication, to elaborate rational arguments, ie to form opinions and defend their opinions during the various stages of communication.
- In the field of communication and media research, it is able to make realistic value judgments based on the processed information and to formulate independent proposals based on the conclusions drawn from them.

c) Attitude:

- It accepts that cultural phenomena are historically and socially defined and variable.
- Consciously represents the methods he uses in his own profession and accepts the different methodological features of other disciplines.
- Open to all forms of professional innovation, inclusive, but not mindful of theoretical, practical and methodological innovations.

d) Autonomy and responsibility:

- It displays its views as a sovereign player in professional and social forums, and represents its profession, organization and professional team responsibly.

18. Requirements, way to determine a grade (obtain a signature)

Two midterm tests must be written (with at least pass (2) assessments) in the course of the study period, and all of the processed texts can be downloaded on the website of the course. The curriculum processed at each lecture will appear separately on the website of the course after the given lecture (so the obligatory readings for the given midterm test will be gathered here).

Points for each midterm test can be increased by 1-1, 3-3, by answering the question in hours (1st midterm can be increased by one of the 3 hours prior to 1st midterm, the 2nd midterm can be increased by one of the 3 between 1st and 2nd midterm) with an hourly response).

Individual performance with a thesis: discussed in individual consultations. This option is for those who want to deal with some of the topics in addition to the opportunities provided by the lessons, they need extra performance (eg I would like to present my thesis at a Scientific Student Conference (TDK)). Conditions: until the time of the first midterm, the choice of this alternative must be agreed with the instructor, a sketch of the ideas must be prepared, and the possibility of writing the thesis should be discussed in a personal consultation. After that, at least two times the subject has to be consulted on the process, the progress of the text, and at the end of the semester the completed thesis will be discussed, evaluated and, if necessary, additional opportunities beyond the semester will be assessed (eg participation in TDK). The thesis must be submitted by the specified date. Visiting the lessons: according to Code of Studies.

The components of the semester grade are: 1st midterm 50% and 2nd midterm 50%.

19. Retake and delayed completion

The condition for participating in the supplementary midterm test is to fulfill the 1st midterm test (with a minimum of pass (2) result). Replacement options: 2 (see Semester Scheduled Program). Both midterms are rewritable for the purpose of increasing the purpose of increasing the mark, and the final mark takes the best results. The results can be viewed on the course website and discussed at the weekly consultation time or by email consultation.

20. Learning materials

https://szoc.bme.hu/

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

Subject description

1. Subject name	**Technology Management**				
2. Subject name in Hungarian	Technológiamenedzsment			**3. Role**	ec
4. Code	**GT20M005**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**JKL**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	4 hours	**Homework**	0 hours
Reading written materials	12 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Management and Corporate Economics
11. Responsible lecturer	Dr. Pataki Béla
12. Lecturers	Dr. Pataki Béla

13. Prerequisites	-(-)-; -(-)-; -(-)-

14. Description of lectures

Course objectives:

- highlight the fundamental importance of technology for the successful operation of the organization;
- to promote a deeper understanding of the competitive nature of technology;
- introduce some of the best practices in technology management.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge:

- You will be aware of the competitive nature of technology.
- Understand the role of technology and engineering in the success of organizations.
- You will know some of the best practices in technology management.

b) Skills:

- Will be able to carry out his engineering tasks taking into account business, economic and management aspects.
- Being in a technology area with a lower level managerial position will be able to perform basic engineering manager tasks.

c) Attitude:

- He strives to put his engineering skills into a business, economic, and management context.
- Responsive to innovation, constant monitoring of technical progress, active participation in development.

d) Autonomy and responsibility:

- He can make his decisions carefully, in consultation with representatives of other disciplines.

18. Requirements, way to determine a grade (obtain a signature)

To complete the subject, students need to write two, 30-minute long, max. 50-50-point midterm tests. The midterm grade is the total score available for the two midterm tests. There is no score limit to be met in any midterm tests.

19. Retake and delayed completion

Each midterm tests can be written immediately after each other.

20. Learning materials

http://mvt.bme.hu/