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

Professional Pilot Bachelor Programme
Curriculum

Valid from September 2024

Code:
6N-AP_alap_2024 (6N-AP)
6NAAP_2024 (6NAAP)

Professional Pilot Bachelor Programme

I.	II.	III.	IV.	V.	VI.	VII.
Mathematics G1 BMETE93BG01 4 2 0 e 6 NS TTK	Mathematics G2 BMETE93BG02 4 2 0 e 6 NS TTK	Mathematics G3k BMETEMIBSGMAT3-00 2 2 0 e 4 NS TTK	Fluid Dynamics, BMEKORHBSP4003-00 Thermodynamics and Heat Transfer 2. 1 2 0 e 4 NS RHT	Quality management BMEKOGJA154 2 0 0 m 2 CE GJT	Micro- and Macroeconomics BMEGT30A001 4 0 0 m 4 CE GTK	Management and Economics BMEKOKGA109 3 0 0 m 4 CE KTKG
		Mechanics 2A BMEKOVJBSP3001-00 3 2 0 m 4 NS VJJT	Vehicle and Drive Elements 2. BMEKOJSA494 1 2 0 e 4 PK VJJT	Basic IR BMEGEENBSXBCIR-01 1 1 0 m 2 PK GPK		Work Organization BMEKOKUA169 2 0 0 m 2 CE ALRT
Technical Chemistry BMEVEKFBS6APMK-01 2 0 0 e 3 NS VBK	Mechanics 1 BMEKOJSA191	Fluid Dynamics, BMEKORHBSP3001-00 Thermodynamics and Heat Transfer 1. 1 1 0 e 3 NS RHT	Electrics and Electronics BMEKORHBSP4001-00 2 0 0 m 2 PK RHT	Logical Networks BMEKOKA137 2 1 0 m 3 PK KJIT	Business Law BMEGT55A001 2 0 0 m 2 CE GTK	Labour Safety BMEKOEAA111 2 0 0 m 2 CE ALRT
Introduction to BMEGEHDBSXIMEA-01 Mechanincal Engineering 2 1 1 e 4 NS GPK	2 3 0 e 5 NS VJJT	Statics of Structures BMEKOJSA192 0 2 0 m 2 PK VJJT	Airframes and Systems BMEKORHBSP4004-00 4 0 0 m 4 PK RHT	Powerplant BMEGEENBSXPOWR-01 3 1 0 e 4 PK GPK	Control BMEKOKAA138 2 1 0 e 3 PK KJIT	Multi-Crew Cooperation BMEGEENBXRMPIL-01 and Jet Orientation 1 2 0 m 3 SP GPK
	Electrotechnics – Electronics BMEKOKAA139 3 2 0 e 6 NS KJIT	Materials and BMEKOGJBSP3001-00 Manufacturing 4 0 0 m 4 PK GJT	Instrumentation BMEKORHBSP4002-00 3 2 0 e 5 PK RHT	Human Performance BMEGT52BS46000-00 3 0 0 e 4 PK GTK	Multi Engine BMEGEENBSXMENG-01 2 1 0 m 3 PK GPK	Elective Course 5 2 0 0 m 2 EC BME%
Communication I. BMEGEENBSXCOM1-01 4 0 0 e 4 CE GPK				Flight Planning and BMEKORHBSP5A01-00 Monitoring 2 3 0 e 5 SP GPK	Flight Performance BMEGEENBSXPRMN-01 Operational Procedures BMEKORHBSP6A01-00 2 1 0 e 4 SP RHT	BACHELOR THESIS BMEKO%
Informatics BMEKOKJBSP1001-00 2 0 2 m 4 PK KJIT	Engineering Drawing 2. BMEKOJSA499	Vehicle and Drive Elements 1. BMEKOJSA493 1 2 0 e 4 PK VJJT	Meteorology BMEGEATBSXMTRL-01 3 2 0 e 4 SP GPK	Communication II. BMEGEENBSXCOM2-01 3 0 0 e 3 SP GPK	Mass and Balance BMEGEENBSXBLNC-01 2 1 0 e 2 SP GPK	
Engineering Drawing 1. BMEKOJSA498 2 3 0 m 6 PK VJJT	Air Law And ATC BMEKORHBSP2001-00 Procedures 2 2 0 e 4 PK RHT	Principles of Flight BMEKORHBSP3002-00 2 2 0 m 4 PK RHT	Radio Navigation BMEKORHBSP4A01-00 2 2 0 m 4 SP RHT	Elective Course 1. 2 0 0 m 2 EC BME%	Elective Course 3. 2 0 0 m 2 EC BME%	
Basics of Aviation I. BMEKORHBSP1001-00 2 2 0 m 4 PK RHT	Basics of Aviation II. BMEKORHBSP2002-00 2 2 0 m 4 PK RHT	General Navigation BMEGEATBSXNAVI-01 3 2 0 e 5 SP GPK	Flying Practice II. BMEGEENBSXPRC2-01 0 2 0 m 2 TS GPK	Elective Course 2. 2 0 0 m 2 EC BME%	Elective Course 4. 2 0 0 m 2 EC BME%	0 8 0 m 15 IP
Home class BMEKOTO8599 0 2 0 s 0 CR KJK		Flying Practice I. BMEGEENBSXPRC1-01 0 2 0 m 2 TS GPK		Flying Practice III. BMEGEENBSXPRC3-01 0 2 0 m 2 TS GPK	Flying Practice IV. BMEGEENBSXPRC4-01 0 2 0 m 2 TS GPK	Flying Practice V. BMEGEENBSXPRC5-01 0 2 0 m 2 TS GPK

cr	
NS	natural science course
PK	professional knowledge course
CE	compulsory economics course
EC	elective course
SP	specialization course
IP	independent project
TS	traineeship
CR	criteria requirement
VII.	term for student mobility

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, cc – compulsory course; sp – specialization course
4. Code	Neptun code of the subject
5. Evaluation type	type of academic performance assessment, e - exam grade; m - mid-term grade
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	bachelor programs related to the subject,: p – Professional Pilot
9. Working hours for fulfilling the requirements of the subject	contact hours – personal appearance at classes in the 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 selecting specializations, the description of the conditions for the **preparation of the Bachelor thesis and the final examination**, as well as the order of the final examination.

1) The subject prerequisite system expresses the connections between the subjects. The specific subject prerequisites are included in the subject datasheets.

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, the co-requisite subject 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 preferably assumes knowledge from the recommended prerequisite subject.

2) *General rules for the selection of specialization and specialization subjects:*

Completion of at least 50 credits from the first two terms of the recommended Curriculum (including the compulsory economics courses and the Basics of Aviation I. and II. courses).

3) *Enrollment rules for the Bachelor thesis subjects in all specializations:*

Completion of all compulsory courses from the first four terms of the recommended Curriculum and the collection of a minimum of 170 credits, of which a minimum of 30 credits from specialization courses. Completion of the Flying Practice I. to IV. courses and successful completion of ATPL exams at the Transport Authority from the following courses: Air Law, Principles of Flight, General Aircraft Knowledge, Instrumentation, General Navigation, Meteorology, Radio Navigation, Communication, Human Performance, and Flight Planning and Monitoring.

4) *Criteria for taking the final examination:*

Completion of all courses included in the recommended Curriculum, including elective courses (all together at least 210 credits), fulfillment of all criterion requirements in the Curriculum (Home class, physical education during two terms, all flying practices), successful completion of ATPL theoretical exams at the Transport Authority, and submitting the Bachelor thesis.

5) *Final examination order:*

The final examination in front of the Final Examination Board consists of **defending the Bachelor 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 knowledge 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.**

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Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Air Law and ATC Procedures**				
2. Subject name in Hungarian	Légijog és légiforgalmi eljárások			**3. Role**	cc
4. Code	**BMEKORHBsP2001-00**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	10 hours	**Homework**	12 hours
Reading written materials	17 hours	**Midterm preparation**	0 hours	**Exam preparation**	25 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Kale Utku
12. Lecturers	Gál István

13. Prerequisites	(),

14. Description of lectures

International Agreements and Organizations; Airworthiness; Aircraft Nationality and Registration Marks; Flight Crew Licensing; Rules of the Air; Instrument Procedures, Departures-, Holding-, Approach- and Special Procedures; Altimeter Setting Procedures; SSR and ACAS; Airspace; Air Traffic Services; Control of Aircraft and Separation; Aerodromes Physical Characteristics; Aerodromes Visual Aids Markings, Signs and Lightings; Aerodrome Service and Obstacle Marking; Security; Facilitation; Search and Rescue; Aircraft Accident and Incident Investigation; Aeronautical Information Service and Publications

15. Description of practices

Practicing the relevant theoretical parts

16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge

They are familiar with the legislation environment of civil aviation, with the system of laws and regulations. They can interpret and use international, regional and national rules and regulations at a skill level.

Knowledge of international and national aviation organisations and their regulations (ICAO Annexes, European Union regulations, EASA regulations, national regulations).

Knowledge of flight rules and procedures and the basis for the development of procedures.

b) Ability

They are able to interpret and process aviation legislation. Without further assistance, they are able to use regulatory publications. They know and use aviation law information sources and procedures related to aviation law.

Ability to prepare and submit a flight plan.

Ability to comply with flight safety rules.

c) Attitude

Compliance with the rules, laws and procedures, which enhances flight safety and maintain proper order of traffic. To do this, they try to keep their legal knowledge up to date. They are characterized by a system-level thinking and approach.

He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

Shares his/her experience with his/her colleagues, thus helping them to develop.

d) Independence and responsibility

The work of oneself and the other crew members is also followed and monitored from a legal point of view. They avoid behavior that violates the rules and legislations and mitigating negative effects.

Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Signature: small project task. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

The small project task can be delayed submitted at the end of the semester.

20. Learning materials

Soros Attila: Nemzetközi légijog, ELTE Eötvös Kiadó, 2021, 444o.
Mudra István: Légtérek, légiforgalmi szabályok, légiforgalmi szolgálatok (2008)
CAE Oxford, Air Law ATPL Ground Trainig Series, Oxford Aviation Academy, 2016 p. 566.

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Subject description

1. Subject name	**Airframes and Systems**				
2. Subject name in Hungarian	Repülőgép sárkány és rendszerismeret			**3. Role**	cc
4. Code	**BMEKORHBsP4004-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**4 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	0 hours
Reading written materials	28 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Kale Utku
12. Lecturers	Dr. Beneda Károly, Faltin Zsolt

13. Prerequisites	(),

14. Description of lectures

During the lectures, the students will get general knowledge of the structure of a modern airliner.

The course deals in general with the principles of operation of systems used in aircraft.

Aircraft structure, loads, maintenance, hydraulic system, landing gear (structure, wheels, brakes), control system, air and cabin pressure and air conditioning system, de-icing and anti-icing systems, fuel system, fire detection and protection system, oxygen system are discussed in detail. During the lectures, students will learn about the different structural designs and material used on airplanes.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- knows the basic operating principles and structure of aircraft systems
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.

b) abilities

- The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.
- Able to operate equipment and systems, airplane propulsion and systems, on-board instruments and instrument systems of the airplane as described in the Air Operations Manual, to detect and properly handle any malfunction.

The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude

- Aviation safety centric approach,
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Characterized by a system-level thinking and approach.

(d) autonomy and responsibility

- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Two mid-term exam with at least 50% results on each

19. Opportunity for repeat/retake and delayed completion

1-1 mid-term exam repetition in the late completition period

20. Learning materials

Beneda J., Gáti B., Hámori Gy., Óvári Gy., Rácz J. REPÜLŐGÉPEK RENDSZEREI ÉS AVIONIKA, Typotex, egyetemi tananyag jegyzetm, 2012, 144 old.
Oxford Aviation Academy ATPL Ground Trainig Series , Book 2 – Aircraft General Knowledge 1 – Airframes & Systems, 2014, p. 344
AviationExam: 021 - Airframe, Systems, Electrics, Power Plant eTextbook
Electronic textbook linked to Aviationexam question bank for efficient EASA exam preparation 2 books, 2022m
https://www.aviationexam.com/product/easa-in-english/textbooks/021-airframe-systems-electrics-power-plant-etextbook

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Subject description

1. Subject name	**Basic IR**				
2. Subject name in Hungarian	Műszeres repülés alapjai			**3. Role**	cc
4. Code	**BMEGEENBSXBCIR-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**1 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

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

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Sztankó Krisztián
12. Lecturers	Szabó Lajos

13. Prerequisites	Instrumentation (BMEKORHBsP4002-00), strong; Radio Navigation (BMEKORHBsP4A01-00), strong; Air Law And Atc Procedures (BMEKORHBsP2001-00), strong

14. Description of lectures

General theory of IFR flight,
-IFR flight preparation, navigation preparation, knowledge of Jeppesen/LIDO/Navtech aeronautical charts
-Altitude terminology, minimum safe altitudes and their presentation on Jeppesen charts
-Wind effect wind correction at different phases of flight
Attitude-based instrument flying methods
-Instrument reading, spacial orientation solely based on instruments
-Interpretation of HSI, RMI, CDI and their practical usage
-Instrument scan and cross-check methods
-Transfer from visual to intrument references after takeoff
-Transfering from instrument to visual references before landing (after DH or MDA)
-Upset Recovery methods during instrument flights
-Instrument failures, partial panel instrument flights
-Operation of radio-navigation equipment in IFR flights
-Interception and tracking of QDM. QDR and VOR radials
-Standard instrument departure proceedures (SIDs)
-Standard arrival routes (STARs)
-Flying mehtods of holding and racetrack proceedures, join the holdings and wind corrections

15. Description of practices

Course reversal proceedures, proceedure turns
-Instrument approach proceedures
-Flying precision and non precision approaches (ILS, VOR/DME, LOC/DME, GNSS (LNAV/VNAV, LPV, APV, RNP AR) NDB, NDB/DME)
-Execution of visual circling maneuver
-Automatisation, autopilot fly director systems operation and system usage
-IFR radio communication proceedures
-Pre-departure clearances, ATC clearances, RNAV, RVSM, TCAS communication proceedures
-TEM (Threat and Error Management) based departure and arrival reviews and briefings
Most important rules concerning IFR flights from the existing and valid rulebooks
-ICAO Annex 2 and the EASA AIR OPS (EU No 965/2012 és EU No 800/213)
Part-CAT - Commercial Air Transport Operations
Part-NCO - Non-commercial operations with other than complex-motor-powered aircraft
-Selection of aerodromes as departure, destination or alternate
-Determining weather minima for departure, destination, and alternate aerodromes, analysing weather information (METAR TAF, SIGMET, Significant Wx Charts, Upper wind a temperature charts), making GO/NOGO decisions
-Provisions of commencing and continuation of an instrument approach
-Rules concerning safe execution of instrument approaches (Stabilized Approach, CDFA procedures)
-Fuel calculation in daily operations, in-flight fuel management and its documentation
Non-normal and Emergency Situation Management

-Fast information analysis, situation assessment, and making an emergency resolution strategy based on the analysis
-Problems and possible errors during situation assessment
-Making preferences, making decisions, and acting based on the preferences
-Emphasize the importance of “Aviate, Navigate, Communicate” basic priority order
-The importance of reassessment of a situation, if necessary, revise earlier strategy and decisions
-The effect of working under time-pressure on flight safety, methods of minimizing human errors
-Existing emergency situation management strategies used by airlines

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
- Knowledge of the factors affecting aviation safety, the basics of the Safety Management System (SMS).
- Knowledge and application of visual and instrument navigation procedures.
--Essential knowledge necessary for practical IFR flights
-Basic application of rules important for IFR flights
-Practical manners and methods to operate IFR flights in accordance with the priority order of flight safety, puncutality, efficiency
b) ability
- Ability to conduct flights in accordance with the Commercial Pilot Licence/Instrument Rating (CPL/IR), in accordance with the rules of the air and the requirements of the Authority.
- Ability to navigate in Instrument Meteorological Condition (IMC), subject to individual limitations, using his/her knowledge and experience of radio navigation, based on on-board instruments.
-The thinking routine necessary for IFR flights (in clouds, at night, without visual references) used in commercial airline operations
-Forming vitally important perceptions necessary for IFR flying. To be able to ignore illusions generated by G-forces and the human vestibular system, to be able to rely on other sensual (visual, auditory, and tactile) information when flying the airplane
-To improve cognitive and psychomotoric abilities necessary to fly solely based on instruments
c) attitude
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
-The subject helps to develop a professional, unpretentious thinking, objective consideration of facts upon decision making and the elimination of emotions where possible
-Developes a self-critical way of thinking that helps to avoid the fixation of earlier mistakes or wrong decisions
-It impacts the way of thinking of the pilot, in such a way that makes him open to new information and different opinions
d) autonomy and responsibility
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

The condition for obtaining the semester grade is to write the 1 summative evaluation.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Tóth János: Rádió és elektronikus léginavigáció I.-II. (Hungarocontrol Jegyzet) 1992, 185 + 185 old.
Közelkörzeti navigáció és repülési eljárások KPM-LRI Repülésoktatási osztály, 2001, 146 old.
Jeppesen: Instrument/Commercial Textbook, p. 1024, ISBN: 978-0-88487-278-8,
Global Aviation: IR Flight Training Handbook, 2013, p. 310
Wilhelm Thaller: Never Get Lost (INTERPRETATION OF RADIONAVIGATION), 2011, p. 260, ISBN-10 : 3000086439
SWISS Aviation Training: IFR Radionavigation
FAA-H-8083-15B: Instrument Flying Handbook, 2022, p. 374
FAA H-8083-18: Flight Navigator Handbook, 2006 p. 485
FAA-H-8083-16: IFR Procedures Handbook, 2017, p. 312

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Subject description

1. Subject name	**Basics of Aviation I.**				
2. Subject name in Hungarian	Repülés alapjai 1.			**3. Role**	cc
4. Code	**BMEKORHBsP1001-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	0 hours
Reading written materials	29 hours	**Midterm preparation**	15 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Rohács Dániel
12. Lecturers	Dr. Balogh Miklós, Dr. Beneda Károly, Jankovics István

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

The lectures provide the required knowledge to start practical flying. The topic of the course covers the following main topics: principles of flight, airframes, powerplant, instrumentation, meteorology, and performance. The learning objectives harmonize with EASA regulations.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

Knows the basic principles of aircraft

Knows the basic principles of aircraft systems and on-board instruments

Basic understanding of meteorology, its effects on flying

Knows the principles and procedures of performance calculations of a single engine piston airplane

Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.

Knowledge of the main theories and problem-solving methods in the field.

b) abilities

Able to identify the risks of flying

Ability to analyse and assess the meteorological situation and take the necessary action.

Able to perform performance calculation during flight planning.

The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude

Responsible, flight safety conscious attitude

He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

d) autonomy and responsibility

Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

One mid-term exam with at least 50% result.

19. Opportunity for repeat/retake and delayed completion

Mid-term exam correction possibility in the late completion period

20. Learning materials

Fábián András: PPL kézikönyv, 2010, ISBN: 9789630690621
Dole, C. E. Flight Theory for Pilots, Jeppesen, 1994, p. 297, ISBN 0891004327,
Pilot's Handbook of Aeronautical Knowledge, 2016,
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/pilot_handbook.pdf

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Subject description

1. Subject name	**Basics of Aviation II.**				
2. Subject name in Hungarian	Repülés alapjai 2.			**3. Role**	cc
4. Code	**BMEKORHBsP2002-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	20 hours	**Homework**	0 hours
Reading written materials	29 hours	**Midterm preparation**	15 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Rohács Dániel
12. Lecturers	Dr. Farkas Balázs, Jankovics István, Dr. Nagy Enikő, Pulay Márk

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Lectures provide the required knowledge to start practical flying. The topic of the course covers the following main topics: navigation, flight planning, operational procedures, human performance. The learning objectives harmonize with EASA regulations.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

Knows the navigational procedures and calculations

Knows the basic procedures of flight planning and operation

Knows the effects of flying on human body and on human performance

Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.

Knowledge of the main theories and problem-solving methods in the field.

b) abilities

Able to perform navigational calculations and execute flight planning tasks

Able to control the aircraft, capable of situational awareness, make decisions during flight

The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude

Responsible, flight safety conscious attitude

He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

d) autonomy and responsibility

Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

One mid-term exam with at least 50% result

19. Opportunity for repeat/retake and delayed completion

Mid-term exam correction possibility in the late completion period

20. Learning materials

Fábián András: PPL kézikönyv, 2010, ISBN: 9789630690621
Dole, C. E. Flight Theory for Pilots, Jeppesen, 1994, p. 297, ISBN 0891004327,
Pilot's Handbook of Aeronautical Knowledge, 2016,
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/pilot_handbook.pdf

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Subject description

1. Subject name	**Business Law**				
2. Subject name in Hungarian	Üzleti jog			**3. Role**	cc
4. Code	**BMEGT55A001**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

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	0 hours	**Midterm preparation**	32 hours	**Exam preparation**	0 hours

10. Department	Department of Business Law
11. Responsible lecturer	Dr. Mezei Kitti
12. Lecturers	Dr. Víg Zoltán, Dr. Grad-Gyenge Anikó

13. Prerequisites	(),

14. Description of lectures

1. Introduction, law 2. State, administration and legal sources 3. Legal system, Legal areas 4. EU law 5. Contract law 1. 6. Contract law 2. 7. Contract law 3. 8. Company law 1. 9. Company law 2. 10. Company law 3. 11. Industrial property 12. Labour law 13. Competition law 14. Summary, consultation

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- He is aware of the social and economic functions of legal regulation.
- He is aware of the basic functions of the main areas of law that affect business.
- He knows the principles of the contract and the processes of concluding a contract, as well as the types of contracts that are of decisive importance in business.
- He knows the concept, structure and operation of companies, the defining forms of business.
- He is aware of the “related areas of law” of business law: the basic rules of industrial property law, labor law and competition law.

b) ability

- Able to orientate himself in the world of law/regulation in general.
- In particular, he is able to properly interpret and place the regulations of business.
- Able to think critically.

c) attitude

- He is sufficiently aware of the assessment of law in general, and of the economy in particular.
- He is open to self-reflection, critical inclusion and critical thinking when thinking about the legal regulation of the economy.
- He accepts the enforcement of fundamental and private law standards and requirements as a starting point for regulation.

d) independence and responsibility

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

Two midterm exams. The results of the tests determine the mark.

19. Opportunity for repeat/retake and delayed completion

Retake and make-up test according to the Code of Studies.

20. Learning materials

The series of slides for the lectures of the subject, as well as the Economic Civil Law textbook (edited by Dr. Zsófia Lehóczki, edited by: dr. Tamás Sárközy).

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

Subject description

1. Subject name	**Communication I.**				
2. Subject name in Hungarian	Repülési szaknyelv I.			**3. Role**	cc
4. Code	**BMEGEENBSXCOM1-01**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**4 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	14 hours	**Homework**	0 hours
Reading written materials	11 hours	**Midterm preparation**	14 hours	**Exam preparation**	25 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Sztankó Krisztián
12. Lecturers	Farkas Vulkán

13. Prerequisites	(),

14. Description of lectures

Introducing standard phraseology used in private pilot transportation. In order to prepare the enrolled student for PPL operation the following topics are discussed: transmission of letters and numbers, abbreviations, categories of messages, VHF range, transmission of time, call signs, direction finding, radio test procedures, read-back, radar procedures, conditional clearances, aeronautical ground and airborne services.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge
- Knowledge and proficiency in the specific English language according to EU Regulation 1178/2011 (03.11.2011) on the conditions for pilot training.
- Knowledge and ability to apply the rules of radio communications.
- Knows the basic rules of radiotelephony.
- Interprets information in various broadcasts.
- Informed about radio check procedures.

b) Abilities
- Ability to set up and use on-board radio and radio navigation equipment.
- Ability to communicate by radio in English.
- Identifies the information received in radio communication.
- Interprets the current air traffic situation
- distinguishes between air trafic control and air trafic information.

c) Attitude
- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
-Follows instructions from air traffic control.
-Checks the information received on the radio.
-Initiates communication with the flight information / air traffic control service.

d) Autonomy and responsibility
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
-Makes a decision on the flight procedure and report it in a radio message.
-Performs various flight procedures.
- Takes responsibility for her/his decisions.

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Farkas Vulkán, Menráth Gábor: Rádiótávbeszélő kifejezések, Jegyzet, HungaroControl,2012
Air Pooley's Manual : APM 7 Radio Telephony ISBN:978-1-84336-226-5

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

Subject description

1. Subject name	**Communication II.**				
2. Subject name in Hungarian	Repülési szaknyelv II.			**3. Role**	sp
4. Code	**BMEGEENBSXCOM2-01**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**3 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

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	0 hours	**Midterm preparation**	10 hours	**Exam preparation**	30 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Sztankó Krisztián
12. Lecturers	Farkas Vulkán

13. Prerequisites	Communication I. (BMEGEENBSXCOM1-01), strong; (), ; (),

14. Description of lectures

Introducing standard phraseology used in IFR professional airline transportation. In order to prepare the enrolled student for commercial operation the following topics are discussed: arrivals/departures at controlled airports, abbreviations of instrument procedures, unit specific instrument procedures (aerodrome, approach, area), radar procedures, conditional clearances, aeronautical ground and airborne services.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge
- Knowledge and proficiency in the specific English language according to EU Regulation 1178/2011 (03.11.2011) on the conditions for pilot training.
- Knowledge and ability to apply the rules of radio communications.
- Define the areas of competence of air traffic services
- Understands instructions / clearances / information in various messages
- Systematizes the instrumental procedures used by the different ATS units

b) Abilities
- Ability to set up and use on-board radio and radio navigation equipment.
- Ability to communicate by radio in English.
- Identifies radio messages used in instrument flight
- Apply the required radio communication procedures
- Selects IR terms appropriate to the situation

c) Attitude
- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Initiates communication appropriate to the flight situation
- Organizes messages received on the radio
- Follow instructions and permissions given to him

(d) autonomy and responsibility
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- Cooperates with ATS services
- Makes decisions on choosing the most appropriate procedure in complex situations
- Compares and evaluates differences between procedures

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Farkas Vulkán, Menráth Gábor: Rádiótávbeszélő kifejezések, Jegyzet, HungaroControl,2012
Air Pooley's Manual : APM 7 Radio Telephony ISBN:978-1-84336-226-5
CAE Oxford, EASA ATPL Ground Training Series, Volume 14. Communication, 2014, p. 158
Shawcross, P. Flightpath: Aviation English for Pilots and ATCOs Student's Book with Audio CDs (3) and DVD Student Edition, Cambridge University press, m2011, p. 192, ISBN-10 : 0521178711

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

Subject description

1. Subject name	**Control**				
2. Subject name in Hungarian	Irányítástechnika			**3. Role**	cc
4. Code	**BMEKOKAA138**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	8 hours	**Homework**	5 hours
Reading written materials	14 hours	**Midterm preparation**	6 hours	**Exam preparation**	15 hours

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

13. Prerequisites	Mathematics G3k (BMETEMIBSGMAT3-00), suggested; Electrotechnics – Electronics (BMEKOKAA139), weak; (),

14. Description of lectures

Basics of control theory. Stability theory: conditions of system stability in case of closed and open control loops. PID control design. Robust stability of controlled systems. State space theory: state space representation, transformations, control methods (pole placement design, LQ control, state observer. Discrete systems and control.

15. Description of practices

System analysis in time and frequency domains. PID control design. State space theory: state space representation, transformations, control method (pole placement design).

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- knows the basics of control theory
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.

b) ability

- capable of understanding a given control problem
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.

c) attitude

- open to resolve control problems
- - He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility

- can independently design PID control
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

19. Opportunity for repeat/retake and delayed completion

There is a retake option for the midterm and the homework can resubmitted upon request till the end of delayed completion period.

20. Learning materials

T. Tettamanti and Q. Lu, Lecture Notes on Control Theory, Budapest: Akadémiai Kiadó, ISBN: 9789634543377, doi:10.1556/9789634543377, https://mersz.hu/tamas-qiong-lecture-notes-on-control-theory, 2019.
Keviczky, L.; Nars, R.; Hetthessy, J.; Banyasz, Cs. Conteol engineering, Springer, 2019, p. 532, ISBN: 978-981-10-8296-2

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

Subject description

1. Subject name	**Electrics and Electronics**				
2. Subject name in Hungarian	Elektronika és elektromos berendezések			**3. Role**	cc
4. Code	**BMEKORHBsP4001-00**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	10 hours	**Homework**	0 hours
Reading written materials	10 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Beneda Károly
12. Lecturers	Faltin Zsolt

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Aeroplanes used for professional transport operations are equipped with sophisticated electric systems. Students enrolled in this class should be familiar with DC and AC electrics, generators and alternators, Ohm's Law, practical aircraft systems, semiconductors, basic computers and logic gates. The aim of this subject is to give an insight into circuit protection and capacitors in terms of in-flight operation as well as introducing basic computer technology for better understanding of computer based flight augmentation devices.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
Students know the most important theories and connections as well as the system of concepts they are based on.
Knowledge of the main theories and problem-solving methods in the field.
b) ability / competence
The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.
c) attitude
Aviation Safety centric attitude,
Shares his/her experience with his/her colleagues, thus helping them to develop.
He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
They are characterized by a system-level thinking and approach.
d) autonomy
Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

One mid-term exam with at least 50% result

19. Opportunity for repeat/retake and delayed completion

Mid-term exam correction possibility in the late completion period

20. Learning materials

Beneda J., Gáti B., Hámori Gy., Óvári Gy., Rácz J. REPÜLŐGÉPEK RENDSZEREI ÉS AVIONIKA, Typotex, egyetemi tananyag jegyzetm, 2012, 144 old.
CAE Oxford EASA ATPL Ground Trainig Series Book 3 – Aircraft General Knowledge 2 – Electrics & Electronics, Oxford Aviation Academy, 2014, pp. 278
021 - Airframe, Systems, Electrics, Power Plant eTextbook Electronic textbook linked to Aviationexam question bank for efficient EASA exam preparation, prepared for ECQB 2021, Author: Aviationexam, 2022,

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

Subject description

1. Subject name	**Electrotechnics – Electronics**				
2. Subject name in Hungarian	Elektrotechnika - elektronika			**3. Role**	cc
4. Code	**BMEKOKAA139**	**5. Evaluation type**	**e**	**6. Credits**	**6**
7. Weekly contact hours	**3 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	70 hours	**Preparation for seminars**	14 hours	**Homework**	16 hours
Reading written materials	16 hours	**Midterm preparation**	24 hours	**Exam preparation**	40 hours

10. Department	Department of Control for Transportation and Vehicle Systems
11. Responsible lecturer	Dr. Szabó Géza
12. Lecturers	Dr. Szabó Géza, Lövétei István Ferenc

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

It provides basic engineering knowledge of principles of electrotechnics, of its measurements, of its basic models. Introduces students to the operating principles of the basic elements of electronics, to their parameters, features, characteristics as well as their selection/engineering options. It also introduces the students to the schematics, modelling and analysis principles of amplifying and switching circuitry, and shows the special transportation and vehicle applications. It presents the principles and main parameters of electrical machines as well as their application in vehicle and transportation.

15. Description of practices

Application of the principles presented on lectures, solving exercises.

16. Description of laboratory practices

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17. Learning outcomes

a.) knowledge:

- understand the basic principles and basic relationships of electrotechnics,
- understands the operation, symbols, features and characteristics of basic electronic components
- understands the amplifying and switching circuits
- understands the working principles of electrical machines
- - Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.

b.) Abilities:

- able to understand and analyze the operation of simple electronic circuits
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c.) Attitude:

- to participate in solving basic electric problems in the field of transport or vehicle, to work efficiently and willingly with specialists of other fields (in particular: electrical engineering)
- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

d) his or her autonomy and responsibility:

- he/she is aware of and treats the responsibility associated with the task solution during electric and electronic system problem solving and analysis .
- Keeps abreast of legislative, technical, technological and administrative changes in the field

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

During the semester: two tests, two small project exercise and three labors with their protocols about the results. The results of the tests, projects and labors is considering (1/3 part) during the exam.

19. Opportunity for repeat/retake and delayed completion

The tests have individual re-tests and second (paid) re-tests; the second (paid) re-test can be taken only if a test or a re-test has been taken. Projects can be corrected or submitted during the special period (paid). The laboratory practices can be re-t

20. Learning materials

1. Uray-Szabó: Elektrotechnika tk. 1989.
2. Sárközy: Elektrotechnika, Egyetemi jegyzet
3. Parádi (szerk.): Elektrotechnika gyakorlatok, Egyetemi jegyzet
4. Kohut (szerk.): Elektrotechnika példatár, Egyetemi jegyzet
5. Szabó G.: Elektrotechnika – Elektronika 2012, Typotex Kiadó, ISBN 978-963-279-587-4
6. Lecture notes

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

Subject description

1. Subject name	**Engineering Drawing 1.**				
2. Subject name in Hungarian	Műszaki ábrázolás 1.			**3. Role**	cc
4. Code	**BMEKOJSA498**	**5. Evaluation type**	**m**	**6. Credits**	**6**
7. Weekly contact hours	**2 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	70 hours	**Preparation for seminars**	21 hours	**Homework**	42 hours
Reading written materials	31 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Lovas László
12. Lecturers	Dr. Lovas László, Dr. Ficzere Péter, Dr. Török István, Győri Márk

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Basics of descriptive geometry. Methods of representation: perspective, axonometry, projections. Making of machine element drawing. The algorithm of thecnical drawing. Basic knowledge of technical drawing: types of projections, cutouts, sections. Dimensions: positioning and organization, messages in text. Holes, slope, conicity. Connection between drawing and manufacturing. Simplified representation: threads, gears, splines. Surface roughness. Tolerance types: dimensions, shape and position. Fits. Development of the thinking in space through computer modelling. CAD applications: specificities and techniques of the 3D modelling, software independent basic knowledge.

15. Description of practices

Basic notions of descriptive geometry, basic constructions. Axonometric and projection views. Technical representation: projections, cutouts, sections, simplified representation. Dimensioning of parts.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- The student knows and understands the mutual position of space elements.
- The student knows the rules and symbols of engineering drawings.

b) skills

- The students is able to visualize solid objects from two-dimensional drawings with depth perception and represents solid objects in two dimensions.
- The student is able to communicate his thoughts, ideas clearly through sketches, furthermore he is able to understand other's drawings.

c) attitude

- The student aims to create exact, aesthetic and obvious drawings.

d) independence and responsibility

- The student is able to create technical drawing documentation.
- The student is aware of the significance of his work and the consequences of mistakes.

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

Two midterm tests and the homeworks are evaluated by scores. Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests and reaching 40% of the semestrial points. The semestrial note is determined by the semestrial sc

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Lecture slides; lecture videos, practice videos;
Lovas L. szerk.: Műszaki ábrázolás I. online texbook, Typotex Kiadó;
Frischherz, Dax, Gundelfinger, Häffner, Itschner, Kotsch, Staniczek: Fémtechnológiai táblázatok. B+V Lap- és Könyvkiadó Kft. 1997;
Bándy A.: Műszaki ábrázolás (Táblázatok). Egyetemi jegyzet, 71080, Műegyetemi Kiadó (recommended literature);
Bándy A.: Miből készül? Hogyan készül? elektronikus jegyzet. (recommended literature)

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

Subject description

1. Subject name	**Engineering Drawing 2.**				
2. Subject name in Hungarian	Műszaki ábrázolás 2.			**3. Role**	cc
4. Code	**BMEKOJSA499**	**5. Evaluation type**	**m**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	14 hours	**Homework**	30 hours
Reading written materials	24 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Ficzere Péter
12. Lecturers	Dr. Lovas László, Dr. Ficzere Péter, Dr. Török István, Győri Márk

13. Prerequisites	Engineering Drawing 1. (BMEKOJSA498), strong; (), ; (),

14. Description of lectures

Continuation of what has been started in Engineering drawing I. Modelling assemblies of multiple parts. Structure and characteristics of assembly drawings. Bolted link drawings and bolt fixation. Shaft-hub assembly drawings. Symbols of welding, welded structure drawings. Spring drawings of various type. Riveted assembly drawings. Basics of CAD theory. Drawing analysis, understanding of drawing. Detail drawings. Role and types of product documentation. Technical drawing in integrated corporate data handling softwares. Application of computer assisted drawing and documentation making. Drawing of typical parts, use of part libraries, parametrized modelling. Basics of standardization, use of standards.

15. Description of practices

Guided exercise solving in the field of part assembly technical drawing.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- The student knows the rules and symbols of engineering drawings.

b) skills

- The students is able to prepare technical drawings and documentation of assemblies composed of many parts.
- The student is able to communicate his thoughts, ideas clearly through sketches, furthermore he is able to understand other's drawings.

c) attitude

- The student aims to create exact, aesthetic and obvious drawings.

d) independence and responsibility

- The student is able to create technical drawing documentation of composed structures.
- The student is aware of the significance of his work and the consequences of mistakes.

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

Two midterm tests and the homeworks are evaluated by scores. Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests and reaching 40% of the semestrial points. The semestrial note is determined by the semestrial sc

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Lecture slides; lecture videos, practice videos;
Lovas L. szerk.: Műszaki ábrázolás I. online texbook, Typotex Kiadó;
Lovas L. szerk.: Műszaki ábrázolás II. online texbook, Typotex Kiadó;
Frischherz, Dax, Gundelfinger, Häffner, Itschner, Kotsch, Staniczek: Fémtechnológiai táblázatok. B+V Lap- és Könyvkiadó Kft. 1997;
Bándy A.: Műszaki ábrázolás (Táblázatok). Egyetemi jegyzet, 71080, Műegyetemi Kiadó. (recommended literature)

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

Subject description

1. Subject name	**Flight Performance**				
2. Subject name in Hungarian	Repülés folyamatai			**3. Role**	sp
4. Code	**BMEGEENBSXPRMN-01**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	0 hours	**Homework**	0 hours
Reading written materials	60 hours	**Midterm preparation**	20 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Szentgyörgyi György

13. Prerequisites	Basic IR (BMEGEENBSXBCIR-01), strong; (), ; (),

14. Description of lectures

This subject is intended to introduce different flight stages from aircraft performance point of view. for different aircraft categories. Thus, the subjects are being extracted general principles of take-off and climb including angle of climb, excess thrust, the effect of weight on climb angle, thrust available, calculating climb gradient, climbing after an engine failure, rate of climb and descent and factors affecting them. This followed by principals of cruise discussing balance of forces in level flight, moving the centre of gravity, aeroplane speeds, indicated airspeed (IAS), calibrated airspeed (CAS), equivalent airspeed (EAS), true airspeed (TAS), true goundspeed (TGS), mach number, endurance, jet aeroplane endurance, propeller aeroplane endurance, range, factors affecting range, optimum altitude, long range cruise (LRC) Finally the end part of flights descent, landing including is discussed involving landing distance, landing distance available (LDA), lift and weight, reverse thrust, drag, landing distance formula, effect of variable factors on landing distance, hydroplaning, landing technique on slippery runways, microbursts and windshear

15. Description of practices

Practicing the relevant theoretical parts

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge and application of the theoretical basis for navigation and performance calculation.
- Knowledge of basic meteorological concepts, phenomena, their impact on aviation and atmospheric processes hazardous to aviation.
- Knowledge of flight rules and procedures and the basis for the development of procedures.
- Knowledge and application of visual and instrument navigation procedures.
- Understands general principles of take-off and climb
- Able to distinguish effects on climb of angle of climb, excess thrust, weight, thrust available
- Compares , aeroplane speeds, indicated airspeed (IAS), calibrated airspeed (CAS), equivalent airspeed (EAS), true airspeed (TAS), true goundspeed (TGS), mach number

b) ability

- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Calculates balance of forces in level flight, moving the centre of gravity, aeroplane speeds
- Determines flights descent and landing distance

Makes difference from normal landing technique to hydroplaning, on slippery runways, microbursts and windshear.

c) attitude

- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Controls centre of gravity and diffrent speed types
- Determines optimal cruising flight level
- Organizes systematically landing partial procedures of flight colntrol and navigation

d) autonomy and responsibility

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

- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Jereb Gábor: Aerodinamika és repüléselmélet I-II. ISBN: 963-10-2032-0
Rohács, J.; Gausz Zs.; Gausz T. Repülésmechanika, Typotex Kiadó, 2012, 304 o.
Oxford Aviation Academy ATPL Ground Training Series Book 6 – Flight Performance & Flight Planning,
ISBN 13: 9781906202767

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

Subject description

1. Subject name	**Flight Planning and Monitoring**				
2. Subject name in Hungarian	Repüléstervezés és monitoring			**3. Role**	sp
4. Code	**BMEKORHBsP5A01-00**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	18 hours	**Homework**	0 hours
Reading written materials	12 hours	**Midterm preparation**	20 hours	**Exam preparation**	30 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Kale Utku
12. Lecturers	Gál István, Jankovics István

13. Prerequisites	General Navigation (BMEGEATBSXNAVI-01), strong; Radio Navigation (BMEKORHBsP4A01-00), strong; (),

14. Description of lectures

Navigation Calculators; PET and PNR calculation, ETOPS operation; Grid navigation; Planning documentation; Flight planning, Flight Plan, Repeptitive Flight Plan; Topographical charts; Theory of fuel calculation

15. Description of practices

Practicing flight planning calculations

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knows the rules and procedures related to flight planning and monitoring
- Knows the most important theories and connections as well as the system of concepts they are based on.
- Knowledge of the main theories and problem-solving methods in the field.

b) ability

- Able to planning a flight
- Ability to comply with flight safety rules.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.
- Ability to plan the flight, perform the necessary navigation and performance calculations.

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility

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

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

Mid-term test during the semester. Requirement for signature of the subject: mid-term test. The final result is according to a written exam.

19. Opportunity for repeat/retake and delayed completion

Replacement of the requirements for signature, as well as subject note are possible in accordance with the current Study and Examination Regulations.

20. Learning materials

Oxford Aviation Academy ATPL Ground Trainig Series , Book 7 – Flight Peformance & Planning 2 – Flight Planning & Monitoring
Flight performance, tabvles of the different aircraft

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

Subject description

1. Subject name	**Fluid Dynamics, Thermodynamics and Heat Transfer 1.**				
2. Subject name in Hungarian	Hő- és áramlástan 1.			**3. Role**	cc
4. Code	**BMEKORHBsP3001-00**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**1 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	15 hours	**Homework**	0 hours
Reading written materials	22 hours	**Midterm preparation**	10 hours	**Exam preparation**	15 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Veress Árpád
12. Lecturers	Dr. Veress Árpád, Dr. Hargitai L. Csaba, Jankovics István Róbert

13. Prerequisites	Mathematics G2 (BMETE94BG02), strong; (), ; (),

14. Description of lectures

Introduction: Systems, Fluid dynamics, thermodynamics and heat transfer and their applications in logistics, transportation and vehicle engineering, Continuum mechanics, Kinetic theory of gases, introduction of basic parameters (ρ, v, p, T), equations of state. Fluid dynamics: Liquids, steams, and gases in p-v-T state space (compressible and incompressible mediums), Description of fluid motions according to Euler and Lagrange, The principle of mass, momentum and energy conservation laws, Hydrostatics, Newtonian fluid, The basic laws of viscous flow, Boundary layer, Boundary layer separation, Internal, external and cascade flows, Fluid dynamics in and around of logistics', transportation's and vehicle's systems – forces and coefficients, Similarity theory of fluids, Compressible fluids: sound speed in liquids and gases, Pressure waves, Doppler's effect, Sound barrier, Mach cone, Allievi's water hammer effect. Thermodynamics: Heat and specific heat, The 1st law of thermodynamics, Thermodynamic processes, The 2nd law of thermodynamics, Cycles, useful work, thermal efficiency and coefficient of performance, Air with moisture and corresponding processes, Introduction to heat transfer – classification, principles, characteristics, applications and their conditions.

15. Description of practices

Exercises are completed after each corresponding chapter by means of solving calculation tasks.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge:

- The student knows the theoretical together with measurement- and analytical calculation-based practical aspects of the studied chapters in fluid dynamics, technical thermodynamics and heat transfer in continuum flow regime with especial care for the logistics, transportation and vehicle engineering, meanwhile she/he knows the advantages, disadvantages, conditions and application ranges of the different processes and methods;
- Student knows the relevant professional literature, she/he knows the way of finding, questing the needed detailed technical information about the investigated problem and the student knows and the student is able to use diagrams and tables in the field of fluid dynamics, thermodynamics and heat transfer.
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.

b) ability:

- The student can complete theoretical and practical (measurements, experiments, tests and calculations) tasks in the field of fluid dynamics, technical thermodynamics and heat transfer in line with the content of the subject in the field of maintenance and developments with verification, plausibility check and validation (in case of relevancies);
- The student can recognise the desired modifications (e.g.: improvements and developments) in the fields of the subject, the student can perform the needed actions for changes and can check, analyse and understand the results of the modifications.
- The student can understand complex systems and processes, can plan, monitor, evaluate and making decision together with considering all external and internal effects acting on the investigated activity and the effects of her/his activity on other systems.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude:

- The student aims to complete her/his studies at the highest level, under the shortest time, by providing her/his knowledge and capacity at the best to obtain knowledge for deep and independent professional work;

- The student cooperates with professors and mates during the studies;
- The student continuously increases her/his knowledge independently by having information from the external literature given by the lectures to complete her/his studies;
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility:

- The student completes her/his homework, reports about laboratory practices and makes exercises about calculation tasks independently;
- The student takes responsibility for guiding mates by the quality of her/his work and by keeping ethic norms;
- The student takes responsibility for applying the knowledge in line with the studied conditions, limitations and constraints;
- The student can friendly accept the well-established constructive criticism and can utilize that in future;
- The student can accept the form of the cooperation; she/he can work alone or in a team member depends on the actual situation;
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

There is a mid-term examination during the semester. The condition for having the signature at the end of the semester is completing the mid-term examination successfully. The subject is ended by examination and its result is the mark of the student.

19. Opportunity for repeat/retake and delayed completion

The missing conditions for fulfilling the subject can be replaced according to the guidance of the TVSZ (Code of Studies).

20. Learning materials

1. A tárgy keretében kiadott mintapéldák, dokumentumok és oktatási segédanyagok.
2. Dr. Benedek Z., Hadházi D., Kiss E.né., Dr. Konecsny F., Dr. Pásztor E., Perjési I., Sánta I., Dr. Steiger I., Műszaki hő- és áramlástan I/1, I/2, II. Műegyetemi kiadó. J 7-724, J 7-724/a.
3. Fox, R. W.; McDonald, A. T. Introduction to fluid dynamics Jhon Wiley and Sons, ISBN 0470547553, 2010, p. 800
4. Borgnakke, C.; Sonntag, R. E. Fundamentals of Thermodynamics, John Wiley and Sons, 2022 ISBN 1119820774, p. 736

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

Subject description

1. Subject name	**Fluid Dynamics, Thermodynamics and Heat Transfer 2.**				
2. Subject name in Hungarian	Hő- és áramlástan 2.			**3. Role**	cc
4. Code	**BMEKORHBsP4003-00**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**1 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

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

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Beneda Károly
12. Lecturers	Dr. Beneda Károly, Dr. Veress Árpád

13. Prerequisites	Fluid Dynamics, Thermodynamics and Heat Transfer 1. (BMEKORHBsP3001-00), strong; (), ; (),

14. Description of lectures

Thermodynamics: Heat transfer (heat conduction, heat convection and radiation), Gas mixtures, Advanced thermodynamic processes, and cycles in vehicles, Thermodynamic processes and cycles of steam. Fluid dynamics: Inviscid flow: Compressible flows: gas dynamics, supersonic flow (Laval tube), Introduction to aeroacoustics, 2D potential flow of incompressible, ideal fluids around stationary and rotating cylinders, Rotational flows (conservation of angular momentum, the vortex theorems of Helmholtz and Kelvin), Vortex-panel method. Viscous flow: the Navier-Stokes equation and the Reynolds averaged Navier-Stokes equation, Turbulent flows (turbulent modelling by Prandtl, introduction of k-ω, k-ε turbulent models), Advanced boundary layer theory (dimensionless parameters and logarithmic law of the wall), Fundamentals of numerical methods in fluid mechanics (CFD). Basics of fluid machinery: Frictional flow in pipes and pipelines, pipeline characteristics curve, Introduction of pumps (structure, operation, types, Euler turbine equation, number of transmission, degree of reaction, characteristics, effective power).

15. Description of practices

Exercises are completed after each corresponding chapter by means of solving calculation tasks.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge:

- The student knows the theoretical together with measurement- and analytical calculation-based practical aspects of the studied chapters in fluid dynamics, technical thermodynamics and heat transfer in continuum flow regime with especial care for the logistics, transportation and vehicle engineering, meanwhile she/he knows the advantages, disadvantages, conditions and application ranges of the different processes and methods;
- Student knows the relevant professional literature, she/he knows the way of finding, questing the needed detailed technical information about the investigated problem and the student knows and the student is able to use diagrams and tables in the field of fluid dynamics, thermodynamics and heat transfer.
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.

b) ability:

- The student can complete theoretical and practical (measurements, experiments, tests and calculations) tasks in the field of fluid dynamics, technical thermodynamics and heat transfer in line with the content of the subject in the field of maintenance and developments with verification, plausibility check and validation (in case of relevancies);
- The student can recognise the desired modifications (e.g.: improvements and developments) in the fields of the subject, the student can perform the needed actions for changes and can check, analyse and understand the results of the modifications.
- The student can understand complex systems and processes, can plan, monitor, evaluate and making decision together with considering all external and internal effects acting on the investigated activity and the effects of her/his activity on other systems.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude:

- The student aims to complete her/his studies at the highest level, under the shortest time, by providing her/his knowledge and capacity at the best to obtain knowledge for deep and independent professional work;
- The student cooperates with professors and mates during the studies;

- The student continuously increases her/his knowledge independently by having information from the external literature given by the lectures to complete her/his studies;
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility:

- The student completes her/his homework, reports about laboratory practices and makes exercises about calculation tasks independently;
- The student takes responsibility for guiding mates by the quality of her/his work and by keeping ethic norms;
- The student takes responsibility for applying the knowledge in line with the studied conditions, limitations and constraints;
- The student can friendly accept the well-established constructive criticism and can utilize that in future;
- The student can accept the form of the cooperation; she/he can work alone or in a team member depends on the actual situation;
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

There is a mid-term examination during the semester. The conditions for having the signature at the end of the semester are the acceptance of two homework with completing the mid-term examination successfully. The subject is ended by examination and its r

19. Opportunity for repeat/retake and delayed completion

The missed conditions for completing the subject are according to the paragraphs of the actual TVSZ (Code of Studies).

20. Learning materials

1. A tárgy keretében kiadott mintapéldák, dokumentumok és oktatási segédanyagok.
2. Dr. Benedek Z., Hadházi D., Kiss E.né., Dr. Konecsny F., Dr. Pásztor E., Perjési I., Sánta I., Dr. Steiger I., Műszaki hő- és áramlástan I/1, I/2, II. Műegyetemi kiadó. J 7-724, J 7-724/a.
3. Fox, R. W.; McDonald, A. T. Introduction to fluid dynamics Jhon Wiley and Sons, ISBN 0470547553, 2010, p. 800
4. Borgnakke, C.; Sonntag, R. E. Fundamentals of Thermodynamics, John Wiley and Sons, 2022 ISBN 1119820774, p. 736

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

Subject description

1. Subject name	**Flying Practice I.**				
2. Subject name in Hungarian	Repülési gyakorlat 1.			**3. Role**	cc
4. Code	**BMEGEENBSXPRC1-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	8 hours	**Preparation for seminars**	52 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Medgyesi Zsolt

13. Prerequisites	Basics of Aviation II. (BMEKORHBsP2002-00), strong; (), ; (),

14. Description of lectures

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15. Description of practices

The goal of this subject to put into practice knowledge gained at theoretical lessons of flying and flight control. Student has to follow of Operational Manual (OM) of the flight traaining organization having appropriate ATO and perform visual flight VFR tasks

16. Description of laboratory practices

-

17. Learning outcomes

a) knowledge

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation
- Knowledge of flight rules and procedures and the basis for the development of procedures
- Understands flight control possibilities in visual flight at daytime VFR conditions

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Ability to comply with flight safety rules.
- Ability, after further training and appropriate experience, to occupy positions of line management (manager responsible for air operations, ground handling, safety, compliance).
- Have the stamina and tolerance for monotony required to carry out practical activities.
- Applies flyimg procedures and controls learnt on theoretical lessons

c) ttitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Organizes systematically take-off, climbing, crusing and landing partial procedures of flight control and navigation

d) autoony and respnsibility

- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for signing the course is the completion of flight time at a practical training organization and at a level accepted by the flight instructor. The instructor of the training organization makes a proposal with justification for the grade.

19. Opportunity for repeat/retake and delayed completion

by replacing the missing number of flight hours accepted by the flight instructor.

20. Learning materials

ATO gyakorlati képzési és működési szabályzat (OM)
Adott repülési gyakorlatokhoz meghatározott segédletek, dokumentumok au oktatók és a gyakorlatvezetők összeállításában.
Airplane Flying Handbook, FAA-H-8083-3C, FAA, 2021, p. 406

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

Subject description

1. Subject name	**Flying Practice II.**				
2. Subject name in Hungarian	Repülési gyakorlat 2.			**3. Role**	cc
4. Code	**BMEGEENBSXPRC2-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	38 hours	**Preparation for seminars**	22 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Medgyesi Zsolt

13. Prerequisites	Flying Practice I. (BMEGEENBSXPRC1-01), strong; (), ; (),

14. Description of lectures

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15. Description of practices

The goal of this subject to put into practice knowledge gained at theoretical lessons of flying and flight control. Student has to follow of Operational Manual (OM) of the flight traaining organization having appropriate ATO and perform visual flight daytime VFR and air-route training tasks.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation
- Knowledge of flight rules and procedures and the basis for the development of procedures
- Understands flight control possibilities in visual flight daytime VFR and night time NVFR conditions

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Ability to prepare and submit a flight plan.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Ability to communicate by radio in English.
- Ability to analyse and assess the meteorological situation and take the necessary action.
- Ability to comply with flight safety rules.
- Ability, after further training and appropriate experience, to occupy positions of line management (manager responsible for air operations, ground handling, safety, compliance).
- Have the stamina and tolerance for monotony required to carry out practical activities.
- Applies flyimg procedures and controls learnt on theoretical lessons

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Organizes systematically take-off, climbing, crusing and landing partial procedures of flight control and navigation

d) autonomy and responsibility

- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for signing the course is the completion of flight time at a practical training organization and at a level accepted by the flight instructor.

19. Opportunity for repeat/retake and delayed completion

by replacing the missing number of flight hours accepted by the flight instructor.

20. Learning materials

ATO gyakorlati képzési és működési szabályzat (OM)
Adott repülési gyakorlatokhoz meghatározott segédletek, dokumentumok au oktatók és a gyakorlatvezetők összeállításában.
Airplane Flying Handbook, FAA-H-8083-3C, FAA, 2021, p. 406

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

Subject description

1. Subject name	**Flying Practice III.**				
2. Subject name in Hungarian	Repülési gyakorlat 3.			**3. Role**	cc
4. Code	**BMEGEENBSXPRC3-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	44 hours	**Preparation for seminars**	16 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Medgyesi Zsolt

13. Prerequisites	Flying Practice II. (BMEGEENBSXPRC2-01), strong; (), ; (),

14. Description of lectures

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15. Description of practices

The goal of this subject to put into practice knowledge gained at theoretical lessons of flying and flight control. Student has to follow of Operational Manual (OM) of the flight traaining organization having appropriate ATO and perform night visual flight (NVFR), upset recovery trainig (UPRT) and single engine instrument rating SEIR tasks

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.
- Knowledge of the factors affecting aviation safety, the basics of the Safety Management System (SMS).
- Knowledge and application of the theoretical basis for navigation and performance calculation.
- Knowledge of flight rules and procedures and the basis for the development of procedures.
- Knowledge and application of visual and instrument navigation procedures.
- Knowledge and ability to apply the rules of radio communications.
- Understands flight control possibilities in single engine instrument rating SEIR conditions

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Ability to prepare and submit a flight plan.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Ability to set up and use on-board radio and radio navigation equipment.
- Ability to navigate by sight in Visual Meteorological Conditions (VMC), taking into account individual limitations, based on geographical knowledge, map skills, visual landmark recognition and experience.
- Ability to communicate by radio in English.
- Ability to analyse and assess the meteorological situation and take the necessary action.
- Ability to interpret and take into account meteorological telegrams and reports when planning and executing flights.
- Ability to comply with flight safety rules.
- Have the stamina and tolerance for monotony required to carry out practical activities.
- Applies flyimg procedures and controls learnt on theoretical lessons

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Organizes systematically take-off, climbing, crusing and landing partial procedures of flight control and navigation

d) atonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for signing the course is the completion of flight time at a practical training organization and at a level accepted by the flight instructor.

19. Opportunity for repeat/retake and delayed completion

by replacing the missing number of flight hours accepted by the flight instructor.

20. Learning materials

ATO gyakorlati képzési és működési szabályzat (OM)
Adott repülési gyakorlatokhoz meghatározott segédletek, dokumentumok au oktatók és a gyakorlatvezetők összeállításában.
Airplane Flying Handbook, FAA-H-8083-3C, FAA, 2021, p. 406

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

Subject description

1. Subject name	**Flying Practice IV.**				
2. Subject name in Hungarian	Repülési gyakorlat 4.			**3. Role**	cc
4. Code	**BMEGEENBSXPRC4-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	43 hours	**Preparation for seminars**	17 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Dobránsky Péter

13. Prerequisites	Flying Practice III. (BMEGEENBSXPRC3-01), strong; (), ; (),

14. Description of lectures

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15. Description of practices

The goal of this subject to put into practice knowledge gained at theoretical lessons of flying and flight control. Student has to follow of Operational Manual (OM) of the flight traaining organization having appropriate ATO and perform multi engine class rating MECR and single engine instrument rating SEIR tasks

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.
- Knowledge of the factors affecting aviation safety, the basics of the Safety Management System (SMS).
- Knowledge and application of the theoretical basis for navigation and performance calculation.
- Knowledge of flight rules and procedures and the basis for the development of procedures.
- Knowledge and application of visual and instrument navigation procedures.
- Knowledge and ability to apply the rules of radio communications.
- Understands flight control possibilities in multi engine class rating MECR and multi engine instrument rating MEIR conditions

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Ability to plan the flight, perform the necessary navigation and performance calculations.
- Ability to prepare and submit a flight plan.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Ability to set up and use on-board radio and radio navigation equipment.
- Ability to navigate by sight in Visual Meteorological Conditions (VMC), taking into account individual limitations, based on geographical knowledge, map skills, visual landmark recognition and experience.
- Ability to navigate in Instrument Meteorological Condition (IMC), subject to individual limitations, using his/her knowledge and experience of radio navigation, based on on-board instruments.
- Ability to communicate by radio in English.
- Ability to analyse and assess the meteorological situation and take the necessary action.
- Ability to interpret and take into account meteorological telegrams and reports when planning and executing flights.
- Ability to comply with flight safety rules.
- Have the stamina and tolerance for monotony required to carry out practical activities.
- Applies flyimg procedures and controls learnt on theoretical lessons

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Organizes systematically take-off, climbing, crusing and landing partial procedures of flight control and navigation

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for signing the course is the completion of flight time at a practical training organization and at a level accepted by the flight instructor.

19. Opportunity for repeat/retake and delayed completion

by replacing the missing number of flight hours accepted by the flight instructor.

20. Learning materials

ATO gyakorlati képzési és működési szabályzat (OM)
Adott repülési gyakorlatokhoz meghatározott segédletek, dokumentumok au oktatók és a gyakorlatvezetők összeállításában.
Airplane Flying Handbook, FAA-H-8083-3C, FAA, 2021, p. 407

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Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Flying Practice V.**				
2. Subject name in Hungarian	Repülési gyakorlat 5.			**3. Role**	cc
4. Code	**BMEGEENBSXPRC5-01**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	43 hours	**Preparation for seminars**	17 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	0 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Dobránsky Péter

13. Prerequisites	Flying Practice IV. (BMEGEENBSXPRC4-01), strong; (), ; (),

14. Description of lectures

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15. Description of practices

The goal of this subject to put into practice knowledge gained at theoretical lessons of flying and flight control. Student has to follow of Operational Manual (OM) of the flight traaining organization having appropriate ATO and perform multiengine instrument rating (MEIR), airline procedure standard multi crew cooperation (APS MCC) and Jet orientation (JOT) tasks

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.
- Knowledge of the factors affecting aviation safety, the basics of the Safety Management System (SMS).
- Knowledge and application of the theoretical basis for navigation and performance calculation.
- Knowledge of basic meteorological concepts, phenomena, their impact on aviation and atmospheric processes hazardous to aviation.
- Knowledge of flight rules and procedures and the basis for the development of procedures.
- Knowledge and application of visual and instrument navigation procedures.
- Knowledge and ability to apply the rules of radio communications.
- Understands flight control possibilities in multi crew cooperation MCC and Jet orientation JOT conditions

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Interpersonal competencies (interpersonal skills, leadership, conflict resolution, teamwork and cooperation), which enable the pilot to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- Ability to perform engineering duties in the service and control of aircraft operations.
- Ability to perform first officer duties on multi-pilot aeroplanes after type rating,
- Ability to conduct flights in accordance with the Commercial Pilot Licence/Instrument Rating (CPL/IR), in accordance with the rules of the air and the requirements of the Authority.
- Ability to plan the flight, perform the necessary navigation and performance calculations.
- Ability to prepare and submit a flight plan.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Ability to set up and use on-board radio and radio navigation equipment.

- Ability to navigate by sight in Visual Meteorological Conditions (VMC), taking into account individual limitations, based on geographical knowledge, map skills, visual landmark recognition and experience.
- Ability to navigate in Instrument Meteorological Condition (IMC), subject to individual limitations, using his/her knowledge and experience of radio navigation, based on on-board instruments.
- Ability to communicate by radio in English.
- Ability to analyse and assess the meteorological situation and take the necessary action.
- Ability to interpret and take into account meteorological telegrams and reports when planning and executing flights.
- Ability to comply with flight safety rules.
- Ability, after further training and appropriate experience, to occupy positions of line management (manager responsible for air operations, ground handling, safety, compliance).
- Have the stamina and tolerance for monotony required to carry out practical activities.
- Applies flyimg procedures and controls learnt on theoretical lessons

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Organizes systematically take-off, climbing, crusing and landing partial procedures of flight control and navigation

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Assesses the efficiency, effectiveness and safety of the work of subordinates.
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- Evaluate feedback informations of flying procedures
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for signing the course is the completion of flight time at a practical training organization and at a level accepted by the flight instructor.

19. Opportunity for repeat/retake and delayed completion

by replacing the missing number of flight hours accepted by the flight instructor.

20. Learning materials

ATO gyakorlati képzési és működési szabályzat (OM)
Adott repülési gyakorlatokhoz meghatározott segédletek, dokumentumok au oktatók és a gyakorlatvezetők összeállításában.
Airplane Flying Handbook, FAA-H-8083-3C, FAA, 2021, p. 407

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Subject description

1. Subject name	**General Navigation**				
2. Subject name in Hungarian	Általános navigáció			**3. Role**	sp
4. Code	**BMEGEATBSXNAVI-01**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**3 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	20 hours	**Homework**	0 hours
Reading written materials	25 hours	**Midterm preparation**	0 hours	**Exam preparation**	35 hours

10. Department	Department of Fluid Mechanics
11. Responsible lecturer	Dr. Farkas Balázs
12. Lecturers	Dr. Farkas Balázs, Szentgyörgyi György

13. Prerequisites	Basics of Aviation II. (BMEKORHBsP2002-00), strong; (), ; (),

14. Description of lectures

The subject of General Navigation discusses all the principles required to plan or carry out flight operations cross-country and overseas using topographical charts and sophisticated navigation equipments. Students enrolled this class are introduced to the following topics: direction, latitude, longitude, great circles, rhumb lines, directions on the earth, earth magnetism, using the navigation computer (E6B, CR-3), 1 in 60 rule, convergency and conversion angle, departure, scale, general chart properties, Mercator and Lambert charts, the polar stereographic chart, transverse and oblique charts, critical point, point of no return, gridded charts, direct indicating compass, aircraft magnetism.

15. Description of practices

Despite the detailed planning methods and map reading exercises, students shall be familiar with dead-reckoning and in-flight diversion procedures.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge and application of the theoretical basis for navigation and performance calculation.
- Knowledge and application of visual and instrument navigation procedures.
- Knows the features of the earth as a celestial body that can be used to determine the position of an aircraft in flight. He is familiar with the cartographic procedures used in flight and the properties of the maps made from them and their applicability in flight planning and execution. Based on the above, you are aware of the principle of operation of navigation devices, understand their limitations. Understands the system of on-board navigation devices and their connection to the aircraft computer system.

b) ability

- Ability to plan the flight, perform the necessary navigation and performance calculations.
- Ability to navigate by sight in Visual Meteorological Conditions (VMC), taking into account individual limitations, based on geographical knowledge, map skills, visual landmark recognition and experience.
- Able to determine position ofthe operated aircraft on the navigation maps used in flight with sufficient accuracy at different stages of the flight using the aircraft navigation devices. He interprets the specifics of the flight task, on the basis of which he prepares the flight plan. Manages on-board devices that support flight during the flight task.

c) attitude

- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation
-During a flight task, he / she always checks that his / her position corresponds to the flight plan defined during the flight preparation. It helps the work of the other participants in the flight, strives to form a partnership. It recognizes the limitations of its own and the aircraft it operates, thus increasing the safety of flight operations

d) autonomy and responsibility

- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- He feels responsible for the safe operation of the technology he operates. Based on his knowledge, he makes a decision about the elements of the flight task. It recognizes anomalies in the performance of the flight task and makes an appropriate decision to modify the flight plan during the performance of the task if circumstances so require.

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

CAE Oxford, EASA ATPL Ground Training Series Book 10 – Navigation 1 – General Navigation(Publisher CAE Oxford Aviation Academy, pp. 570. (EASA általl hivatalosan elfiogadott könyv.)
061 - General Navigation eTextbook, Electronic textbook linked to Aviationexam question bank for efficient EASA exam preparation (author : Aviationexam, 2022,
Tóth János: Léginavigáció (Hungarocontrol lecturenote), HungaControl Repülésoktatási Központ 2005, 186 old.

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Subject description

1. Subject name	**Human Performance**				
2. Subject name in Hungarian	Emberi teljesítőképesség			**3. Role**	cc
4. Code	**BMEGT52BS46000-00**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**3 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	15 hours	**Homework**	0 hours
Reading written materials	13 hours	**Midterm preparation**	20 hours	**Exam preparation**	30 hours

10. Department	Department of Ergonomics and Psychology
11. Responsible lecturer	Dr. Tóvölgyi Sarolta
12. Lecturers	Pulay Márk

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

This course examines human performance and the external factors affecting the human body during flight from both physiological and psychological perspectives. In order to properly execute piloting tasks at high altitudes in a pressurized cabin, it is essential to understand the physiological and psychological principles of human performance. From a physiological standpoint, it is crucial to know the functions of the circulatory, oxygen supply, and respiratory systems. Additionally, understanding the nervous system, the ear's role in hearing and balance, and visual functions is important. The effects of rapid decompression on perception and respiratory functions are particularly significant. The psychological part of the course analyzes the factors influencing cooperation in the cockpit, such as information exchange processes, human errors and their mitigation, learning processes, behavior patterns, and motivation. It is also essential to understand the effects of fatigue and the risks of falling asleep. Furthermore, the cooperation between humans and machines, decision-making, and understanding risks are vital. The principles of crew cooperation and multi-pilot operations will also be introduced.

15. Description of practices

16. Description of laboratory practices

17. Learning outcomes

a) knowledge

1. They have comprehensive knowledge of the physiological effects of aviation on the human body.
2. They have comprehensive knowledge of the psychological effects of aviation on the human body.
3. They have comprehensive knowledge of how human information is processed.
4. They have comprehensive knowledge of crew resources management and about the preparation for a multi-pilot environment.
5. Knowledge and proficiency in the specific English language according to EU Regulation 1178/2011 (03.11.2011) on the conditions for pilot training.
6. Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
7. Knowledge of the main theories and problem-solving methods in the field.
8. Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.
9. Ismeri a repülésbiztonságot befolyásoló tényezőket, a Repülésbiztonsági Rendszer (Safety Management System, SMS) alapjait.

b) ability

1. They are able to recognize when unexpected physiological phenomena (eg. hypoxia) in flight affect the pilot's or passengers' body.
2. They are able to recognize when unexpected psychological phenomena (eg. hyperventilation) in flight affect the pilot's or passengers' body.
3. They are able to make the right decision and take action when the above phenomena occur.
4. Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
5. Interpersonal competencies (interpersonal skills, leadership, conflict resolution, teamwork and cooperation), which enable the pilot to operate civil aircraft.
6. Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
7. Ability to navigate by sight in Visual Meteorological Conditions (VMC), taking into account individual limitations, based on geographical knowledge, map skills, visual landmark recognition and experience.

8. Ability to navigate in Instrument Meteorological Condition (IMC), subject to individual limitations, using his/her knowledge and experience of radio navigation, based on on-board instruments.

9. Have the stamina and tolerance for monotony required to carry out practical activities.

c) attitude

1. They are characterized by sensitivity to human needs. They are characterized by a user-centric thinking and approach.

2. They are characterized by continuous learning skills, broad and thorough education, interdisciplinary inter-est.

3. They are characterized by a system-level thinking and approach.

4. They are characterized by a strong critical and self-critical sense.

5. He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

6. He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.

7. Shares his/her experience with his/her colleagues, thus helping them to develop..

d) independence and responsibility

1. To solve various professional problems, they Awareness of various human performance and external factors affecting the human body in flight.

2. They are open to independently monitor technical, technological and human developments in his / her field.

3. In order ensure the safety of flight, it mobilizes its theoretical and practical knowledge and skills in an au-tonomous manner, if necessary in cooperation with the other members of the fly deck.

4. Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.

5. Assesses the efficiency, effectiveness and safety of the work of subordinates.

6.He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.

7. Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

The condition for obtaining the signature is to write the 1 summative midterm test, with min. 50% result. The final grade depends on the final exam result.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Hercegfi Károly és Izsó Lajos: Ergonómia, Typotex Kiadó, 2007. Budapest
Randolph Blake - Robert Sekuler: Észlelés, Osiris Kiadó, 2004.
Fábián András: PPL kézikönyv, 2010, 466 o.
CAE Oxford: ATPL Ground Trainig Series Book 8 – Human Performance & Limitations, Oxford Aviation Academy, 2016, p. 464
Chambell, D. R.; Bagshaw, M. Human Performance and Limitations in Aviation, John Wiley and Sons, ISBN: 0632059656, 2002, p. 208

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Faculty of Transportation Engineering and Vehicle Engineering

Subject description

1. Subject name	**Informatics**				
2. Subject name in Hungarian	Informatika			**3. Role**	cc
4. Code	**BMEKOKJBsP1001-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**0 practice**	**2 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	12 hours	**Homework**	23 hours
Reading written materials	14 hours	**Midterm preparation**	15 hours	**Exam preparation**	0 hours

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

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

In the course, our goal is to develop the algorithmic thinking of engineering students through the teaching of a selected, widespread algorithmic programming language. During the education, students get acquainted with the basic knowledge of algorithm design, data management, and basic process control procedures such as branching, loops, and functions. During the semester, the syntactic structure of the language will be described in the lectures. In addition to the deepening of the syntactic knowledge, the algorithms and groups of algorithms applying them will be described.

15. Description of practices

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16. Description of laboratory practices

The lab sessions help to deepen the practical learning of the lecture. As part of this, students perform basic programming and algorithm design tasks independently, with the help of a qualified instructor.

17. Learning outcomes

a) knowledge:
- knows the basic concepts of computer science
- Basic computer skills (word processing, spreadsheet, database management) at user level.
- knows the basic concepts of structured programming and the syntax of a language studied within the subject
- knows the elementary algorithm design methods, their implementation possibilities
- has knowledge of the basics of object-oriented programming

b) ability:
- can write simple applications on their own
- is able to implement an algorithm based on a specification
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.

c) attitude
- is interested in the development of computer technology
- can use the acquired knowledge in other engineering fields
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility
- is able to learn other programming environments independently
- Keeps abreast of legislative, technical, technological and administrative changes in the field

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

Two midterm tests and the homeworks are evaluated by scores. Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests and reaching 40% of the semestrial points. The semestrial note is determined by the semestrial sc

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Lecture slides, electronic course material and exercise book

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

Subject description

1. Subject name	**Instrumentation**				
2. Subject name in Hungarian	Fedélzeti műszerek, rendszerek			**3. Role**	cc
4. Code	**BMEKORHBsP4002-00**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**3 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	15 hours	**Homework**	0 hours
Reading written materials	30 hours	**Midterm preparation**	10 hours	**Exam preparation**	25 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Beneda Károly
12. Lecturers	Dr. Beneda Károly, Gál István, Jankovics István, Dr. Sziroczák Dávid

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

This class is intended to discuss the principles of electric, pitot-static and gyroscopic flight instruments with special focus on automatic, computer based systems. Therefore the following topics are going to be extracted for the enrolled students: sensors, measurement of air data parameters, direct reading compass, flux valve, inertial navigation and reference systems, automatic flight control systems, flight envelope protection, auto-throttle, communication systems, flight management computer, alerting systems and proximity systems, integrated instruments, digital circuits and computers.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

Knows the operating principle, characteristic design and peculiarities of the use of aircraft instruments and warning systems.

Knows the operating principle and peculiarities of the use of the aircraft's autopilot, stability-augmentation systems and flight control systems.

Knowledge of the main theories and problem-solving methods in the field.

b) ability / competence

Able to operate on-board instruments and instrument systems and to detect and handle its failures.

The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.

c) attitude

He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy

Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Mid-term test during the semester. Requirement for signature of the subject: the mid-term test. The final result is according to a written exam.

19. Opportunity for repeat/retake and delayed completion

Replacement of the requirements for signature, as well as subject note are possible in accordance with the current Study and Examination Regulations.

20. Learning materials

Ferenczi István, Ferenczi Ildikó, Szilágyi D.: Légi járművek fedélzeti rendszerei, NYE, 2018, ISBN9786155545894 (http://zeus.nyf.hu/~elat/legi_jarmuvek.pdf)
Beneda J., Gáti B., Hámori Gy., Óvári Gy., Rácz J. REPÜLŐGÉPEK RENDSZEREI ÉS AVIONIKA, Typotex, egyetemi tananyag jegyzet, 2012, 144 old.
CAE Oxford EASA ATPL Ground Trainig Series Book 5 – Aircraft General Knowledge 4 – Instrumentation Osford Aviation Academy, pp. 686.
Wyatt, D. Aircraft Flight Instruments and Guidance Systems , Eoutledge 2014, ISBN-10 : 9780415706834, pp. 258

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Subject description

1. Subject name	**Introduction to Mechanincal Engineering**				
2. Subject name in Hungarian	Gépészmérnöki alapismeretek			**3. Role**	cc
4. Code	**BMEGEHDBSXIMEA-01**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**1 practice**	**1 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	7 hours	**Homework**	0 hours
Reading written materials	14 hours	**Midterm preparation**	15 hours	**Exam preparation**	28 hours

10. Department	Department of Hydrodynamic Systems
11. Responsible lecturer	Dr. Paál György
12. Lecturers	Dr. Hős Csaba

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

The aim of the course is to introduce the basic physical and mechanical quantities, the required concepts and methods to study machines and processes. The aim is also to describe the steady-state operation of the machines, the work, the efficiency, the various drives (friction, belt, gear, worm), the load factor, the losses. In addition, the course aims to introduce the basics of flow processes, the Bernoulli equation, the Venturi tube, the basics of caloric processes, the concepts of heating value, specific consumption and the enthalpy, the cycle of a thermal power plant, the variable speed operation of machines, the basics of coulisse and crank mechanism, piston pumps and internal combustion engines, the indicator diagram, and the terms of the characteristic curve and the operating point.

15. Description of practices

In the example-solving exercise, students learn about problem-solving/sizing methods through numerical examples, and are also prepared for the exam.

16. Description of laboratory practices

Measurements carried out in group work in the departmental laboratory and preparation of an independent report on the measurement

17. Learning outcomes

a) knowledge

- - Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- - Knowledge of the main theories and problem-solving methods in the field.
- Knows the basic physical (mechanical) quantities and their dimensions. He is familiar with basic engineering concepts such as: rotational motion, torque, work, energy, Newton's laws. Define the steady operation of machines, work and efficiency. He is familiar with friction, belt, gear, worm drive and modification as well as the slip. Define load, losses and efficiency for electrical and mechanical machines. He is aware of the laws of Archimedes and f continuity. He knows the Bernoulli equation and its applications as well as that of the Venturi tube. Defines the basic concepts of caloric processes, calorific value, specific consumption. He understands the thermal power plant cycle, the concept of enthalpy and its simplified forms. It sees through the bevel and crank drive; and the operation of the piston pump. He has a thorough knowledge of the topics of internal combustion engine operation, indicator diagram and carburetor operation. It distinguishes between the description of the steady and unsteady operation of machines. He is aware of the concept of characteristic curve and working point. Understands the operation of simple measuring instruments and how to read them

b) ability

- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Uses physical (mechanical) base quantities and their dimensions appropriately. Uses his/her knowledge to evaluate a measurement task and draw the appropriate conclusions. Uses basic engineering concepts such as: rotational motion, torque, work, energy, Newton's laws. Sketches friction, belt, gear, and worm drive. Applies the Bernoulli equation to solve simple fluid dynamics problems. Applies Archimedes's; law and the continuity equation in solving problems. Able to properly represent a characteristic curve describing a machine or a system. Based on measured data, he/she calculates the load factor and the efficiency for electrical and mechanical machines. Applies his/her knowledge of machine operation. He/she determines the specific consumption and calorific value of an internal combustion engine. He/she distinguishes between steady and unsteady operation of machines. Describes the bevel and crank gear; and the operation of the piston pump. Able to apply and comply with safety and fire protection rules and regulations. He/she is able to correctly read the measuring instruments of a measuring system and to process the measured data.

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives
- He/she is open to collaborating with the instructor and fellow students to expand knowledge. Open to the use of information technology tools. He/she seeks to learn about and routinely use a set of tools for simple laboratory measurements. Improves his/her abilities to solve engineering tasks precisely and error-free. He/she strives to apply the principles of energy efficiency and environmental

awareness in solving simpler physical (mechanical) tasks. He/she continuously expands his/her knowledge of basic engineering. He/she constantly monitors his work, results and conclusions

d) autonomy and responsibility

- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- He/she reads laboratory measuring instruments independently. He/she openly accepts well-founded critical remarks. In some situations, as part of a laboratory measurement group, he or she collaborates with his or her fellow-students to solve tasks. He is committed to the principles and methods of systemic thinking and problem-solving. Using his/her knowledge, he/she makes a responsible, well-founded decision based on his/her analysis.

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

1. Midtherm performance evaluation

Type: level assessment (diagnostic) assessment

Number of pieces: 6. Midtherm performance evaluation

Type: summative assessment

Number of pieces: 1

19. Opportunity for repeat/retake and delayed completion

How to correct or repeat a summary performance assessment for the first time:
summative performance evaluations can be individually improved or repeated
Is the possibility of repeated correction of the summary performance evaluation allowed, and if so, in

20. Learning materials

Attila Kovács: General Mechanical Engineering, Budapest University of Technology Publishing House, 1999, Budapest, ISBN 963 420 609 3
Demény J., Kósa L., Kovács. A Kullmann L.: General mechanical engineering excercises. Budapest University of Technology Publishing House, 2006 Budapest
Online material: http://www.hds.bme.hu/oktatas.php?sm=1&xml=BMEGEVGBG01
Grote, Antonsson: Handbook of Mechanical Engineering ISBN: 978-3-540-49131-6
Mechanical Engineering Education Handbook, (ed. by Jr. Baukal, C. E. Nova Science Pub Inc. 2020 p. 488 , ISBN-10 : 1536177911

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

Subject description

1. Subject name	**Labour Safety**				
2. Subject name in Hungarian	Munkavédelem			**3. Role**	cc
4. Code	**BMEKOEAA111**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

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	22 hours	**Midterm preparation**	6 hours	**Exam preparation**	0 hours

10. Department	Department of Material Handling and Logistics Systems
11. Responsible lecturer	Dr. Rinkács Angéla
12. Lecturers	Dr. Rinkács Angéla

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

14. Description of lectures

Concepts of occupational safety, the appearance of hazards and hazards. Concept and current level of occupational safety. Occupational accident processes, causes of occupational accidents, course and consequences of accidents. Areas and boundaries of safety at work. Occupational health and safety. Ergonomic concepts. General principles of security. Safety features of protective equipment. The influence of environmental influences on the safe operation of machinery. Formulate and handle ergonomic problems professionally. Human-machine-environment relationships. The domestic situation of the application of ergonomics. Electricity Safety Regulations and Regulations. Safe installation, operation and maintenance of high-voltage electrical equipment. Electric shock protection. Protection classes. Grounded and unearthed networks, Protective and non-conductive contact protection modes. Safe storage of chemicals, flammable and explosive materials. General principles of work environment design. Requirements for workplace air conditions. General principles of room ventilation, natural and artificial ventilation. Structural design of ventilation equipment. Taking the human factor into account when designing technical systems. Processes for introducing new information technologies. Ergonomic analysis and design issues. Workplace lighting. Requirements and ways of natural and artificial lighting of rooms and work areas. Noise control at work. Properties of noise sources, noise reduction methods. Flow noise sources. Noise reduction with installation and organizational methods. Occupational safety and environmental aspects of plant installation. Factors Influencing Human Performance and Exercise in the Human Computer System. Ergonomic analysis. Color Dynamics.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

Knowledge of labour safety issues in industrial systems.

b) skills

He is able to assess solutions to a certain problem.

Capable of assess the dangers and their remedy.

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)

During the semester, students report on their work during the semester in two tests. Mid-semester grade acquisition is a prerequisite for completing the tests to a minimum. The mid-semester mark is the average of the marks obtained for the two tests using

19. Opportunity for repeat/retake and delayed completion

The homework can be submitted by paying a special procedure fee until the end of the supplementary week. Tests can be rewritten twice during the semester inclusive the supplementary week.

20. Learning materials

Dr. Keiszt István: Munkavédelem (Labour safety - in Hungarian) (2012) Typotex Kiadó www.tankonyvtar.hu

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

Subject description

1. Subject name	**Logical Networks**				
2. Subject name in Hungarian	Logikai hálózatok			**3. Role**	cc
4. Code	**BMEKOKA137**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

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	23 hours	**Midterm preparation**	17 hours	**Exam preparation**	0 hours

10. Department	Department of Control for Transportation and Vehicle Systems
11. Responsible lecturer	Dr. Gáspár Péter
12. Lecturers	Dr. Bécsi Tamás, Farkas Balázs, Dr. Baranyi Edit

13. Prerequisites	Electrotechnics – Electronics (BMEKOKAA139), weak; (), ; (),

14. Description of lectures

The topic of the course covers the following main topics:

The definition of system. The properties and class of systems. The tasks of system and control theory. The definition of control.

Deterministic, event-driven, discrete and static systems. Logical variables, fundamental operations, expressions and functions. Canonical forms, minimalism. Static and transient behaviour of combinational logic network. Methods of design of combinational logic networks.

Discrete event systems. Deterministic, finite-state automatons. Moore and Mealy machines. Deterministic, time-driven, discrete and dynamic systems. Methods of design of synchronous sequential circuit. Deterministic, event-driven, discrete and dynamic systems. Methods of design of asynchronous sequential circuit.

15. Description of practices

The topic of the course covers the following main topics:

Methods of design of logic networks (combinational and sequential circuit). Construction of the combinational and sequential circuit networks with logical gates and other electronic blocks. Simulation of logic networks

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge:

- knows the methods of description of deterministic, event-driven, discrete and static system with logic variables
- knows the logic fundamental operation, expressions and functions
- knows the static and transient behaviour of combinational logic network
- know the methods of design of sequential circuits
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.

b) ability:

- is able to modelling with digital logic gate of a given system
- is able to simulation of a given logic networks
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

c) attitude:

- is interested in the basic digital technology
- aim a skill development in the problem solution
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility:

- is able to describe of given logic network and use a mathematics formalisms
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

The grade is based on the result of two term tests (50-50%). Both must result in at least a grade of 2.

19. Opportunity for repeat/retake and delayed completion

The midterms can be retried during the week after the semester.

20. Learning materials

Lecture slides, electronic course material and exercise book
Dr. Arató Péter: Logikai rendszerek tervezése, Műegyetemi Kiadó, 2001, 397 o.
Tatrnai G.; Bokor J.; Sághi B.; baranyi E.; Bécsi T. Irányítástechnika I.Egyetemi Tananyag, BME KJK, Typotex, 2011,112 o. ISBN 978-963-279-602-4
M. L. O'Leary: A First Course in Mathematical Logic and Set Theory, Wiley, 2015, p. 464, ISBN: 978-1-118-54791-5

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

Subject description

1. Subject name	**Management and Economics**				
2. Subject name in Hungarian	Menedzsment és vállalkozás gazdaságtan			**3. Role**	cc
4. Code	**BMEKOKGA109**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**3 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	14 hours	**Homework**	0 hours
Reading written materials	34 hours	**Midterm preparation**	30 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

General overview of companies, its environment, and company forms. Types of companies, foundation in the practise. Liquidation of the companies. Competition regulation. Features of a market. Company resources, processes. Evaluation of resources. Productivity indicators, correlations. Cost definitions, correlations. Human resource management. Basic tax knowledge. Innovation and its process. Management aspects of the transportation modes.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
- Familiar with the economic issues of a company, marketing activities and its legal framework.

b) skills
- Able to overview the company in economic aspects, to evaluate its processes, to evaluate and determine the position of the products.

c) attitude
- Aims to solve complex economic tasks by giving the best of the abilities.
- Aims to do complex problem solving by considering more criteria.

d) autonomy and responsibility
- Able to solve economic and marketing problems on a high level alone, or as a team member.
- Feels responsibility for the results and quality of the work.

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

Two midterm tests during the semester (min. 40% must be achieved). The final mark is the average of the tests.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period.

20. Learning materials

Samuelson, P. A.: Microeconomics
Kotler, P.: Marketing management
Actual regulations

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

Subject description

1. Subject name	**Mass and Balance**				
2. Subject name in Hungarian	Súly és súlypont			**3. Role**	sp
4. Code	**BMEGEENBSXBLNC-01**	**5. Evaluation type**	**e**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	42 hours	**Preparation for seminars**	3 hours	**Homework**	0 hours
Reading written materials	1 hours	**Midterm preparation**	6 hours	**Exam preparation**	8 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Sztankó Krisztián
12. Lecturers	Dr. Sztankó Krisztián

13. Prerequisites	Airframes and Systems (BMEKORHBsP4004-00), strong

14. Description of lectures

The class is focusing on the compulsory pre-flight mass and balance calculation. Introduced as well as the following topics: effects of overloading, movement of CG in flight, weighting of aircraft, calculation of fuel mass, basic empty mass, cargo handling, floor loading, area load limitations, single engine piston, multi engine piston and medium range jet twin engine aircraft load calculations. The other subpart of this subject is intended to introduce different flight stages from aircraft performance point of view. Thus, the subjects are being extracted: general principles of cruise, take-off, climb and descent, landing for different aircraft categories.

15. Description of practices

Formulas describing arms and moments around the center of gravity of the designated aircraft.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge - Knowledge of international and national aviation organisations and their regulations (ICAO Annexes, European Union regulations, EASA regulations, national regulations). - Understand the effects of aircraft center of gravity position on flight characteristics - Able to distinguish between maximum take-off weight and Basic empty weight and maximum landing weight - Systematizing standardized masses taken under different legislation.

b) ability - Ability to comply with flight safety rules. - Apply airplane center of gravity calculation methods. - Determines the optimal center of gravity distribution of the aircraft. - Operates the fuel distribution calculation.

c) Attitude - He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation. - Controls the position of the center of gravity in different phases of flight. - Configuring the distribution of luggage and passengers on board the aircraft - Organizes l systematically loading and unloading sequences into a system.

d) autonomy and responsibility - Assesses the efficiency, effectiveness and safety of the work of subordinates. - Evaluates the effects of weight changes on the center of gravity at each stage of the flight. - Makes decisions on the amount and distribution of the required fuel - Controls aircraft weight distribution planning.

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Jereb Gábor: Aerodinamika és repüléselmélet II. Műszaki könyvkiadó 1987, ISBN:963102685X
Oxford Aviation Academy ATPL Ground Trainig Series:
OAT Book 6 – Flight Performance & Flight Planning 1 – Mass & Balance ISBN13: 9781906202545

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

Subject description

1. Subject name	**Materials and Manufacturing**				
2. Subject name in Hungarian	Anyag- és gyártásimeret			**3. Role**	cc
4. Code	**BMEKOGJBsP3001-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**4 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	10 hours	**Homework**	0 hours
Reading written materials	32 hours	**Midterm preparation**	22 hours	**Exam preparation**	0 hours

10. Department	Department of Automotive Technologies
11. Responsible lecturer	Dr. Bán Krisztián
12. Lecturers	Dr. Bán Krisztián, Dr. Markovits Tamás, Dr. Hlinka József, Dr. Katona Géza

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

The aim of the subject is the acquirement of basic phenomena in material science. Topics focused on the structure and properties of metallic materials and their testing methods applied in the vehicle industry. The main topics: ideal and real crystalline structure, thermodynamics, binary phase diagrams (phase transformations), the phase diagram of Fe-C system, metallographic structure, non-equilibrium transformations, non-ferrous alloys, destructive and non-destructive testing of materials, x-ray diffraction and electron-microscopy, main destruction forms of structural materials.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) Knowledge

- Knows the most important basic concepts of thermodynamics.
- Knows the crystal structure of structural materials.
- Knows the role of equilibrium phase diagrams.
- Knows the role of non-equilibrium transformation diagrams.
- Knows the possibilities of increasing the strength of alloys.
- Knows the microstructural structure of alloys.
- Knows the types and properties of superalloys.
- Knows the types and properties of non-ferrous alloys used in the aerospace industry.
- Knows the types and properties of the most important polymers and composite systems.
- Knows the main causes and processes of material wear.
- Knows the most important destructive and non-destructive material testing techniques.
- Knows the most important semi-finished and prefabricated manufacturing, plastic forming, casting and surface modification technologies used in the aerospace industry.
- Knows the major bonding technologies used in the aerospace industry.
- Knows the basic concepts and technologies of cutting.
- Knows the main features of production measurement technology.
- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.

b) Ability

- Able to interpret the results of significant destructive material testing.
- Able to interpret a material quality mark.
- Able to specify standard materials and technologies for an aircraft part or component.
- Able to characterize elements manufactured with different technologies, to recognize defects
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- Ability to perform engineering duties in the service and control of aircraft operations.

c) Attitude

- Seeking a deeper understanding of the curriculum to look for connections between each subject area.
- Striving to interpret what is said in the lectures (contexts, statements, figures) independently, open to thinking together with the instructor and his fellow students.
- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) Autonomy and responsibility

- He accepts the framework formulated for the fulfilment of the subject, and within it he performs his task independently and responsibly, in accordance with ethical norms.
- Apply the knowledge acquired during the course responsibly, taking into account the limits of its validity.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

During the semester students have to comply with two midterm exam with the result of 50% of the maximal points. The conditions for obtaining the final are completing the midterm test.

19. Opportunity for repeat/retake and delayed completion

Two occasions are possible for the retake of each midterm exam.

20. Learning materials

Lovas (szerk.): Anyagismeret, Typotex, 2011., www.tankonyvtar.hu
Buza Gábor: Kétalkotós ötvözetek egyensúlyi fázisdiagramjai, kézirat, 2003.
Verő – Káldor: Fémtan, Tankönyvkiadó, 1996.
Balla S. et al.: Járműszerkezeti anyagok és technológiák I. www.tankonyvtar.hu, Budapest, 2011.
Szmejkál A., Ozsváth P.: Járműszerkezeti anyagok és technológiák II., Typotex Kiadó, 2011
Moodle segédanyagok, és óravázlatok

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

Subject description

1. Subject name	**Mathematics G1**				
2. Subject name in Hungarian	Matematika G1			**3. Role**	cc
4. Code	**BMETE93BG01**	**5. Evaluation type**	**e**	**6. Credits**	**6**
7. Weekly contact hours	**4 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	84 hours	**Preparation for seminars**	36 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	20 hours	**Exam preparation**	40 hours

10. Department	Department of Differential Equations
11. Responsible lecturer	Dr. Kiss Krisztina
12. Lecturers	Dr. Kiss Krisztina

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Algebra of vectors in plane and in space. Arithmetic of complex numbers. Infinite sequences. Limit of a function, some important limits. Continuity. Differentiation: rules, derivatives of elementary functions. Mean value theorems, l'Hospital's rule, Taylor theorem. Curve sketching for a function, local and absolute extrema. Integration: properties of the Riemann integral, Newton-Leibniz theorem, antiderivatives, integration by parts, integration by substitution. Integration in special classes of functions. Improper integrals. Applications of the integral.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge and application of the theoretical basis for navigation and performance calculation.

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- Ability to use English language literature and documentation at a proficiency level.
- Ability to perform engineering duties in the service and control of aircraft operations.
- Have the stamina and tolerance for monotony required to carry out practical activities.

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Assesses the efficiency, effectiveness and safety of the work of subordinates.
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Requirements during study term: two midterm exams. Requirements during the examination period: written exam.
Consultation opportunities: consultations organised before the examinations, and individual consultations in the course of the tutorials

19. Opportunity for repeat/retake and delayed completion

Retake according to the Code of Studies.

20. Learning materials

Joel Hass; Christopher Heil; Maurice D Weir; George B Thomas, Jr.: Thomas' Calculus
Pearson 2017, ISBN: 9789353060411
EDWIN "JED" HERMAN, UNIVERSITY OF WISCONSIN-STEVENS POINT
GILBERT STRANG, MASSACHUSETTS INSTITUTE OF TECHNOLOGY: Calculus Volume 1
OpenStax 2020, DIGITAL VERSION ISBN-13:978-1-947172-13-5
"Download for free at https://openstax.org/details/books/calculus-volume-1."
EDWIN "JED" HERMAN, UNIVERSITY OF WISCONSIN-STEVENS POINT
GILBERT STRANG, MASSACHUSETTS INSTITUTE OF TECHNOLOGY: Calculus Volume 2
OpenStax 2017, PDF VERSION ISBN-13: 978-1-947172-14-2
"Download for free at https://openstax.org/details/books/calculus-volume-2."

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

Subject description

1. Subject name	**Mathematics G2**				
2. Subject name in Hungarian	Matematika G2			**3. Role**	cc
4. Code	**BMETE93BG02**	**5. Evaluation type**	**e**	**6. Credits**	**6**
7. Weekly contact hours	**4 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**180 hours**
Contact hours	84 hours	**Preparation for seminars**	36 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	20 hours	**Exam preparation**	40 hours

10. Department	Department of Differential Equations
11. Responsible lecturer	Dr. Kiss Krisztina
12. Lecturers	Dr. Kiss Krisztina

13. Prerequisites	Mathematics G1 (BMETE93BG01), weak; (), ; (),

14. Description of lectures

Solving systems of linear equations: elementary row operations, Gauss-Jordan- and Gaussian elimination. Homogeneous systems of linear equations. Arithmetic and rank of matrices. Determinant: geometric interpretation, expansion of determinants. Cramer's rule, interpolation, Vandermonde determinant. Linear space, subspace, generating system, basis, orthogonal and orthonormal basis. Linear maps, linear transformations and their matrices. Kernel, image, dimension theorem. Linear transformations and systems of linear equations. Eigenvalues, eigenvectors, similarity, diagonalizability. Infinite series: convergence, divergence, absolute convergence. Sewuences and series of functions, convergence criteria, power series, Taylor series. Fourier series: axpansion, odd and even functions. Functions in several variables: continuity, differential and integral calculus, partial derivatives, Young's theorem. Local and global maxima / minima. Vector-vector functions, their derivatives, Jacobi matrix. Integrals: area and volume integrals.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge and application of the theoretical basis for navigation and performance calculation.

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- Ability to use English language literature and documentation at a proficiency level.
- Ability to perform engineering duties in the service and control of aircraft operations.
- Have the stamina and tolerance for monotony required to carry out practical activities.

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Assesses the efficiency, effectiveness and safety of the work of subordinates.

- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Requirements during study term: two midterm exams. Requirements during the examination period: written exam.

Consultation opportunities: consultations organised before the examinations, and individual consultations in the course of the tutorials

19. Opportunity for repeat/retake and delayed completion

Retake according to the Code of Studies.

20. Learning materials

Joel Hass; Christopher Heil; Maurice D Weir; George B Thomas, Jr.: Thomas' Calculus
Pearson 2017, ISBN: 9789353060411
EDWIN "JED" HERMAN, UNIVERSITY OF WISCONSIN-STEVENS POINT
GILBERT STRANG, MASSACHUSETTS INSTITUTE OF TECHNOLOGY: Calculus Volume 3
OpenStax 2018,PDF VERSION ISBN-13 978-1-947172-16-6
"Download for free at https://openstax.org/details/books/calculus-volume-3."
K.F.RILEY,M.P.HOBSON,S.J.BENCE. Mathematical methods for physics and engineering. Cambridge University Press 2006, ISBN-13: 978-0-521-86153-3
ANTON, H., RORRES, C.: Elementary Linear Algebra, Applications Version, Wiley, 2014, ISBN 978-1-118-43441-3

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

Subject description

1. Subject name	**Mathematics G3k**				
2. Subject name in Hungarian	Matematika G3k			**3. Role**	cc
4. Code	**BMETEMIBSGMAT3-00**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	21 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	18 hours	**Exam preparation**	25 hours

10. Department	Department of Differential Equations
11. Responsible lecturer	Dr. Nagy Katalin
12. Lecturers	Dr. Nagy Katalin

13. Prerequisites	Mathematics G2 (BMETE93BG02), weak; (), ; (),

14. Description of lectures

Classification of differential equations. Separable ordinary differential equations, linear equations with constant and variable coefficients, systems of linear differential equations with constant coefficients. Some applications of ODEs. Scalar and vector fields. Line and surface integrals. Divergence and curl, theorems of Gauss and Stokes, Green formulae. Conservative vector fields, potentials. Some applications of vector analysis. Software applications for solving some elementary problems.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge and application of the theoretical basis for navigation and performance calculation.

b) ability

- Personal competencies (responsibility, accuracy, stamina, endurance, stress tolerance, spatial awareness, motor coordination, manual dexterity, psychomotor functions, verbal skills, attention span, decisiveness) to be able to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- Ability to use English language literature and documentation at a proficiency level.
- Ability to perform engineering duties in the service and control of aircraft operations.
- Have the stamina and tolerance for monotony required to carry out practical activities.

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Assesses the efficiency, effectiveness and safety of the work of subordinates.
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Requirements during study term: two midterm exams. Requirements during the examination period: written exam.

Consultation opportunities: consultations organised before the examinations, and individual consultations in the course of the tutorials

19. Opportunity for repeat/retake and delayed completion

Retake according to the Code of Studies.

20. Learning materials

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"Download for free at https://openstax.org/details/books/calculus-volume-3."
K.F.RILEY,M.P.HOBSON,S.J.BENCE. Mathematical methods for physics and engineering. Cambridge University Press 2006, ISBN-13: 978-0-521-86153-3

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

Subject description

1. Subject name	**Mechanics 1**				
2. Subject name in Hungarian	Mechanika 1			**3. Role**	cc
4. Code	**BMEKOJSA191**	**5. Evaluation type**	**e**	**6. Credits**	**5**
7. Weekly contact hours	**2 lecture**	**3 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**150 hours**
Contact hours	70 hours	**Preparation for seminars**	20 hours	**Homework**	0 hours
Reading written materials	18 hours	**Midterm preparation**	12 hours	**Exam preparation**	30 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Béda Péter
12. Lecturers	Dr. Béda Péter, Dr. Forberger Árpád

13. Prerequisites	Introduction to Mechanincal Engineering (BMEGEVGBG01), suggested; (), ; (),

14. Description of lectures

The aim of the course is to transfer the static and dynamic knowledge used in the current field (vehicle engineering, transportation engineering, logistics engineering). Vectors, reducing systems of forces. Parallel, distributed forces, center of gravity. Second moment of area and mass, inertia tensor. Friction, rolling drag. Kinematics. Natural coordinate system, equation of motion, circular motion, harmonic oscillation. Angular velocity, velocity couple, law of projected velocities. Dry rolling and slipping, centroid of motion, kinematics of mechanisms. Kinetics. Linear momentum, Newton's second law, angular momentum, principle of angular momentum, energy methods. Conservative force, potential. Method of power and work. Rotating masses, balancing of rotating masses. Relative motion, motion in non-inertial coordinate system, virtual forces.

15. Description of practices

Application examples following the topics of the lecture. Guided and individual exercise solution.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- The student knows the basic rules of static, kinematics, kinetics.

b) skills

- The student understands the relation between Degrees of Freedom and boundary conditions, able to work with vectors (force, moment, motion parameters);
- The student understands the relation between angular velocite and angular momentum, able to choose appropriate coordinate system, able to apply eqauations (of vectors) to solve a problem,
- The student is able to solve problems with educated methods, able to complete his/her knowledge from different sources.

c) attitude

- The student aims to create exact, aesthetic and obvious documentations;
- The student accepts the rules of cooperation with teachers and collegues.

d) independence and responsibility

– The student solves unprecedent problems independently, proactive cooperation in education and problem solving, takes responsibility on own activity.

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

During the semester, there are tests scored by points. There are two test evaluations during the semester. A minimum of 40% must be reached by each test evaluation. A minimum of 40% of the overall semestrial points must be reached to get a signature, the

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period.

20. Learning materials

Csizmadia – Nándori: Mechanika mérnököknek I – Statika, Nemzeti Tankönyvkiadó, Bp.1996. Csizmadia – Nándori: Mechanika mérnököknek III - Mozgástan, Nemzeti Tankönyvkiadó, Bp. 1997. Béda – Bezák: Kinematika és dinamika, Megyetemi Kiadó, Bp. 1999.

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

Subject description

1. Subject name	**Mechanics 2A**				
2. Subject name in Hungarian	Mechanika 2A			**3. Role**	cc
4. Code	**BMEKOVJBsP3001-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**3 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	28 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	16 hours	**Exam preparation**	20 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Béda Péter
12. Lecturers	Dr.Béda Péter, Forberger Árpád, Dr. Pápai Ferenc, Dr. Szabó Zoltán, Richlik György

13. Prerequisites	Mechanics 1 (BMEKOJSA191), strong; Mathematics G1 (BMETE93BG01), strong; (),

14. Description of lectures

The objective of the course is to introduce students to the basic concepts of strength and elasticity, the concepts of loads, stresses, deformations, displacements and the relationship between them, which can be used to perform basic tasks, dimensioning and checking. Emphasis is placed on the calculation of stresses and strains from simple and complex stresses in beams and girders. The methods used also allow the solution of certain statically indeterminate problems. Basic statics concepts (repetition), stress diagrams. Fundamentals of solid mechanics, concept of beam element. Concepts and basic equations of central tension-pressure, introductory numerical examples, calculation of deformations. Concept of pure shear, check of simple relationships for centre pull-push and pure shear. Twisting on circular symmetric cross section, concept of polar inertia, calculation of deformations. Basic equations of pure bending, concept of moments of inertia. Basics of inertia calculation. Straight bending, calculation of normal stresses and deformations. Oblique bending. External tensile stress: basic concepts of stress calculation, concept of neutral axis. Reciprocity of shear stresses. Bending and shearing: Zhuravsky's theory. Stress tensor and stress state, and the concepts of principal stresses and principal directions. Concepts of strain tensor and strain state, calculation of principal stresses and principal strains. The concept of strain energy. Calculation of strain energy in bars under different stresses. Working theorems of strength, calculation of displacements of statically determinate structures. Working theorems of solid mechanics, calculation of reactions and displacements of statically indeterminate structures. Deflection of compressed bars.

15. Description of practices

Numeracy exercises, homework and practice problems, solved individually or in groups.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
- knows the concepts of load, stress, strain and displacement,
- knows the concepts of rod and rod element,
- knows the geometric quantities characterising the cross section of a rod and how to calculate them,
- knows the linear elastic and linear elastic-perfectly ductile material models,
- knows the stresses in the cross-sections of bars, the resulting stresses and the formulae for their calculation,
- know the deformations of the cross-sections of the bars, their relationship to the stresses and the deformations of some points,
- knowledge of the effect of temperature on deformations,
- know the stresses acting on an elementary slab, the concept of stress state,
- understanding of the directional dependence of stresses, the concept of principal stresses and principal stress directions,
- is familiar with the deformation of an elementary split, the concept of deformation state,
- is familiar with the directional dependence of strain, the concept of principal stresses and principal directions of strain,
- is familiar with the phenomenon of the deflection of compressed rods.

b) skills
- calculate the stresses and deflections in tension and compression bars, carry out dimensioning and checking tasks,
- calculate stresses and deformations arising from pure shear, carry out dimensioning and verification tasks,
- calculate stresses and deformations due to twisting for simple cross-sections, carry out simple dimensioning and checking tasks,
- calculates stresses and deflections due to straight bending, performs sizing and verification tasks,
- recognises oblique bending and calculates the stresses and deflections arising from it, carries out the dimensioning and verification tasks,
- calculate the stresses resulting from simultaneous bending and shearing,

- calculate the stresses in a laterally tensioned-compressed cross-section for a material which is linearly elastic or resistant to compression only,
- determine the principal stresses and principal stress directions at a point in a cross-section,
- determine the critical load on an elastic bar supported at the end point,
- calculate the displacements at a given point of simple rod structures.

c) attitude

- strive to solve problems accurately and without error,
- develop a task in such a way that it can be followed or even continued by anyone.

d) independence and responsibility

- is prepared to recognise and correct mistakes.

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

The assessment of learning outcomes is based on two mid-year written performance assessments (midterm test; 20-20%) and a written exam test(60%). The duration of each test is 90 minutes. A test with a mark lower than 50% is failed. A signature may be obta

19. Opportunity for repeat/retake and delayed completion

All midterm tests can be corrected or made up once at the time set at the beginning of the semester. The better of the results of the tests and of the correction or replacement will be taken into account. At the end of the semester, a student who has miss

20. Learning materials

Kaliszky S., Kurutzné Kovács M., Szilágyi Gy.: Szilárdságtan, 2000; Beer, Johnston: Mechanics of materials; Budynas: Advanced Strength and Applied Stress Analysis; Popov: Mechanics of materials; Gere – Goodno: Mechanics of Materials. Cengage Learning, 2015; Forberger-Galambosi-Vörös: Szilárdságtan példatár

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

Subject description

1. Subject name	**Meteorology**				
2. Subject name in Hungarian	Meteorológia			**3. Role**	sp
4. Code	**BMEGEATBSXMTRL-01**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**3 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	70 hours	**Preparation for seminars**	10 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	10 hours	**Exam preparation**	30 hours

10. Department	Department of Fluid Mechanics
11. Responsible lecturer	Dr. Balogh Miklós
12. Lecturers	Gyöngyösi András Zénó

13. Prerequisites	(),

14. Description of lectures

The subject deals with aviation-meteorology, namely weather phenomena that basically affect flight operations and aviation. Students should deepen their knowledge in the following topics: structure of atmosphere, atmospheric stratification (stability), global circulation, movement of air masses, wind, pressure systems, weather fronts, cloud and fog formation, precipitation, global and regional climate, and weather hazards in aviation. In addition to learning the theoretical background

15. Description of practices

it is important to use meteorological data in practice, ie to acquire, understand, interpret and utilize meteorologyical informations.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge - Knowledge of basic meteorological concepts, phenomena, their impact on aviation and atmospheric processes hazardous to aviation. - The student is aware of the effects and dangers of weather on a flight. - Sees through the theoretical background of the processes influencing the development of weather. - Gathers meteorological data and information needed to plan a flight task.

b) ability - Ability to navigate in Instrument Meteorological Condition (IMC), subject to individual limitations, using his/her knowledge and experience of radio navigation, based on on-board instruments. - Ability to analyse and assess the meteorological situation and take the necessary action. - Ability to interpret and take into account meteorological telegrams and reports when planning and executing flights. - The student examines the current and predicted weather for the flight route. - Interprets the specifics of the flight task and the associated weather criteria. - Handles special weather phenomena and hazards that occur during the flight.

c) attitude - He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives. - The student continuously monitors the available meteorological information during planning the flight task and during the flight. - Assists the work of aviation service providers and its participants, and strives to form partnerships with them. - Recognizes weather criterion (minima) for herself/himself as well as for the aircraft, ensuring the safety of flight operations.

d) autonomy and responsibility - Keeps abreast of legislative, technical, technological and administrative changes in the field. - The student feels responsibility for the safe operation of the aircraft, keeping in mind the weather criteria. - Makes a decision on the execution of the flight task based on meteorological data and information. - Recognizes hazardous weather conditions during the flight and makes an appropriate decision to modify the flight plan if it is required.

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Sándor Valéria, Wantuch Ferenc: Repülésmeteorológia ISBN: 9637702911
CAE Oxford: ATPL Ground Trainig Series, Book 9 – Meteorology, Oxford Aviation Academy, 2016, p. 644
IC Joshi: Aviation Meteorology Himalayan books, p. 150, ISBN 81-7002-099-9

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

Subject description

1. Subject name	**Micro- and Macroeconomics**				
2. Subject name in Hungarian	Mikro- és makroökonómia			**3. Role**	cc
4. Code	**BMEGT30A001**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**4 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	16 hours	**Homework**	0 hours
Reading written materials	24 hours	**Midterm preparation**	24 hours	**Exam preparation**	0 hours

10. Department	Department of Economics
11. Responsible lecturer	Dr. Gilányi Zsolt
12. Lecturers	Hajnal Zsófia

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

14. Description of lectures

By introducing into the basic notions, principles and context of economic base knowledge, as well as into the logics of economic model building, the course enables students to decrypt everyday life economic phenomena and to uderstand social phenomena in a broad sense.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

A. Knowledge

1. the process of scientific theory building, basic economic notions and the logics of the main economic theories
2. the mainstream economic theory's (general equilibirum theory) analysis method (comparative statics, equilibirum, alternative cost)
3. the method of analysing economic welfare
4. the princing strategies for some market structures
5. some specific microeconomic issues of market failures (adverse selection, signaling, moral hazard, pollution, public goods)
6. the logics of national accounting and data available from national accounting
7. the three basic properties of monetary economies underlined by Keynes (multiplier effect, paradox of thrift, unvolontary unemployment)
8. the growth logc of market economies
9. the rules that govern the modern banking system and its properties 1
10. the basic logics of financial decisions

B. Skills

1. apply mainstream theory to assess welfare variations, tax impacts and other pricing issues
2. carry out profitability calculus (presnet value, cost-benefit analysis) including different loan constructions (ex. CHF loan),
3. identify fundamental market structures, determine indexes to describe market structures and firm's position,
4. understand macroeconomic changes, especially monetary and fiscal policy measures
5. extend economic knowedge alone
6. understand economic issues and use economic litterature
7. understand economic events published in the media

C. Attitude

1. collaborate with their instructors and fellow students during the learning process,
2. continously gain knowledge and information,
3. are open to learn and adapt the methodology of information technology tools
4. are aiming at knowing and using the tools that helps economic problem solving
5. are aiming at precise and correct problem solution.
6. are aiming at applying economic efficiency on firm level; and are able to take well founded decisions in complex or unexpected situations

D. Independence and responsibility

1. independently formulate and solve micro- and macroproblems,

2. are open for reliable critical remarks
3. collaborates with the experts of other fields
4. use systemtic approach.

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

Learning unit assessment: the complex assessment of knowledge, skills and attitude is written test containing a test part and an exercice part. The test part is intended to assess the knowledge of notions and principles, the exercice part is intended to a

19. Opportunity for repeat/retake and delayed completion

1) The obligatory mid-term test can be retaken or made up once without any fee during the semester In case of make up, the make up grade counts. 2) If the student fails including the retake specified in point 1), then – for specific fee fixed in the unive

20. Learning materials

1. Margitay – Daruka – Petró: Mikroökonómia (Jegyzet a Mikro- és makroökonómia tárgyhoz),
2. Pindyck, R. S.– Rubinfeld, D. L.: Microeconomics. Eighth Edition (Global Edition). Pearson, 2015.
3. Gilányi, Zs.(2020), Piacgazda(g)ság: oikonomia vagy khrematistiké?, Akadémia kiadó.
4. L-Randall Wray (2015), Modern Money Theory, Palgrave.
5. Hal. R Varian (2014), Intermediate Microeconomics with Calculus, WW Norton and Co. New York
6. Egyéb oktatási segédanyagok (gyakorló feladatok, mintazh stb.) a tanszék honlapján, a tárgy neve és kódja alatt érhetőek el: http://kgt.bme.hu/tantargyak/bsc/BMEGT30A001 other learning material (ex.: exercices for practice, sample tests) is available ont he webpage under the subject code.

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

Subject description

1. Subject name	**Multi Engine**				
2. Subject name in Hungarian	Többhajtóműves repülés			**3. Role**	cc
4. Code	**BMEGEENBSXMENG-01**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	0 hours	**Homework**	0 hours
Reading written materials	32 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Lezsovits Gábor

13. Prerequisites	Basic IR (BMEGEENBSXBCIR-01), strong; (), ; (),

14. Description of lectures

This module is a conversion from the single engine piston to the multi engine piston airplane. The trainee learns how to handle assimetric thrust with its limitations and how to follow emergency procedures in VMC and IMC conditions under IFR rules. This is the first step towards the big complex airplanes flying..

15. Description of practices

Practicing the relevant theoretical parts

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of the factors affecting aviation safety, the basics of the Safety Management System (SMS).
- Understands the difference in between one and multi engine operation
- Able to distinguish pros and cons of multi engine operation
- Compares, the difference in between simmetrical and assimetrical trust force operation

b) ability

- Ability to comply with flight safety rules.
- Have the stamina and tolerance for monotony required to carry out practical activities
- Calculates trust force in case of simmetrical and assimetrical operation
- Determines flights descent and landing distance in case of simmetrical and assimetrical operation
- Makes difference from normal landing technique to hydroplaning, on slippery runways, microbursts and windshear. in case of simmetrical and assimetrical operation

c) attitude

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Controls different velocities in case of simmetrical and assimetrical operation
- Determines optimal cruising flight level in case of simmetrical and assimetrical operation
- Organizes systematically landing partial procedures of flight control and navigation in case of simmetrical and assimetrical operation

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment
- Evaluate feedback informations of flying procedures in case of multi engine operation
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

The condition for obtaining the semester grade is to write the 1 summative evaluation.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Jereb Gábor: Aerodinamika és repüléselmélet I-II. ISBN: 963-10-2032-0
Bob Gardner: The Complete Multi-Engine Pilot ISBN: 9781644251973
Dusenbury, M.; Daku, S. The Pilot's Manual: Multi-Engine Flying: All the aeronautical knowledge required to earn a multi-engine rating on your pilot certificate (The Pilot's Manual Series), 2015, p. 294, ISBN-10 161954266

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

Subject description

1. Subject name	**Multi-Crew Cooperation and Jet Orientation**				
2. Subject name in Hungarian	Többpilótás kooperáció és Jet orientáció			**3. Role**	sp
4. Code	**BMEGEENBXRMPIL-01**	**5. Evaluation type**	**m**	**6. Credits**	**3**
7. Weekly contact hours	**1 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	42 hours	**Preparation for seminars**	24 hours	**Homework**	0 hours
Reading written materials	0 hours	**Midterm preparation**	24 hours	**Exam preparation**	0 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Lezsovits Gábor

13. Prerequisites	Basic IR (BMEGEENBSXBCIR-01), strong; Multi Engine (BMEGEENBSXMENG-01), strong; Flight Performance (BMEGEENBSXPRMN-01), strong

14. Description of lectures

This module is a bridge type of course that covers the difference between the single pilot and multi pilot operation under IFR conditions and rules. It is an introduction to the following areas: Communication, Leadership and Team Working, Situation Awareness (Threat and Error Management), Workload Management, Problem Solving and Decision Making, Monitoring and cross-checking, Task-sharing, Checklist handling, Briefing Techniques, Flight Management, Use of Flight Management Computers, System Normal Operations, Abnormal and Emergency Operations, Environment, Weather and ATC, strict procedural work using standard operating procedures, emergency procedures, crew co-ordinations and decision making models on turboprop or turbojet airplanes. This modul futhermore is JET handlig course that teaches how to operate and fly medium size of JET airplane. The following topics learned: jet handling, limitations, performance, FMS use and programming, high level handling. This module also containes an airline technical screening program simulator practice detail

15. Description of practices

Practicing the relevant theoretical parts

16. Description of laboratory practices

-

17. Learning outcomes

a) knowledge

- Knowledge of flight rules and procedures and the basis for the development of procedures.
- Understands the difference in between one and multi pilot operation
- Able to distinguish pros and cons of multi pilot operation
- Compares, the difference in between trust force given by piston engines and Jet engines

b) ability

- Interpersonal competencies (interpersonal skills, leadership, conflict resolution, teamwork and cooperation), which enable the pilot to operate civil aircraft.
- Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.
- Ability to perform first officer duties on multi-pilot aeroplanes after type rating,
- Applies flyimg procedures of multi pilot cooperation
- Determines flights descent and landing distance in case of Jet engine driven aeroplanes
- Makes difference from normal landing technique in case of Jet operation to hydroplaning, on slippery runways, microbursts and windshear. in case of simmetrical and assimetrical operation

c) attitude

- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Controls different velocities in case of Jet engine operation
- Determines optimal cruising flight level in case of Jet engine operation
- Organizes systematically landing partial procedures of flight control and navigation in case of Jet engine operation

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.

- Assesses the efficiency, effectiveness and safety of the work of subordinates.
- He/she is responsible for promoting the professional development of his/her subordinates and for managing and assisting them in their efforts in this direction.
- Evaluate feedback informations of flying procedures in case of Jet engine operation
- Makes decisions based on evaluations of cicumstances and demands
- Keeps under control operation of flying by demands and conditions

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Közelkörzeti navigáció és repülési eljárások (Hungarocontrol Jegyzet) 2001, 146 o.
APS/MCC Operations Manual Part B - Rev 1.0 Flying the I-JET published by IPCA – International Pilot Center Alliance, 2020 p. 145.
CAVOK MCC/JOC combined course materials prepared by CAVOK

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

Subject description

1. Subject name	**Operational Procedures**				
2. Subject name in Hungarian	Üzemeltetési eljárások			**3. Role**	sp
4. Code	**BMEKORHBsP6A01-00**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	10 hours	**Homework**	0 hours
Reading written materials	13 hours	**Midterm preparation**	25 hours	**Exam preparation**	30 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Kale Utku
12. Lecturers	Dr. Kale Utku

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

During this class enrolled students are introduced every segment of commercial transport operations starting off with the latest European Union Operational Procedures general requirements on the following topics: all weather operations, airplane equipment and instruments, crew, logs and flight records, long range flight and polar navigation, transport of dangerous goods by air, contaminated runways, emergency and precautionary landings, special operational procedures and hazards, fuel jettison. This course prepares students to be able to function as a crew member on board of a civil transport aircraft.

15. Description of practices

Practicing the standard messages related to NAT region flying. Practicing what was learned during the theoretical education.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

-known the procedures and requirements of commercial aviation in the EU

-knowm the special operational procedures and hazards,

-known the all weather operations

-known the minimum equipment ans instrument list used for the flight

-known the procedures of crew

-known the procedures of long range flight and polar navigation

-known the procedures of transport of dangerouos goods

- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.

- Knowledge of international and national aviation organisations and their regulations (ICAO Annexes, European Union regulations, EASA regulations, national regulations).

- Knowledge of basic meteorological concepts, phenomena, their impact on aviation and atmospheric processes hazardous to aviation.

- Knowledge of flight rules and procedures and the basis for the development of procedures.

- Knowledge and application of visual and instrument navigation procedures.

b) ability

- able to interpret and use the operational procedures by aircraft operator

- The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.

- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.

- Ability to conduct flights in accordance with the Commercial Pilot Licence/Instrument Rating (CPL/IR), in accordance with the rules of the air and the requirements of the Authority.

- Képes továbbképzés, megfelelő gyakorlat megszerzése után szakági vezetői pozíciók betöltésére (légiüzemeltetésért, földi kiszolgálásért, repülésbiztonságért, megfelelősségért felelős vezető).

c) attitude

- strives for adhere and enforce the operation procedures of all phases of the flight

- He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

- He/she shall endeavour to carry out his/her tasks and management decisions by seeking the opinion of his/her supervisors, preferably in cooperation.
- Shares his/her experience with his/her colleagues, thus helping them to develop.

d) independence and responsibility

- can interpret and execute operational procedures independently
- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Assesses the efficiency, effectiveness and safety of the work of subordinates.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Requirement of signature: one mid-term exam with at least 50% result.

19. Opportunity for repeat/retake and delayed completion

Mid-term exam correction possibility.

20. Learning materials

965/2012/EU rendelet https://eur-lex.europa.eu/legal-content/HU/TXT/?uri=CELEX:32012R0965
Különböző repülőgépek légiüzemeltetési utasításai
Vállalati Repülésvégrehajtási Utasítások/Kézikönyvek
Oxford Aviation Academy ATPL Ground Trainig Series: Book 12 – Operational Procedures

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

Subject description

1. Subject name	**Powerplant**				
2. Subject name in Hungarian	Hajtóművek			**3. Role**	cc
4. Code	**BMEGEENBSXPOWR-01**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**3 lecture**	**1 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	0 hours	**Homework**	0 hours
Reading written materials	26 hours	**Midterm preparation**	10 hours	**Exam preparation**	28 hours

10. Department	Department of Energy Engineering
11. Responsible lecturer	Dr. Lezsovits Ferenc
12. Lecturers	Dr. Lezsovits Ferenc

13. Prerequisites	Fluid Dynamics, Thermodynamics and Heat Transfer 1. (BMEKORHBsP3001-00), strong; (), ; (),

14. Description of lectures

During classes, the basics of piston and turbine engine based systems are discussed. Starting with the basic principles of operation and auxiliary systems as lubrication and cooling mechanisms. With regards piston engines the following topics are covered: ignition, fuel, mixture, carburetors, engine icing, fuel injection, performance and power augmentation and propellers. The second part of this subject extracts the features and composition of turbine engines by covering the following topics: air inlets, compressors, combustion chambers, turbine assembly, exhaust system, lubrication, thrust, performance and thrust augmentation, reverse thrust, gearboxes and accessory drives, ignition systems, auxiliary power units and engine starting, fuel systems and bleed air

15. Description of practices

Practicing the relevant theoretical parts

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
- Knowledge of the main theories and problem-solving methods in the field.
- Knowledge of fire and accident hazards associated with aircraft and related activities and their prevention and mitigation.
- Understand theoretical and practical principals of Internal combustion engines and gas-turbines
- Able to distinguish ambient and power conditions having effects on powerplant operation
- Systematizing auxiliary systems are necessary for opeartion of powerplants

b) ability

- The ability to identify, identify, formulate and solve (through the practical application of standard operations) routine technical problems, and to identify, formulate and solve (through the practical application of standard operations) the theoretical and practical background necessary to solve them.
- The ability to operate the aeroplane's airframe equipment and systems, the aeroplane's powerplant and systems, on-board instruments and instrument systems as described in the Operations Manual, to identify and correct any malfunction which may occur.
- Adopt operational procedures for optimal and adequate operation of powerplants
- Determines powerplant opeartion conditions adequate to demands and ambient conditions
- Operate adequate control systems having effects on powerplant operation

c) attitude

- He/she shall endeavor to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.
- Shares his/her experience with his/her colleagues, thus helping them to develop.
- Controls informations gained by instruments of powerplants
- Configuring the best powerplant operation according to given boundary conditions
- Organizes systematically devices and manipulators of powerplants and flying controls

d) autonomy and responsibility

- Under the guidance of his/her supervisor, directs the work of the staff assigned to him/her and supervises the operation of machinery and equipment.
- Keeps abreast of legislative, technical, technological and administrative changes in the field.
- Evaluate feedback informations of powerplants

- Makes decisions based on evaluations of circumstances and demands
- Keeps under control operation of powerplants by demands and conditions

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

Requirement for completion of the subject: successful completion (min. 40%) of the midterm tests. Final grade equals to the result of exam.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Veress A. Gázturbinák, Beneda K. Simongáti Gy., Veress Á. Járművek hő és áramlástechnikai berendezése I. ISBN 978-963-279-639-0, 195 o.
Thomas W. Wild: Aircraft Powerplants, 9th Edition ISBN: 9781259835704 , p. 736.
ACE Oxford ATPL Ground Trainig Series Book4 Powerplants, Oxford Aviation Academy, ISBN13: 9781906202545m p 730

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

Subject description

1. Subject name	**Principles of Flight**				
2. Subject name in Hungarian	Repüléselmélet			**3. Role**	cc
4. Code	**BMEKORHBsP3002-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	12 hours	**Homework**	0 hours
Reading written materials	30 hours	**Midterm preparation**	22 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Kale Utku
12. Lecturers	Jankovics István

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

During class the subsonic and supersonic principles of flight are discussed alongside the following topics: the standard and non-standard atmosphere, basic aerodynamic theory, subsonic airflow, lift, drag, stalling, high lift devices. To prepare students for high speed and altitude operation under intermediate conditions airframe contamination, stability and control, flight mechanics, high speed flight, limitations and windshear are also discussed.

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

Knows the principles and rules of thumb related to the theory of flight

Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.

Knowledge of the main theories and problem-solving methods in the field.

b) ability / competence

Methodological competencies (analytical thinking, self-control (self-monitoring), problem solving, troubleshooting, situational awareness, systems thinking, judgement, organisational skills), which enable the pilot to operate civil aircraft.

The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.

c) attitude

Aviation Safety centric attitude,

Shares his/her experience with his/her colleagues, thus helping them to develop.

They are characterized by a system-level thinking and approach.

He/she shall endeavour to keep his/her self-training in the field of professional piloting continuous and consistent with his/her professional objectives.

d) autonomy

Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

Two mid-term exam with at least 50% results on each

19. Opportunity for repeat/retake and delayed completion

1-1 mid-term exam repetition in the late completition period

20. Learning materials

Oxford Aviation Academy ATPL Ground Trainig Series , Book 13 – Principles Of Flight
Petróczy György: Repüléselmélet

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	Minőségügy			**3. Role**	cc
4. Code	**BMEKOGJA154**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

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	19 hours	**Midterm preparation**	9 hours	**Exam preparation**	0 hours

10. Department	Department of Automotive Technologies
11. Responsible lecturer	Dr. Török Árpád
12. Lecturers	Dr. Török Árpád

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Topics of “Quality management in vehicle technique”: the significance and importance of quality management; the development of quality systems and their characteristics in major economic regions; standards-based quality management systems and their role; quality (business excellence) awards and their role; legal frameworks for quality, regulators of quality; certification, auditing; economic aspects of quality; implementing the philosophy of 'better quality at a lower cost'; quality concepts, conformity, conformity assurance, quality characteristics, quality levels, quality creation and key phases, quality sources, quality control, organizational framework; ISO 9000 family of standards, industry quality management standards, QS 9000 and ISO TS16949 standards, environmental management system, integrated quality management systems, process integrated quality management system, quality awards, TQM; self-monitoring, team culture, project culture, project management, continuous improvement, PDCA principle, problem solving and techniques.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge: know the basic concepts and tools of quality in the automotive industry
b) ability: able to apply the basic quality tools
c) attitude: open mind in the direction of quality
d) autonomy and responsibility: participate in the quality tasks

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

During the semester 1 midterm test have to be completed with more the 50 % of the maximal points.
The conditions for obtaining the signature are the completing the midterm test.

19. Opportunity for repeat/retake and delayed completion

The midterm test can be retake once.

20. Learning materials

Lecture notes and issued by the department.

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

Subject description

1. Subject name	**Radio Navigation**				
2. Subject name in Hungarian	Rádió navigáció			**3. Role**	sp
4. Code	**BMEKORHBsP4A01-00**	**5. Evaluation type**	**m**	**6. Credits**	**4**
7. Weekly contact hours	**2 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	56 hours	**Preparation for seminars**	16 hours	**Homework**	0 hours
Reading written materials	32 hours	**Midterm preparation**	16 hours	**Exam preparation**	0 hours

10. Department	Department of Aeronautics and Naval Architecture
11. Responsible lecturer	Dr. Beneda Károly
12. Lecturers	Dr. Beneda Károly, Gál István, Jankovics István, Dr. Sziroczák Dávid

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Despite its title, this subject introduces the equipments and their detailed parameters used for in-flight radio navigation. By describing the principles behind the mechanisms of radio aids, direction finding equipment, on-board radio instruments; this subject gives an insight of how to rely on these devices during normal and abnormal operations. In order to achieve the before mentioned objective, the following topics are covered during course-work: radio propagation theory, modulation, antennae, Doppler radar, VHF direction finder, Automatic Direction Finder (ADF), VHF Omni-Directional Range (VOR), ILS and MLS landing systems, ground radar, airborne weather radar, distance measuring equipment, area navigation systems, electronic horizontal situation indicator (EHSI), Global Navigation Satellite Systems (GNSS).

15. Description of practices

Solving practical problems related to the theory presented in the lecture.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
Knows the operatin princples and procedaures of on-board radio navigation equipments
Knows the calculation methods related to radio navigation procedures
Knowledge of the key concepts and theories related to his/her area of competence and the concepts that underpin them.
Knowledge of the main theories and problem-solving methods in the field.
b) abilities
The ability to pass the theoretical and practical examinations of the ATP(A) integrated training without further training.
Ability to set up and use on-board radio and radio navigation equipment.
c) attitude
Aviation safety centric approach,
Shares his/her experience with his/her colleagues, thus helping them to develop.
Characterized by a system-level thinking and approach.
d) autonomy and responsibility
Keeps abreast of legislative, technical, technological and administrative changes in the field.

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

One mid-term exam with at least 50% result

19. Opportunity for repeat/retake and delayed completion

Mid-term exam correction possibility in the late completion period

20. Learning materials

Tóth János: Rádió és elektronikus léginavigáció I.-II. (Hungarocontrol Jegyzet) 1992, 185 + 185 old.
CAE Oxford ATPL Ground Trainig Series , Book 11 – Navigation 2 – Radio Navigation, Oxford Aviation Academy, 2014, p. 396.

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

Subject description

1. Subject name	**Statics of Structures**				
2. Subject name in Hungarian	Szerkezetek statikája			**3. Role**	cc
4. Code	**BMEKOJSA192**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**0 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**60 hours**
Contact hours	28 hours	**Preparation for seminars**	10 hours	**Homework**	0 hours
Reading written materials	10 hours	**Midterm preparation**	12 hours	**Exam preparation**	0 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Béda Péter
12. Lecturers	Dr. Béda Péter, Dr. Forberger Árpád

13. Prerequisites	Mechanics 1 (BMEKOJSA191), strong; (), ; (),

14. Description of lectures

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15. Description of practices

Statics of structures. Balance of two, three and four planar forces. Simple structures. Analysis of trusses. Method of joints, method of sections. Complex structures, structures with hinges. Superposition method. Method of division. Coulomb friction. Rolling resistance, rope friction. Guided and individual exercise solution.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- The student knows the basic rules of statics of structures.

b) skills

- The student understands an can apply the method of joints and the method of sections for trusses;
- The student understands an can apply the superposition method and the method of division for hinged structures.
- The student is able to solve problems with educated methods, able to complete his/her knowledge from different sources.

c) attitude

- The student aims to create exact, aesthetic and obvious documentations;
- The student accepts the rules of cooperation with teachers and collegues.

d) independence and responsibility

– The student solves unprecedent problems independently, proactive cooperation in education and problem solving, takes responsibility on own activity.

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

During the semester, we will write two tests. The mid-term ticket is then determined on the sum of the scores of both tests. Requirement for completion of the subject to reach at least 40%.

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period

20. Learning materials

Csizmadia – Nándori: Mechanika mérnököknek I – Statika, Nemzeti Tankönyvkiadó, Bp.1996.

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

Subject description

1. Subject name	**Technical Chemistry**				
2. Subject name in Hungarian	Műszaki kémia			**3. Role**	cc
4. Code	**BMEVEKFBs6AP1MK-01**	**5. Evaluation type**	**e**	**6. Credits**	**3**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**90 hours**
Contact hours	28 hours	**Preparation for seminars**	8 hours	**Homework**	20 hours
Reading written materials	20 hours	**Midterm preparation**	4 hours	**Exam preparation**	10 hours

10. Department	Department of Chemical and Environmental Process Engineering
11. Responsible lecturer	Dr. Kun Róbert
12. Lecturers	

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Introduction. Description of the objectives of the subject. Thermodynamics of chemical reactions. Concepts of internal energy, enthalpy, entropy, free enthalpy and their role in chemical reactions. Calculation of enthalpy of chemical reactions in standard and non-standard states. Preconditions for spontaneously occurring chemical reactions.

Kinetics of chemical reactions. Interpretation and description of reaction rates for elementary and complex reactions. Interpretation and use of the rate equation. The role of reaction rate in the reaction space, formation of carbon monoxide. Operation of a triple-action catalyst.

Chemical equilibrium. Expression and interpretation of equilibrium constants for homogeneous and heterogeneous reactions. Possibilities of shifting the equilibrium. Carbon monoxide-carbon dioxide equilibrium in the furnace. Dissociation constants of acids, pH calculation. Function of acid-base indicators, effect of acid rain on living water.

Electrochemical corrosion I. Electrochemical basics for electrochemical corrosion, galvanic cell function, electrode potential, Nernst equation. Construction and use of electrode potential table to predict corrosion in standard and non-standard conditions.

Electrochemical corrosion II Necessary and sufficient conditions for electrochemical corrosion. Interpretation of examples of electrochemical corrosion: acid corrosion, dissolved oxygen corrosion, biological corrosion, chloride ion corrosion, stray current effect.

Electrochemical corrosion III Corrosion studies, polarization curve and interpretation. The concept and use of overvoltage. Chemical basis of corrosion protection processes (alloying, coating, inhibitors, active, passive and complex protection)

Basic concepts of combustion engineering Combustion heat, calorific value, determination by measurement and calculation. Reasons for different calorific values of different materials. Ignition temperature. Lower and upper flammability limits. Factors affecting the melting point of slag. Slag burner.

Combustion engineering II. Excess air coefficient and its role in gas, oil and coal firing. Flue gas constituents and factors affecting the formation of air pollutants (CO, NO, (CH)x). Chemical basis of operation of low NOx emitting burners.

Coal technology. Gasification and gasification of coal. Coke production. Sulphur content of coal. Effect of sulphur dioxide formation, acid rain. Flue gas desulphurisation options

Petroleum technology I. Atmospheric and vacuum distillation of petroleum, products, processing. Possibilities of reducing sulphur content. Properties of petrol as an engine fuel (volatility, distillation curve, actual and potential resin content, octane and octane boosting processes, technologies.

Petroleum technology II. Petroleum, properties of gas oil, atomizability, coking, sulphur content, cetane number. Alternative motor fuels ethanol and biodiesel. Lubricating oil production. Function of lubricating oil additives.

Water chemistry. Water hardness. Methods of reducing and removing water hardness. Boiler feed water preparation. Drinking water technology. Effect of water pollutants.

15. Description of practices

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16. Description of laboratory practices

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17. Learning outcomes

a) knowledge

- Has a comprehensive knowledge of the basic facts, trends and boundaries of the subject area of the technical field.
- Knows the general and specific mathematical, natural and social science principles, rules, connections and procedures necessary for the cultivation of the technical field.
- Knows the conceptual system, the most important relationships and theories related to his field of expertise.
- He has a comprehensive knowledge of the main theories of his field of knowledge acquisition and problem solving methods.

b) ability

- Capable of basic analysis of the disciplines that make up the knowledge system of the energetics and general technical fields, the synthetic formulation of connections and adequate evaluation activities.
- Ability to plan, organize and carry out self-study and knowledge acquisition.
- Able to identify routine professional problems, to explore the theoretical and practical background necessary for their solution, to formulate them and to solve them (with the practical application of standard operations).
- Able to understand and use the online and printed literature, IT and library resources typical of his field of expertise.
- He is able to apply the acquired IT knowledge in solving the tasks arising in his field of expertise.
- He is able to use his knowledge in a creative way to effectively manage the resources of his workplace.
- In the course of his work, he is able to apply and comply with the fire safety and hygiene rules and regulations.
- Able to communicate orally and in writing in his native language and at least one foreign language in a professionally adequate manner according to his field of expertise.
- Able to interpret and characterize the structure and operation of the structural units and elements of energy conversion and supply systems, the design and connection of the applied system elements.
- You have sufficient stamina and tolerance for monotony to perform some practical activities.

c) attitude

- Open and receptive to the application of energy, health and environmentally conscious design and operation principles and methods.
- He solves his tasks and makes his management decisions by getting to know the opinions of the managing and supervised colleagues.
- In the course of his work, he enforces the requirements of efficiency, sustainability, and environmental and health awareness.
- Assumes and authentically represents the social role of his profession and its fundamental relationship with the world.
- By applying his acquired technical knowledge, he strives to get to know the observable phenomena as thoroughly as possible, to describe and explain their laws.
- In the course of his work, he observes and adheres to the relevant safety health protection, environmental protection, and quality assurance and control requirements systems.
- Pays attention to promoting the professional development of his subordinates, managing and assisting their efforts in this direction, applying the principle of equal access.
- He shares his experiences with his colleagues, helping them to develop in this way.
- Strives to interpret and utilize information related to health preservation, to apply modern management knowledge and skills in order to create a workplace environment that supports health and efficiency.

d) autonomy and responsibility

- Even in unexpected decision-making situations, he independently thinks through comprehensive, foundational professional questions and develops them based on given sources.
- Responsibly professes and represents the value system of the engineering profession, openly accepts professionally grounded critical comments.
- During the performance of his professional tasks, he also cooperates with qualified professionals from other (primarily technical, economic and legal) fields.
- Based on the instructions of his workplace manager, he directs the work of the assigned staff and supervises the operation of energy systems.
- Evaluates the efficiency, effectiveness and safety of subordinates' work.
- He takes responsibility for the consequences of his technical analyses, the proposals formulated on the basis of them, and the decisions he makes.
- By applying a systematic approach, it contributes to the economical and sustainable use of energy carriers and sources.
- Open to workplace methods of organizational and individual health development.

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

Attendance of lectures during the term time according to the TVSZ. Writing a theoretical summary exam. Max. 40 points (min. 21 points required). Completion of a mid-term assignment.

19. Opportunity for repeat/retake and delayed completion

The theoretical summary exam and the mid-term assignment can be repeated according to the TVSZ, with the possibility to make up for them.

20. Learning materials

1) Írásos segédlet a teljes tananyagból, elérhető az intraneten és sokszorosítva
2) Tanszéki munkaközösség: Műszaki kémia gyakorlatok, Műegyetemi Kiadó, 71018
3) Berecz: Kémia műszakiaknak, Nemzeti Tankönyvkiadó, 1998 (ajánlott)
4) Vajta-Szebényi-Czencz: Általános kémiai technológia, Nemzeti Tankönyvkiadó, 1999
5) Bajnóczy-Szebényi: Műszaki kémia, Műegyetemi Kiadó, 2001
6) Jess, A.; Wasserscheid, P. Chemical Technology: An Integral Textbook, Wiely, 2013, p 888, ISBN: 978-3-527-67061-1
7) McMurry, J. E.; Fay, R. C. Chemistry, person Education ltd., 2014, ISBN 1-292-02502-6, p. 1062.

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

Subject description

1. Subject name	**Vehicle and Drive Elements 1.**				
2. Subject name in Hungarian	Jármű- és hajtáselemek 1.			**3. Role**	cc
4. Code	**BMEKOJSA493**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**1 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	14 hours	**Homework**	15 hours
Reading written materials	20 hours	**Midterm preparation**	6 hours	**Exam preparation**	23 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Lovas László
12. Lecturers	Devecz János, Dr. Ficzere Péter, Dr. Lovas László

13. Prerequisites	Engineering Drawing 2. (BMEKOJSA499), strong; (), ; (),

14. Description of lectures

Classification of vehicle structure elements. Structural material properties. Fatigue. Load models, load carrying capacity parameters. Basics of dimensioning. Bolted links and screw mechanisms, bolted links under pretension. Dimensioning of welded structures and weldings. Principles of welded constructions. Adhesive links. Hub-shaft links with shape closing and force closing. Construction principles, dimensioning. Spring types. Coil and rubber springs, stiffness diagrams. Shaft shape and dimensioning, critical velocity. Clutch types. Special clutches in vehicle industry, synchronizers, special clitches. Basics of tribology. Principle and construction of journal bearings.

15. Description of practices

Practice by solving individual machine construction problems.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
- The student knows the basic machine elements
- The student knows the dimensioning for load changing periodically in time

b) skills
- The student is able to chose the appropriate solution to a given simple technical problem
- The student is able to communicate via technical drawings and descriptions in text

c) attitude
- In his work, the student prepares clean, aesthetic, easy to read drawings and written documentation.

d) independence and responsibility
- The student is aware of the importance of his work and sees the consequence of eventual design errors.

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

During the semester, there is a test and homeworks scored by points. There are two homework evaluations during the semester. A minimum of 40% must be reached by each homework evaluation. A minimum of 40% of the overall semestrial points must be reached t

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period. Homework correction upon the lesson's timetable.

20. Learning materials

Lecture slides; lecture videos, practice videos;
Devecz János (szerk.): Jármű-és hajtáselemek I. online textbook, Typotex kiadó. Szendrő Péter (szerk.): Gépelemek BSc textbook. Mezőgazda Kiadó, 2007. Devecz János (szerk.): Gépelemek I. Feladatok, Műegyetemi Kiadó, 75009. Zsáry Árpád: Gépelemek I. Tankönyvkiadó 2003., 44523 (recommended literature)

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

Subject description

1. Subject name	**Vehicle and Drive Elements 2.**				
2. Subject name in Hungarian	Jármű- és hajtáselemek 2.			**3. Role**	cc
4. Code	**BMEKOJSA494**	**5. Evaluation type**	**e**	**6. Credits**	**4**
7. Weekly contact hours	**1 lecture**	**2 practice**	**0 lab**	**8. Curriculum**	**p**

9. Working hours for fulfilling the requirements of the subject					**120 hours**
Contact hours	42 hours	**Preparation for seminars**	14 hours	**Homework**	15 hours
Reading written materials	20 hours	**Midterm preparation**	6 hours	**Exam preparation**	23 hours

10. Department	Department of Railway Vehicles and Vehicle System Analysis
11. Responsible lecturer	Dr. Lovas László
12. Lecturers	Devecz János, Dr. Ficzere Péter, Dr. Lovas László

13. Prerequisites	Engineering Drawing 2. (BMEKOJSA499), strong; (), ; (),

14. Description of lectures

Rolling bearing types. Bearing design, choice of bearings, fitting environment, assembly. Basics of elastohydrodynamical librication theory. Static seals, seals of rotating motion. Gear transmission types, tasks, principles, with emphasis on those of vehicles and mobil machines. Classification of mechanical drives, force closing and shape closing types. Basics of belt drives, phisycal parameters, forces, torques. Trapezoidal belt, toothed belt, chaind and variator drives. Gear drives: classification, characteristics, parameters. Conditions of the homocinetical drive, conjugated profile pairs. Basic characteristics of the involute profile, toothing systems. Gear materials, basics of manufacturing. Internal toothing, conical drives. Forces and torques in gear drives. Failure modes of gears, basics of gear dimensioning. Geared structures, systems with cylindrical, conical and planetary gears. Basics of worm drives. Relation between profile errors and drive conditions. Basics of gear measurement.

15. Description of practices

Practice by solving machine construction problems in teams.

16. Description of laboratory practices

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17. Learning outcomes

a) knowledge
- The student knows the basic elements of gear drives
- The student knows the basic elements of belt and chain drives

b) skills
- The student is able to chose the appropriate solution to a given problem in drive technics
- The student is able to communicate via technical drawings and descriptions in text

c) attitude
- In his work, the student prepares clean, aesthetic, easy to read drawings and written documentation.

d) independence and responsibility
- The student is aware of the importance of his work and sees the consequence of eventual design errors.

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

During the semester, there is a test and homeworks scored by points. There are two homework evaluations during the semester. A minimum of 40% must be reached by each homework evaluation. A minimum of 40% of the overall semestrial points must be reached t

19. Opportunity for repeat/retake and delayed completion

Midterm test correction possibility in the delayed completion period. Homework correction upon the lesson's timetable.

20. Learning materials

Lecture slides, lecture videos, practice videos;
Devecz János (szerk.): Jármű-és hajtáselemek II. online textbook, Typotex kiadó. Szendrő Péter (szerk.): Gépelemek, Mezőgazda Kiadó, 2007. Veér Lajos-Cseke József: Gyakorló feladatok. Exercise book. Zsáry Árpád: Gépelemek II. Tankönyvkiadó 2003. 744524

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

Subject description

1. Subject name	**Work Organization**				
2. Subject name in Hungarian	Üzemszervezés			**3. Role**	cc
4. Code	**BMEKOKUA169**	**5. Evaluation type**	**m**	**6. Credits**	**2**
7. Weekly contact hours	**2 lecture**	**0 practice**	**0 lab**	**8. Curriculum**	**p**

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	16 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, Bertalan Marcell, Molnár-Major Petra

13. Prerequisites	(), ; (), ; (),

14. Description of lectures

Connection between logistics and work organization. Grouping of indicators in production systems. Exact and preliminary methods for obtaining teh indícators. Methods of time measurement. Time norm calculation. Structure of Calendar ~, Useful ~, Duty list ~ and Productive ~ time basis. Concept of opened reserve. Involving open reserves in production. Project planning. Basic concepts of network design. Network design procedures. CPM is a fixed-term design. PERT is a casual periodic design. Cost planning. Resource planning. Optimum search methods. Automatization of production systems. Layout and connection possibilities in shop floor control. Tchnological transmit time, gantt-charts.

15. Description of practices

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16. Description of laboratory practices

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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) ability
- 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) automomy 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)

One midterm test is expected at the end of the semester, which is successful if the student achieves at least 50%. A total of 7 weekly assignments will be given during the semester, of which 4 pre-defined assignments are compulsory. In each of these 4 tas

19. Opportunity for repeat/retake and delayed completion

The midterm test and the 4 compulsory weekly assignments can be substituted once each.

20. Learning materials

E-learning MIT/GIS/ERP/PPS moodle system. Education version of MTM and MicroSoft Project system.