

Faculty of Mechanical Engineering

IMPORTANT NOTES

If for one subject you can find several different types (lecture, practice, laboratory) of courses then please choose one and only one course from each type in order to be able to perform the subject's requirements successfully. Civil Engineering courses are on the website separately. Courses chosen from the offer of Faculty of Civil Engineering will be checked and arranged individually by the departmental coordinator.

Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTBG04	Air Pollution Control, Wastewater and Solid Wastes Management		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	A-2024o-E	English	TUE:08:15-11:00(D316A)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TBG04 http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATBG04 https://gpk.bme.hu/en/content/42				
Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTBG11	Fluid Mechanics		Mid-semester mark	6
Course type	Course code	Course language	Timetable information	
Laboratory	A-2024o-L1_8-14	English	TUE:14:15-16:00(AE_NAGYLAB)	
Lecture	A-2024o-E	English	TUE:10:15-12:00(KF87)	
Practice	A-2024o-G1	English	WED:16:15-18:00(R517)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TBG11 http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATBG11 https://gpk.bme.hu/en/content/42				
Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTNW04	Computational Fluid Dynamics		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Laboratory	A-2024o-L2	English	THU:08:15-10:00(AE_CFDLAB)	
Laboratory	A-2024o-L3	English	THU:10:15-12:00(AE_CFDLAB)	
Laboratory	A-2024o-L1	English	WED:12:15-14:00(AE_CFDLAB)	
Lecture	A-2024o-E	English	MON:14:15-16:00(KF82)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TNW04 http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW04 https://gpk.bme.hu/en/content/42				
Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTNW08	Building and Environmental Aerodynamics		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	A-2024o-Lprs	English	WED:10:15-12:00(AE_NAGYLAB)	
Lecture	A-2024o-E	English	WED:08:15-10:00(AE_MERLEG-T)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TNW08 http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW08 https://gpk.bme.hu/en/content/42				
Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTNW10	Advanced Technical Acoustics and Measurement Techniques		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	A-2024o-Lprs	English	THU:12:15-14:00(AE_NAGYLAB)	
Lecture	A-2024o-E	English	MON:10:15-12:00(AE_MERLEG-T)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TNW10				

<http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW10>
<https://gpk.bme.hu/en/content/42>

Subject code	Subject name		Requirement	ECTS credit
BMEGEÁTNW19	Vehicle Aerodynamics		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	A-2024o-L	English	WED:16:15-18:00(AE_NAGYLAB)	
Lecture	A-2024o-E	English	WED:14:15-16:00(KM34)	

<https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%81TNW19>
<http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW19>
<https://gpk.bme.hu/en/content/42>

Subject code	Subject name		Requirement	ECTS credit
BMEGEÉEBG51	Transfer processes		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	A9	English	WED:13:15-15:00(D102)	
Practice	A10	English	WED:15:15-16:00(D102)	

URL: <https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGE%C3%89EBG51>

Subject code	Subject name		Requirement	ECTS credit
BMEGEENBGEB	Energy Processes and Equipment		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Laboratory	25-1-ENG-LAB	English	TUE:12:15-14:00(DCS1)	
Lecture	25-1-ENG-E	English	MON:13:15-16:00(D224)	

<https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBGEB>

Subject code	Subject name		Requirement	ECTS credit
BMEGEENBGEK	Energy and Environmental Measurements		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	25-1-ENG-LAB	English	WED:12:15-14:00(DCS1)	
Practice	25-1-ENG-G	English	WED:11:15-12:00(DCS1)	

<https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBGEK>

Subject code	Subject name		Requirement	ECTS credit
BMEGEENBGHG	Heat Engines G		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	TUE:16:15-18:00(D224)	
Practice	25-1-ENG-G1	English	FRI:14:15-16:00(D318)	
Practice	25-1-ENG-G2	English	FRI:14:15-16:00(D318)	

<https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBGEK#>

Subject code	Subject name		Requirement	ECTS credit
BMEGEENBGTD	Engineering Thermodynamics G		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	TUE:12:15-14:00(D224)	
Lecture	25-1-DEU-E	German	WED:10:15-12:00	
Practice	25-1-ENG-G	English	TUE:10:15-12:00(D224)	
Practice	25-1-DEU-G	German	THU:14:15-16:00	

<https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBGTD>

Subject code	Subject name		Requirement	ECTS credit
BMEGEENBKSD	Final project		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	25-1-ENG-G	English		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBKSD				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENBMHO	Thermal engineering		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	WED:14:15-15:00(D224)	
Practice	25-1-ENG-G	English	WED:12:15-14:00(D224)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENBMHO				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNKDA	Master Thesis Project A		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	25-1-ENG-G	English		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNKDA				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNKDB	Master Thesis Project B		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	25-1-ENG-G	English		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNKDB				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNKLC	LCA of energy systems		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	25-1-ENG-LAB	English	FRI:13:15-15:00(D216)	
Lecture	25-1-ENG-E	English	FRI:12:15-13:00(D216)	
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNKSG	Internship M		Signature	0
Course type	Course code	Course language	Timetable information	
Practice	25-1-ENG-G	English		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNKSG				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNWEC	Energy Conversion		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	WED:10:15-12:00(D224)	
Practice	25-1-ENG-G	English	THU:16:15-18:00(D216,D224)	
ONLY FOR MSc STUDENTS! BSc students should choose BMEGEENBGEB,,,"Energy processes and equipments"subject. https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNWEC				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNWME	Measurement in Energy Engineering		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	25-1-ENG-LAB	English	FRI:14:15-16:00(D218)	
ONLY FOR MSc STUDENTS!				

https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNWME				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNWPR	Teamwork Project		Mid-semester mark	6
Course type	Course code	Course language	Timetable information	
Laboratory	25-1-ENG-LAB	English		
ONLY FOR MSc STUDENTS! https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNWPR				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNWSE	Dynamic simulation of energy engineering systems		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	MON:16:15-18:00(D216)	
ONLY FOR MSc STUDENTS! https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNWSE				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENNXTU	Turbines		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	MON:08:15-10:00(KF86)	
Practice	25-1-ENG-G	English	MON:10:15-12:00(KF86)	
ONLY FOR MSc STUDENTS! https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENNXTU				
Subject code	Subject name		Requirement	ECTS credit
BMEGEENUVHT	Advanced thermodynamics		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Lecture	25-1-ENG-E	English	TUE:12:15-14:00(D216)	
Practice	25-1-ENG-G	English	TUE:11:15-12:00(D216)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEENUVHT				
Subject code	Subject name		Requirement	ECTS credit
BMEGEÉPAG62	Air-Conditioning		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	A29	English	WED:08:15-10:00(D126)	
Practice	A30	English	WED:10:15-12:00(D126)	
Air-Conditioning BMEGEÉPAG62 Main aims and objectives, learning outcomes of the subject: The objective is the introduction to the fundamentals of air-conditioning systems in buildings providing a comprehensive knowledge on the theory and practice of system design and dimensioning with particular attention to the most recent technologies. By the end of this course you will: <ul style="list-style-type: none"> - Have knowledge about the aims of air-conditioning: providing comfort - both thermal and good indoor air quality, reduce energy consumption, increase energy performance, etc. - Be able to apply appropriate mathematical and computer-based methods for the calculation of buildings' heat loads and cooling loads, sizing of air-conditioning elements. - Be able to apply knowledge of techniques, codes and standards of practice to the design of cooling components and systems. Method of education: The theoretical background will be interpreted via lectures, the calculations and tools will be presented during the seminars. Calculation problems/examples will require active participation. Detailed thematic description of the subject (by topic, min. 800 character): Date of class				

Topics to be discussed, readings required for the class

Week 1

Introduction, AC systems, types

Heat transfer

Week 2

Thermal comfort

Heat load calculation

Week 3

Thermal comfort, examples

Indoor Air Quality

Week 4

Cooling load calculation

h-x diagram, psychrometric chart

Week 5

Elements, heat exchangers, hum.

Volume flow rate calculation

Week 6

Elements, heat exch. cooling, hum

Injection

Week 7

Test 1, HW out

Injection

Week 8

Pressure diagram

Air Inlets, SCHAKO

Week 9

Elements, heat recovery

Week 10

Elements, filters

Week 11

Air handling processes

Duct network, sizing

Week 12

Air handling processes

Week 13

Air handling unit, calc. example

Week 14

Test 2

HW in

Requirements and grading

a) in term-period Knowledge, understanding and skills are assessed through a combination of written tests and homework throughout the semester. Homework will be distributed during the semester and will have to be turned in by the end of the course, before the exam period. Later submission is allowed but a fee has to be paid and homework will have to be turned in by the 3rd week of the exam period. Homework will not be graded but is compulsory in order to receive a grade.

b) in examination period The course ends with an exam in the exam period. Student will be allowed to take the exam if both mid-term and end-term tests are passed.

c) Disciplinary Measures Against the Application of Unauthorized Means at Mid-Terms, Term-End Exams and Homework

URL: <https://epget.bme.hu/subjects.php?lepes=2&tid=216>

Subject code	Subject name		Requirement	ECTS credit
BMEGEGINWDT	Machine Design and Production Technology		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	EA	English	FRI:08:15-10:00(R113)	
Practice	G1	English	FRI:10:15-12:00(R113)	
Practice	G2	English	FRI:10:15-12:00(R113)	
https://oktatas.gpk.bme.hu/tad/tantargy/BMEGEGINWDT				
Subject code	Subject name		Requirement	ECTS credit
BMEGEGTAG94	Manufacturing processes		Exam	4
Course type	Course code	Course language	Timetable information	
Laboratory	J2	English	MON:14:15-16:00(G113)	
Lecture	J1	English	MON:12:15-14:00(G116)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEGTAG94				
Subject code	Subject name		Requirement	ECTS credit
BMEGEGTBG65	CAD/CAM applications		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Laboratory	EJ2	English	THU:08:15-10:00(G123)	
Laboratory	EJ4	English	THU:18:15-20:00(G123)	
Laboratory	EJ3	English	THU:16:15-18:00(G123)	
Lecture	EJ1	English	THU:10:15-12:00(G113)	
Practice	EJ5	English	THU:12:15-14:00(G113)	
https://oktatas.gpk.bme.hu/tad/en/tantargyak/BMEGEGTBG65				
Subject code	Subject name		Requirement	ECTS credit
BMEGEGTNWNC	NC Machine Tools		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	J1	English	THU:15:15-16:00(T47)	
Practice	J2	English	THU:16:15-17:00(T47)	
Practice	J3	English	THU:16:15-17:00(G113)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEGTNWNC				
Subject code	Subject name		Requirement	ECTS credit
BMEGEGTNWPP	Process Planning		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	J1	English	FRI:08:15-09:00(G113)	
Practice	J2	English	FRI:09:15-10:00(G113)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEGTNWPP				
Subject code	Subject name		Requirement	ECTS credit
BMEGEHDBSXIMEA-01	Introduction to Mechanical Engineering A		Exam	4
Course type	Course code	Course language	Timetable information	
Laboratory	EnL	English	THU:10:15-12:00(L-HIDROLAB)	
Lecture	EnE	English	THU:08:15-10:00(K155_r)	
Practice	EnGy	English	MON:16:15-18:00(D327)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEHDBSXIMEA-01				
Subject code	Subject name		Requirement	ECTS credit
BMEGEMIBXIT	Control engineering		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	24o_A_E	English	WED:10:15-12:00(D401); THU:08:15-10:00(D401); THU:08:15-10:00(D401)	

Practice	24o_A_G	English	WED:10:15-12:00(D401)
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEMIBXIT			
Subject code	Subject name		Requirement ECTS credit
BMEGEMMBXM1	Statics		Mid-semester mark 4
Course type	Course code	Course language	Timetable information
Lecture	LEC	English	MON:10:15-12:00(KF87)
Practice	SEM1	English	THU:12:15-14:00(KF81)
Practice	SEM2	English	THU:12:15-14:00(D316B)
https://oktatas.gpk.bme.hu/tad/tantargy/BMEGEMMBXM1			
Subject code	Subject name		Requirement ECTS credit
BMEGEMMBXM3	Dynamics		Exam 5
Course type	Course code	Course language	Timetable information
Lecture	LEC	English	WED:10:15-12:00(KF87)
Practice	SEM	English	WED:16:15-18:00(KF87)
https://oktatas.gpk.bme.hu/tad/tantargy/BMEGEMMBXM3			
Subject code	Subject name		Requirement ECTS credit
BMEGEMMBXVE	Fundametals of the finite element method		Mid-semester mark 3
Course type	Course code	Course language	Timetable information
Laboratory	AL1	English	THU:12:15-14:00(KF82)
Lecture	AE	English	THU:10:15-12:00(KF82)
https://oktatas.gpk.bme.hu/tad/tantargy/BMEGEMMNWCM			
Subject code	Subject name		Requirement ECTS credit
BMEGEMMNWCM	Continuum Mechanics		Mid-semester mark 5
Course type	Course code	Course language	Timetable information
Lecture	E	English	TUE:12:15-14:00(KF81)
Practice	G1	English	TUE:14:15-16:00(KF81)
Practice	G2	English	TUE:14:15-16:00(KF85)
https://oktatas.gpk.bme.hu/tad/tantargy/BMEGEMMNWCM			
Subject code	Subject name		Requirement ECTS credit
BMEGEMTAGE1	Metal forming		Mid-semester mark 4
Course type	Course code	Course language	Timetable information
Laboratory	L2	English	THU:16:15-18:00
Laboratory	L1	English	THU:16:15-18:00
Lecture	Ea	English	THU:14:15-16:00(G120)
BME GPK TAD			
Subject code	Subject name		Requirement ECTS credit
BMEGEMTBGE2	Nondestructive Testing of Materials		Mid-semester mark 3
Course type	Course code	Course language	Timetable information
Lecture	Ea	English	THU:14:15-16:00(MT103)
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEMTBGE2			
Subject code	Subject name		Requirement ECTS credit
BMEGEMTBKSD	Final project		Mid-semester mark 15
Course type	Course code	Course language	Timetable information
Practice	AGy	English	

Subject code	Subject name			Requirement	ECTS credit
BMEGEMTBVS1	Integrity of engineering structures 1			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Lecture	Ea	German	THU:16:15-18:00(MT103)		
Subject code	Subject name			Requirement	ECTS credit
BMEGEMTBVS2	Integrity of engineering structures 2			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Lecture	Ea	German	TUE:12:15-14:00(MT103)		
Subject code	Subject name			Requirement	ECTS credit
BMEGEMTNWFF	Fatigue and Fracture			Exam	3
Course type	Course code	Course language	Timetable information		
Lecture	Ea	English	THU:10:15-12:00(MT103)		
BME GPK TAD					
Subject code	Subject name			Requirement	ECTS credit
BMEGEPTBGE2	Injection molding			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Laboratory	LAB_1	English	MON:08:15-10:00(MT_PTLAB)		
Laboratory	LAB_2	English	MON:10:15-12:00(MT_PTLAB)		
Lecture	LECT	English	MON:08:15-10:00(T200)		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEPTBGE2 Objectives: theoretical and practical understanding of the injection molding technology. Knowledge of production engineering and design aspects of modern plastic products. Understanding of the most advanced design and simulation procedures. Topics: detailed description of the injection molding technology. Analysis of the process cycle diagram. Construction and operation of injection molding machines. Design for injection molding. Materials for injection molding, and fiber reinforced materials. Methods for the identification and elimination of molding defects. Injection mold design and injection molding simulation.					
Subject code	Subject name			Requirement	ECTS credit
BMEGEPTBGE3	Polymer processing			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Laboratory	LAB_1	English	MON:10:15-12:00(MT_PTLAB)		
Laboratory	LAB_2	English	MON:10:15-12:00(MT_PTLAB)		
Lecture	LECT	English	MON:10:15-12:00(T200)		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEPTBGE3 The aims of this subject is at familiarizing the students with the polymer processing technologies in details: preliminary techniques, extrusion, blow molding, thermoforming, rotational molding, polymeric foams and elastomers technology. Topics:classification of polymer processing technologies. Basic rheological aspects of polymers. Preliminary techniques of polymer processing (material conveying, drying, mixing, dosing etc.). Calendering. Extrusion. Extruder constructions, single and twin screw extruders. Compounding wit extruder. Extrusion dies (film blowing, flat film-, pipe, sheet, profile extrusion; extrusion blow molding; extrusion coating). Thermoforming: vacuum and pressure forming. Rotational molding. Foams technology: thermoplastic and thermoset foams. Elastomer technologies. Finishing and decoration. Joining technologies: welding and adhesive bonding.					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGA4SD	BSc Final Project			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	EnGy	English			
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN One-semester long individual project work. 10 hours/15 credits. * VG in the code stand for the supervising Department of Hydrodynamic Systems.					

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGAG04	Volumetric Pumps and Compressors		Mid-semester mark	2
Course type	Course code	Course language	Timetable information	
Lecture	EnE_AG04	English	THU:10:15-11:00(D126)	
Practice	EnGy_AG04	English	THU:11:15-12:00(D126)	

<http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN>

Main aims and objectives, learning outcomes of the subject:

Upon finishing the course, the students will be familiar with the operating principles and basic types of positive displacement pumps and compressors. They will be able to perform simple sizing tasks and design basic hydraulic circuits.

Method of education:

lecture: 1h/w

seminar: 1h/w

laboratory: 0h/w

homework: two design problems

Detailed thematic description of the subject:

Positive displacement pumps. Pump characteristic and performance. Reciprocating and rotary types. Gear pumps. Performance of a gear pump. Characteristics. Pressure balancing. Bearing forces. Screw pumps. Screw pumps for delivery of higher viscosities fluid. Roots blower. Delivery, isentropic and adiabatic power. Reciprocating compressors. Compression efficiency. Valves. Regulation. Pressure-volume diagrams for different methods of regulating and governing compressors. Sliding vanes pump. Characteristic performance. Capacity and efficiency. Effect of viscosity.

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGAG14	Analysis of Technical and Economical Data		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EnE_AG14	English	MON:14:15-16:00(R108)	
Practice	EnGy_AG14	English	THU:14:15-16:00(R513)	

<http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN>

6. Main aims and objectives, learning outcomes of the subject:

Processing and analysis of technical data is often part of engineering tasks. The data can originate from measurements of economical processes and results or from some technological tests but the main methods of the analysis are basically independent from the data source. Utilizing these methods the valuable information can be extracted from complex data sets through measurements of possible correlations, hypothesis testing and quality assurance tests.

7. Method of education:

Lectures: 2hrs/week

Seminar: 1hr/week

To be able to practice the course material usage of computers is necessary.

8. Detailed thematic description of the subject (by topic, min. 800 character):

1.

Probability theory basic review: relative frequency, probability, probability density and distribution, expected value, standard deviation.

2.

Basic definition in statistics: average, empirical variance, empirical density and distribution functions. Application: quality control, histogram, Pareto-Lorenz diagram.

3.

Data acquisition with sampling: sampling techniques. Sampling in quality control. Application: calculation of the required dataset sizes for analysis.

4

Operation characteristics curve: product acceptance using statistical sampling. Application: calculation of economically justifiable fallout rate.

5.

Quality and reliability. Upper- and lower control bounds. Control capability index. Application: Machine settings verification.

6.
Data acquisition with measurement: measurement principles (comparability, equality, disparity). Direct and indirect measurements. Propagation of measurement errors.
Application: evaluation of acceptance measurements, error bounds.
7.
Point and interval estimation: properties of the estimations. Confidence interval for expected value and variance.
Application: Analysis of technical and economic data with the help of confidence interval.
8.
Correlation coefficient, empirical correlation coefficient. Main properties.
Application: correlation diagram, use of correlation in quality control.
9.
Regression analysis based on generalization of Gauss-Markov theorem.
Application: linear and polynomial regression between the variables of the data of technical processes.
10.
Regression models: Estimation of degree-index. Coefficient of determination. Forecasting economic trends with moving average and exponential smoothing.
Application: prognosis of capacities, production and utilization.
11.
Statistical tests: parametric and non-parametric test. Detailed discussion of the U-test. Critical domain. First and second type errors.
Application: verification of change in consumption trends.
12.
Parametric tests: T-test, F-test, etc.
Application: Quality and production control with parametric tests.
13.
Non-parametric tests: c2 and Wilcoxon tests.
Application: verification of fittings in production and quality control.
14.
Introduction to variance analysis: hypothesis testing with F-test, ANOVA test.
Application: analysis of production quality.

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGAV03	Chemical Engineering Fundamentals		Exam	2
Course type	Course code	Course language	Timetable information	
Lecture	EnE_AV03	English	THU:08:15-10:00(K155)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGAV04	Chemical Engineering Practice		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	EnL_AV04	English	WED:08:15-10:00(L-HIDROLAB)	
Practice	EnGy_AV04	English	WED:08:15-10:00(D327)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG01	Introduction to mechanical engineering		Exam	4
Course type	Course code	Course language	Timetable information	
Laboratory	EnL_BG01	English	THU:14:15-16:00(L-HIDROLAB)	
Lecture	EnE_BG01	English	THU:08:15-10:00(K155)	
Practice	EnGy_BG01	English	WED:10:15-12:00(D327)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBG01				

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG03	Measurement Technique of Processes		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	EnL1	English	THU:08:15-10:00(L-HIDROLAB)	
Lecture	EnE	English	THU:08:15-10:00(KF82)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBG03 Main objectives of the subject: The aim of this subject is to present the fundamental devices and methods of measurement techniques of processes. The course presents the mathematical methods of the measuring techniques and the signal processing; shows the practical usage of them; and points out the achievable results. Detailed thematic description of the subject: Lectures: 7*2h Reviewing the basic concepts of probability theory and mathematical statistics; Error Estimation for indirect measurements; estimating systematic errors Estimating systematic (accuracy class) and random errors ensemble for indirect measurement results; CalibrationThe fundamentals of measuring time variant signals: Sampling and Quantization Theorems; Theorem's analysis; Consequences in measuring techniquesFourier series and transformation, and their role in signal processing; The Spectrum and it's applications; Recognizing periodic and noise processesApplication of spectrum and cepstrum analysis for investigation operating machinesThe real measurement result; Noise, as the characterization of stochastic processes; Amplitude density function; Autocorrelation and Cross correlation functionsApplication of Autocorrelation and Cross correlation technique for analyzing periodic and transient signals Laboratory practices: 4*3,5h Pressure transducer's response to step functionPressure transducer's response to harmonic excitationMeasuring transmission characteristics of an impulse lineInvestigating the effects of sampling parameters				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG06	Individual project 1.		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Laboratory	EnL-ARA	English		
Laboratory	EnL-EGR	English		
Laboratory	EnL-ÉPGET	English		
Laboratory	EnL-HDS	English		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBG06 Independent Study 1 BMEGEVGBG06 One-semester long individual project work. 4 hours/4 credits.				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG10	Introduction to mechanical engineering		Exam	5
Course type	Course code	Course language	Timetable information	
Laboratory	EnL4	English	THU:10:15-12:00(L-HIDROLAB)	
Laboratory	EnL3	English	THU:10:15-12:00(L-HIDROLAB)	
Laboratory	EnL1	English	THU:14:15-16:00(L-HIDROLAB)	
Laboratory	EnL2	English	THU:14:15-16:00(L-HIDROLAB)	
Lecture	EnE	English	THU:08:15-10:00(K155)	
Practice	EnGy1	English	WED:10:15-12:00(D327)	
Practice	EnGy2	English	MON:16:15-18:00(D316A)	
Practice	EnGy3	English	MON:16:15-18:00(D327)	
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG13	Fluid Flow Systems		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Laboratory	EnL1	English	WED:16:15-18:00(L-HIDROLAB)	
Lecture	EnE	English	THU:14:15-16:00(KF83)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBG13&#160;				

Subject code	Subject name			Requirement	ECTS credit
BMEGEVGBG16	Positive Displacement Pumps and Compressors			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Lecture	EnE	English	THU:10:15-12:00(D126)		
Practice	EnGy	English	THU:12:15-13:00(L-HIDROLAB)		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBKSD					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGBKSD	Final project			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	EnGy	English			
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBKSD					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGBKSZ	Summer Internship			Signature	0
Course type	Course code	Course language	Timetable information		
Practice	EnGy	English			
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBKSZ					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGBX14	Analysis of technical and economical data			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Laboratory	EnL	English	THU:14:15-16:00(R513)		
Lecture	EnE	English	MON:14:15-16:00(R108)		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGBX14					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGNKDA	Master Thesis Project A			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	EnGy	English			
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGNKDA					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGNKDB	Master Thesis Project B			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	EnGy	English			
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGNKDB					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGNWPR	Teamwork Project			Mid-semester mark	6
Course type	Course code	Course language	Timetable information		
Laboratory	EnL	English			
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGNWPR					
Subject code	Subject name			Requirement	ECTS credit
BMEGEVGNX26	Hemodynamics			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Lecture	EnE	English	THU:12:15-14:00(R108)		
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGNX26					

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNX27	Flow Stability		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EnE	English	THU:10:15-12:00(D327)	
https://oktatas.gpk.bme.hu/tad/en/tantargy/BMEGEVGNX27				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNXPB	Project Work B		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	EnL	English		