

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
BMEGEÁTA4SD	BSc Final Project			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	A-2020o-G	English			
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATA4SD https://gpk.bme.hu/en/content/42					
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-2020o-E	English			
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATBG04					
Subject code	Subject name			Requirement	ECTS credit
BMEGEÁTBG11	Fluid Mechanics			Mid-semester mark	6
Course type	Course code	Course language	Timetable information		
Laboratory	A-2020o-L1prs	English	TUE:16:15-18:00(AE_NAGYLAB)		
Lecture	A-2020o-E	English	TUE:10:15-12:00(KF83)		
Practice	A-2020o-G1	English	WED:16:15-18:00(KF83)		
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATBG11 https://gpk.bme.hu/en/content/42					
Subject code	Subject name			Requirement	ECTS credit
BMEGEÁTBKSD	Final Project			Mid-semester mark	15
Course type	Course code	Course language	Timetable information		
Practice	A-2020o-G	English			
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATBKSD https://gpk.bme.hu/en/content/42					
Subject code	Subject name			Requirement	ECTS credit
BMEGEÁTNW02	Computational Fluid Dynamics			Mid-semester mark	5
Course type	Course code	Course language	Timetable information		
Lecture	A-2020o-E	English	TUE:14:15-16:00(KF87)		
Practice	A-2020o-G1	English	THU:08:15-10:00(AE_CFDLAB)		
Practice	A-2020o-G4	English	THU:16:15-18:00(AE_CFDLAB)		
Practice	A-2020o-G2	English	WED:12:15-14:00(AE_CFDLAB)		
Practice	A-2020o-G3	English	THU:12:15-14:00(AE_CFDLAB)		
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW02 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-2020o-L	English	WED:10:15-12:00(AE_NAGYLAB)		
Lecture	A-2020o-E	English	WED:08:15-10:00(AE_MERLEG-T)		
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-2020o-L	English	MON:10:15-12:00(AE_MERLEG-T)		

Lecture	A-2020o-E	English	THU:12:15-14:00(AE_NAGYLAB)																				
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW10 https://gpk.bme.hu/en/content/42																							
Subject code	Subject name		Requirement ECTS credit																				
BMEGEATNW19	Vehicle Aerodynamics		Mid-semester mark 3																				
Course type	Course code	Course language	Timetable information																				
Laboratory	A-2020o-L	English	WED:16:15-18:00(AE_NAGYLAB)																				
Lecture	A-2020o-E	English	WED:14:15-16:00(AE_MERLEG-T)																				
http://www.ara.bme.hu/oktatas/tantargy/NEPTUN/BMEGEATNW19 https://gpk.bme.hu/en/content/42																							
Subject code	Subject name		Requirement ECTS credit																				
BMEGEENBGEB	Energy Processes and Equipments		Mid-semester mark 5																				
Course type	Course code	Course language	Timetable information																				
Laboratory	21-1-ENG-LAB	English	FRI:11:15-13:00(D218)																				
Lecture	21-1-ENG-E	English	FRI:08:15-11:00(D218)																				
<p>Subject for BSC students, MSC students please choose Energy Conversion (BMEGEENNWEC) subject Energy Processes and Equipment Aims and objectives and description of the course: The course gives a general overview of energy production and energy generation systems functioning and operation, importance of energy management. Opportunities and challenges are also discussed. Learning outcomes: General overview of energy production and energy generation systems function and operation. Course description: The Detailed topics are: basic processes of energy conversion fossil, and renewable energy sources. Steam and gas turbine, IC engines, fuel-cells, solar collectors, power stations: gas, steam, nuclear, and combined heat and power generation. Energy saves consumer equipments. Methodology to be used: Three hour lectures and two laboratory test per week. The presentations are oral presentations, with computer projection, and notes on the blackboard. URL: ftp://ftp.energia.bme.hu/pub/TAD/SDS_BMEGEENAG71_Energy_Processes_and_Equipments.pdf</p>																							
Subject code	Subject name		Requirement ECTS credit																				
BMEGEENBG EK	Energy and Environmental Measurements		Mid-semester mark 3																				
Course type	Course code	Course language	Timetable information																				
Laboratory	21-1-ENG-LAB	English	WED:12:15-14:00(DCS1)																				
Practice	21-1-ENG-G	English	WED:11:15-12:00(DCS1)																				
<p>Measurement at Energy and Environment Protection Aims and objectives and description of the course: middot; Fundamentals of measurement theory and basic metrological concepts. middot; Measurement procedures and data processing techniques. middot; The measuring system components and characteristics. middot; Basics of emissions, temperature, energetic and heat engines measurements. Learning outcomes: The main outcomes are the general overview of measurements of energetic systems, different temperature and emission measuring systems. The students has practice to use this elements. Course description: The role of measurements in maintaining and controlling the energy conversation processes. Hardware and software tools of the control and measurement systems. Laboratory tests of different engines and equipments. Simultaneous determination of system variables (flow rates, pressures, temperatures, etc.). Methods of determination of performance, efficiency, exhaust gas composition. Methodology to be used: Three hour lectures and laboratory test per week. The presentations are oral presentations, with computer projection, and notes on the blackboard. Presentation of the theoretical background and lab tests. URL: ftp://ftp.energia.bme.hu/pub/TAD/SDS_BMEGEENAG51_Measurement_at_Energ_and_Environment_Protection.pdf</p>																							
Subject code	Subject name		Requirement ECTS credit																				
BMEGEENBGHK	Heat transfer G		Mid-semester mark 4																				
Course type	Course code	Course language	Timetable information																				
Lecture	21-1-ENG-E	English	MON:16:15-18:00(D224)																				
Practice	21-1-ENG-G1	English	TUE:08:15-10:00(KF82)																				
Practice	21-1-ENG-G2	English	TUE:10:15-12:00(KF85)																				
<table border="1"> <tr> <td>Subject code</td> <td colspan="2">Subject name</td> <td>Requirement ECTS credit</td> </tr> <tr> <td>BMEGEENBGTD</td> <td colspan="2">Engineering thermodynamics G</td> <td>Mid-semester mark 4</td> </tr> <tr> <td>Course type</td> <td>Course code</td> <td>Course language</td> <td>Timetable information</td> </tr> <tr> <td>Lecture</td> <td>21-1-DEU-E</td> <td>German</td> <td></td> </tr> <tr> <td>Practice</td> <td>21-1-DEU-G</td> <td>German</td> <td></td> </tr> </table>				Subject code	Subject name		Requirement ECTS credit	BMEGEENBGTD	Engineering thermodynamics G		Mid-semester mark 4	Course type	Course code	Course language	Timetable information	Lecture	21-1-DEU-E	German		Practice	21-1-DEU-G	German	
Subject code	Subject name		Requirement ECTS credit																				
BMEGEENBGTD	Engineering thermodynamics G		Mid-semester mark 4																				
Course type	Course code	Course language	Timetable information																				
Lecture	21-1-DEU-E	German																					
Practice	21-1-DEU-G	German																					

Subject code	Subject name		Requirement	ECTS credit
BMEGEENMLCA	LCA of Powe generation system		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Laboratory	21-1-ENG-LAB	English		
Lecture	21-1-ENG-E	English		
Subject code				
Subject name		Requirement	ECTS credit	
BMEGEENMWDA	Final project A		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	21-1-ENG-G	English		
In course of the Final Project A one student or group of 2 students will work on one selected challenging problem of mechanical engineering. Several experimental and/or numerical project proposals will be announced by the project leaders. The aim of the course is to develop and enhance the capability for complex problem solving of the students under advisory management of their project leader. At the end of each semester a written Project Report is to be submitted and the summary and findings of the investigations on the selected problem is to be presented as Project Presentation.				
Subject code				
Subject name		Requirement	ECTS credit	
BMEGEENMWDB	Final project B		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	21-1-ENG-G	English		
The aim of the subject of is to demonstrate the ability of the student to solve high level, practical engineering problems, based on acquired knowledge in the fields of mechanical engineering. The projects have to be prepared by the students under the guidance of supervisors. The Final Projects include tasks in design, simulations, laboratory tests, manufacturing as well as controlling, interfacing and software tasks. The expected result is mostly a Final Report prepared according to written formal requirements. During the Final Exam, the results have to be explained in an oral presentation.				
Subject code				
Subject name		Requirement	ECTS credit	
BMEGEENMWPR	Teamwork project		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	21-1-ENG-LAB	English		
The complex task covers a semester project in the diverse topics of energetics.				
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	21-1-ENG-G	English		
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	21-1-ENG-G	English		
Subject code				
Subject name		Requirement	ECTS credit	
BMEGEENNWEC	Energy Conversion		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Lecture	21-1-ENG-E	English	WED:10:15-12:00(D316A)	
Practice	21-1-ENG-G	English	THU:16:15-18:00(D216,D218)	
ONLY FOR MSc STUDENTS!BSc students should choose BMEGEENBGEB, "Energy processes and equipments" subject.				

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	21-1-LAB	English	FRI:14:15-16:00(D218)		
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	21-1-ENG	English	FRI:10:15-12:00(D216)		
Subject code	Subject name			Requirement	ECTS credit
BMEGEENNXTU	Turbines			Mid-semester mark	5
Course type	Course code	Course language	Timetable information		
Lecture	21-1-ENG-E	English	MON:08:15-10:00(KF82)		
Practice	21-1-ENG-G	English	MON:10:15-12:00(KF82)		
Subject code	Subject name			Requirement	ECTS credit
BMEGEENUVHT	Advanced thermodynamics			Mid-semester mark	4
Course type	Course code	Course language	Timetable information		
Lecture	21-1-ENG-E	English			
Practice	21-1-ENG-G	English			
Subject code	Subject name			Requirement	ECTS credit
BMEGEÉPAG62	Air-Conditioning			Exam	4
Course type	Course code	Course language	Timetable information		
Lecture	A21	English	WED:08:15-10:00		
Practice	A22	English	WED:10:15-12:00		
<p>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: - 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: http://epget.bme.hu/hu/14-oktatas/bsc/158-air-conditioning</p>					
Subject code	Subject name			Requirement	ECTS credit
BMEGEPTAGE2	Injection molding			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Laboratory	L1	English	WED:08:15-10:00(MT_PTLAB)		

Laboratory	L2	English	THU:08:15-10:00(MT_PTLAB)
Lecture	E	English	WED:08:15-10:00(MT_PTEA)

http://www.pt.bme.hu/targyalapadat/88_BMEGEPTAGE2_targyleiras.pdf 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. /* Font Definitions */ @font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4; mso-font-charset:238; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870145 1107305727 0 0 415 0;} @font-face {font-family:Calibri; panose-1:2 15 5 2 2 2 4 3 2 4; mso-font-charset:238; mso-generic-font-family:swiss; mso-font-pitch:variable; mso-font-signature:-536870145 1073786111 1 0 415 0;} @font-face {font-family:"Palatino Linotype"; panose-1:2 4 5 2 5 5 3 3 4; mso-font-charset:238; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870265 1073741843 0 0 415 0;} /* Style Definitions */ p.MsoNormal, li.MsoNormal, div.MsoNormal {mso-style-unhide:no; mso-style-qformat:yes; mso-style-parent:""; margin-top:0cm; margin-right:0cm; margin-bottom:8.0pt; margin-left:0cm; line-height:107%; mso-pagination:widow-orphan; font-size:11.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;} .MsoChpDefault {mso-style-type:export-only; mso-default-props:yes; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;} .MsoPapDefault {mso-style-type:export-only; margin-bottom:8.0pt; line-height:107%;} @page WordSection1 {size:595.3pt 841.9pt; margin:70.85pt 70.85pt 70.85pt 70.85pt; mso-header-margin:35.4pt; mso-footer-margin:35.4pt; mso-paper-source:0;} div.WordSection1 {page:WordSection1;} --> /* Style Definitions */ table.MsoNormalTable {mso-style-name:"Normál táblázat"; mso-tstyle-rowband-size:0; mso-tstyle-colband-size:0; mso-style-noshow:yes; mso-style-priority:99; mso-style-parent:""; mso-padding-alt:0cm 5.4pt 0cm 5.4pt; mso-para-margin-top:0cm; mso-para-margin-right:0cm; mso-para-margin-bottom:8.0pt; mso-para-margin-left:0cm; line-height:107%; mso-pagination:widow-orphan; font-size:11.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-

Subject code	Subject name	Requirement	ECTS credit
BMEGEPTAGE3	Polymer processing	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	L2	English	WED:10:15-12:00(MT_PTLAB)
Laboratory	L1	English	WED:10:15-12:00(MT_PTLAB)
Lecture	E	English	WED:10:15-12:00(T200)

http://www.pt.bme.hu/targyalapadat/90_BMEGEPTAGE3_targyleiras.pdf 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. /* Font Definitions */ @font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4; mso-font-charset:238; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870145 1107305727 0 0 415 0;} @font-face {font-family:Calibri; panose-1:2 15 5 2 2 2 4 3 2 4; mso-font-charset:238; mso-generic-font-family:swiss; mso-font-pitch:variable; mso-font-signature:-536870145 1073786111 1 0 415 0;} @font-face {font-family:"Palatino Linotype"; panose-1:2 4 5 2 5 5 3 3 4; mso-font-charset:238; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870265 1073741843 0 0 415 0;} /* Style Definitions */ p.MsoNormal, li.MsoNormal, div.MsoNormal {mso-style-unhide:no; mso-style-qformat:yes; mso-style-parent:""; margin-top:0cm; margin-right:0cm; margin-bottom:8.0pt; margin-left:0cm; line-height:107%; mso-pagination:widow-orphan; font-size:11.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;} .MsoChpDefault {mso-style-type:export-only; mso-default-props:yes; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-

latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;} .MsoPapDefault {mso-style-type:export-only; margin-bottom:8.0pt; line-height:107%;} @page WordSection1 {size:595.3pt 841.9pt; margin:70.85pt 70.85pt 70.85pt 70.85pt; mso-header-margin:35.4pt; mso-footer-margin:35.4pt; mso-paper-source:0;} div.WordSection1 {page:WordSection1;} --> /* Style Definitions */ table.MsoNormalTable {mso-style-name:"Normál táblázat"; mso-tstyle-rowband-size:0; mso-tstyle-colband-size:0; mso-style-noshow:yes; mso-style-priority:99; mso-style-parent:""; mso-padding-alt:0cm 5.4pt 0cm 5.4pt; mso-para-margin-top:0cm; mso-para-margin-right:0cm; mso-para-margin-bottom:8.0pt; mso-para-margin-left:0cm; line-height:107%; mso-pagination:widow-orphan; font-size:11.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-

Subject code	Subject name	Requirement	ECTS credit
BMEGEVÉAG02	Diffusion Processes	Exam	2
Course type	Course code	Course language	Timetable information
Lecture	A40	English	THU:08:15-09:00(D102)
Practice	A41	English	THU:09:15-10:00(D102)

Diffusion Processes Aim of the subject: To teach to the students the theory of the mass transfer operations and the methods and equipment of one of the most important diffusion process (distillation). Topics of the subject: 1st week: Applications of mass transfer, more important diffusion processes. Batch and continuous operation. Continuous and stagewise contact. Equilibrium stage. Phase rule of Gibbs. Vapour-liquid equilibrium of a binary mixture. 2nd week: Steady state and transient diffusion. Theory of diffusion, Fick's 1-st law. Analogy with momentum and heat transfer. 3rd week: Relation between the diffusivities $D_{A,B}$ and $D_{B,A}$. Equimolar counter diffusion. One way (unimolar) diffusion. 4th week: Prediction of diffusivities for gases, influence of pressure and temperature. Diffusion in small pores (Knudsen diffusion, in pores of intermediate size). Diffusion in liquids. Dilute aqueous solutions. 5th week: Schmidt number. Turbulent diffusion. Transient diffusion. Mass transfer coefficients. 6th week: Theory of film. Two film theory. The rate of mass transfer. Relation between the overall (K_y) and film transfer coefficients (k_x, k_y). 7th week: Determination of mass transfer coefficients. Measurements: wetted wall column. Correlations, Sherwood-number. 8th week: Vapour-liquid equilibrium conditions. Basic notions and laws. Vapour-liquid equilibrium of ideal mixtures. Temperature-composition ($T-x,y$) and $y-x$ equilibrium diagrams of ideal and azeotropic (minimum and maximum boiling point) mixtures. Optimal feed plate location. 9th week: Distillation methods. Flashing and its calculation. 10th week: Rectification. Determination of the number of theoretical plates. Heat condition of feed (q). Intersection of the operating lines (q -line). 11th week: Heat balance of the column. Total reflux, minimum number of plates. Minimum reflux ratio. Optimal reflux ratio. 12th week: Rectification calculations. 13th week: Differential distillation, calculations. Batch rectification under constant reflux ratio and constant distillate composition. 14th week: Plate efficiencies. Different types of plates. URL: <http://www.epget.bme.hu/hu/14-oktatas/bsc/159-diffusion-processes>

Subject code	Subject name	Requirement	ECTS credit
BMEGEVÉAG04	Measurement Techniques for Chemical and Environmental Processes	Mid-semester mark	3
Course type	Course code	Course language	Timetable information
Laboratory	A24	English	THU:09:15-11:00(D101)
Practice	A23	English	THU:08:15-09:00(D101)

BMEGEVÉAG04 Measurement for Chemical and Environmental Processes (0/1/2/f/3) Aim of the subject: Basic measurement techniques and their application possibilities in chemical industry and environmental protection. Topics of the subject: 1-6. week : Classroom / Dep. of Building Services and Proc.Engin./ 5x3 lessons. - Basic concepts for process plant instrumentation. Instrument selection. (Temperature, flow rate, pressure, level and weight measurement methods.) - Mixing autoclave. Mixing performance is calculated. Torque measurement. Data processing. -Instrumentation and control of dryers.Measurement of heat- and mass transfer coefficients. Air humidity measurement. - Instrumentation and control of evaporators. Measurement of heat- and mass transfer coefficients. Composition Measurement. - Water quality monitoring. pH, conductivity, turbidity measurements. 6-7week: Lab. Exercises / Dep. of Building Service and Proc.Engin./ 2x3 lessons LAB1. Measurement of a convective dryer. LAB2. Measurement of a single effect evaporator. 8-9. week: Lab. Exercises / Department of Fluid Mechanics/ 2x3 lessons. LAB3. Investigation on capture hood of hot flue gas LAB4. Wind tunnel investigation on pollutant transport 10-11. week: Lab. Exercises / Department of Energy Engineering/ 2x3 lessons. LAB5. Reduction in emissions with Catalytic Converters LAB6. Determination of the Three-way Catalyst Conversion Efficiency 12-13. week: Lab. Exercises / Department of Hydrodynamic Systems/ 2x3 lessons. LAB7. Measurement of fluidization LAB8. Measurement of cyclone 14. week: /Dep. of Building Services and Proc.Engin. TEST practices material URL: <http://www.epget.bme.hu/hu/14-oktatas/bsc/161-measurement-techniques-for-chemical-and-environmental-processes>

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGA4SD	BSc Final Project		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	AnGy_a	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	AnE	English	THU:12:15-13:00(R501)	
Practice	AnGy	English	THU:13:15-14:00(R501)	
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	AnE	English	THU:10:15-12:00	
Practice	AnGy2	English	MON:14:15-16:00	
Practice	AnGy1	English	MON:14:15-16:00	
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	AnE-Vegy	English	FRI:10:15-12:00(KF82)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGA04	Chemical Engineering Practice		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Laboratory	AnL-Vegy	English	WED:08:15-10:00(L-HIDROLAB)	
Practice	AnGy-Vegy	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 maschinenkunde		Exam	4
Course type	Course code	Course language	Timetable information	
Laboratory	AnL1	English	WED:10:15-12:00(L-HIDROLAB)	
Laboratory	AnL3	English		
Laboratory	AnL2	English	WED:10:15-12:00(L-HIDROLAB)	
Lecture	AnE	English	THU:08:15-10:00(KF87)	
Practice	AnGy2	English	WED:10:15-12:00(D327)	
Practice	AnGy1	English	WED:10:15-12:00(D327)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
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	AnL	English	FRI:12:15-14:00(L-HIDROLAB)	
Lecture	AnE	English	FRI:12:15-14:00(D327)	
<p>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; Calibration The fundamentals of measuring time variant signals: Sampling and Quantization Theorems; Theorems's analysis; Consequences in measuring techniques Fourier series and transformation, and their role in signal processing; The Spectrum and its applications; Recognizing periodic and noise processes Application of spectrum and cepstrum analysis for investigation operating machines The real measurement result; Noise, as the characterization of stochastic processes; Amplitude density function; Autocorrelation and Cross correlation functions Application of Autocorrelation and Cross correlation technique for analyzing periodic and transient signals Laboratory practices: 4*3,5h Pressure transducers's response to step function Pressure transducers's response to harmonic excitation Measuring transmission characteristics of an impulse line Investigating the effects of sampling parameters</p>				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBG13	Fluid Flow Systems		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Laboratory	AnL	English	THU:16:15-17:00(KF83)	
Lecture	AnE	English	THU:14:15-16:00(KF83)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGBKSD	Final project		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	AnGy	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGMWDA	Final Project A		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	AnGy_m	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				

Subject code	Subject name		Requirement	ECTS credit
BMEGEVGMWDB	Final Project B		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	AnGy_m	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
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	AnGy	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
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	AnGy	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNWPR	Teamwork Project		Mid-semester mark	6
Course type	Course code	Course language	Timetable information	
Laboratory	AnL	English		
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNX26	Hemodynamics		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	AnE	English	THU:12:15-14:00(D327)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNX27	Flow Stability		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	AnE	English	THU:10:15-12:00(D327)	
http://www.hds.bme.hu/oktatas.php?sm=1&lang=EN				
Subject code	Subject name		Requirement	ECTS credit
BMEGEVGNX28	Theoretical acoustics		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	AnE	English	MON:16:15-18:00(D327)	