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 seperately. 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-2020t-G	English	

https://gpk.bme.hu/en/content/42

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTAG04	Air Pollution Control, Wastewater and Solid Wastes Management	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	WED:16:15-19:00(KM34)

Aims and objectives and description of the course: The main aim of the course is to provide sufficient and up-to-date theoretical background and practical knowledge in air pollution control, wastewater treatment and solid wastes management for mechanical engineers. Getting acquainted with the theoretical background, measurement principles, application areas, advantages and limitations of various environmental protection techniques applied in industrial practice. The main objectives are: getting acquainted with physical, chemical and biological methods amp; possibilities of separation, recovery and deformation of various pollutants of gaseous and solid phase; typical tasks of waste water treatment methods amp; technologies, basic processes and engineering equipment of the technology; characteristics of solid wastes, characterisation, collection and treatment, theoretical basics of burning solid wastes, typical equipment, solid waste disposal and recycling. The students are prepared to be able to recognize amp; evaluate the environmental protection problems and to solve the most typical engineering problems in topics of air pollution control, wastewater and solid wastes management. Based on the acquainted knowledge the students will be capable to solve also more complex problems of this subject with further study amp; research. Detailed thematic description of the course: Part I. Solid waste management (Dr. Laacute;ng, P.) 4Iacute;3h lectures: Types, sources, properties, quantities, and qualities of solid wastes. On-site handling, storage and processing of solid wastes. Collection, transfer and transport of solid wastes. Solid wastes processing techniques. Biological, chemical and energetic resource recovery processes. Ultimate disposal. Part II. Waste water management (Bothneacute; Dr. Feheacute;r, K.) 3Iacute;3h lectures: Wastewater characteristics, pre-treatment (primary, secondary, tertiary treatment). Primary separation or clarification wastewater treatment techniques. Physical-chemical wastewater treatment techniques. Biological treatment techniques for biodegradable waste water. Wastewater sludge treatment techniques, sludge disposal. Part III. Treatment of gaseous components (Dr. Parti, M.) 4Iacute;3h lectures: Notations in absorption. Equilibrium, equilibrium curve. Selection of solvent. Material balances, operating line, minimum liquid-gas ratio. Flow sheet for absorption of sulphur dioxide. Notations in adsorption. Equilibrium, adsorbents, adsorption plant, packed beds, regeneration of adsorbents. Application of adsorption (organic gases and vapours, sulphur dioxide). Chemical waste gas treatment, explosion range, material and heat balance, heat recovery. Other processes. Advantages and disadvantages. Part IV. Particle removal from gases (Dr. Suda, J.M.) 3Iacute;3h lectures: Aerosols. Particle dynamics. Mass balance of a separator, overall/fractional efficiency. Mean particle concentration, particle mass flow rate, isokinetic sampling. Particle removal from gases: main forces/effects. From settling chambers, pre-separator louvers, Venturi-scrubbers, cyclones, surface amp; depth filtration, electrostatic precipitation.

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTAG15	Technical Acoustics and Noise Control	Exam	3

Course type	Course code	Course language	Timetable information
Laboratory	A-2020t-L	English	THU:16:15-18:00(AE_NAGYLAB)
Lecture	A-2020t-E	English	THU:14:15-16:00(KF87)

https://gpk.bme.hu/en/content/42

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTAG26	Numerical Simulation of Fluid Flows	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	A-2020t-L1	English	TUE:16:15-18:00(AE_CFDLAB)

Lecture	A-2020t-E	English	MON:10:15-12:00(KF83,KF81)
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTBG26	Computational Fluid Dynamics	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Laboratory	A-2020t-L1	English	
Lecture	A-2020t-E	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTMW11	Open Source Computational Fluid Dynamics	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	
Practice	A-2020t-G	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTMW17	Multiphase and reactive flow modelling	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTMWDA	Final Project A	Mid-semester mark	15

Course type	Course code	Course language	Timetable information
Practice	A-2020t-G	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTMWDB	Final Project B	Mid-semester mark	15

Course type	Course code	Course language	Timetable information
Practice	A-2020t-G	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTMWTP	Teamwork Project	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	A-2020t-L	English	
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTNW01	Advanced Fluid Mechanics	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	WED:12:15-15:00(KF87)
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTNW03	Fluid Mechanics Measurements	Mid-semester mark	5

Course type	Course code	Course language	Timetable information
Laboratory	A-2020t-L	English	TUE:14:15-16:00(AE_NAGYLAB)
Lecture	A-2020t-E	English	MON:12:15-14:00(KF87)
https://gpk.bme.hu/en/content/42			

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTNW11	Open Source Computational Fluid Dynamics	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	WED:08:15-09:00(AE_CFDLAB)
Practice	A-2020t-G	English	WED:09:15-11:00(AE_CFDLAB)

https://gpk.bme.hu/en/content/42

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTNW22	Aero-Elasticity	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	TUE:14:15-16:00(AE_MERLEG-T)

https://gpk.bme.hu/en/content/42

Subject code	Subject name	Requirement	ECTS credit
BMEGEÁTNW27	Multiphase and Reactive Flow Modelling	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	A-2020t-E	English	TUE:12:15-14:00(AE_MERLEG-T)

https://gpk.bme.hu/en/content/42

Subject code	Subject name	Requirement	ECTS credit
BMEGEENAEGK	Heat Engines	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	20-2-ENG-E	English	WED:12:15-14:00(D318)
Practice	20-1-ENG-G	English	WED:14:15-16:00(D318)

Heat Engines BMEGEENAEGK Fuels, fuel technology. Different type of boiler construc- tions. Circulation in boilers. Steam and gasturbine cycles. Theoretical and real cycles. Impulse and reaction stages. Radial and axial turbines. IC engines. Otto/Diesel engines, crank mechanism, valve arrangement and constructions. Fuel systems of IC engines. Refrigerators and heat pumps. Mechanical construction, dimensioning. Control and op- eration. Environmental aspects. 4 hours/4 credits.

Subject code	Subject name	Requirement	ECTS credit
BMEGEENBGHK	Heat transfer G	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Lecture	20-2-DEU-E	German	
Practice	20-2-DEU-G	German	

Subject code	Subject name	Requirement	ECTS credit
BMEGEENBGKG	Heat engines G	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	20-2-ENG-E	English	

Subject code	Subject name	Requirement	ECTS credit
BMEGEENBGTD	Engineering thermodynamics G	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Lecture	20-2-ENG-E	English	MON:08:15-10:00
Practice	20-2-ENG-G	English	TUE:10:15-12:00(D318)

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	20-2-ENG-LAB	English	
Lecture	20-2-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	20-2-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	20-2-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
BMEGEENMWM2	Measurements in Thermal Engineering	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Laboratory	20-2-ENG-LAB	English	FRI:12:15-14:00(D318); FRI:14:15-16:00(D318); FRI:14:15-16:00 (D318)
Lecture	20-2-ENG-E	English	FRI:12:15-14:00(D318)

Fundamentals of measurement theory. Emission components and analysers. Emission analysers. Temperature measurement. Power plant and measuring equipment, measurement, accreditation, quality assurance. Measurement procedures and data processing techniques. Dynamical process identification. Cooling system test. High speed pressure measurement. Discontinuous boiler test and calculations. Gas Engine test. Gas Turbine test.

Subject code	Subject name	Requirement	ECTS credit
BMEGEENMWPR	Teamwork project	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	20-2-ENG-LAB	English	

The complex task covers a semester project in the diverse topics of energetics.

Subject code	Subject name	Requirement	ECTS credit
BMEGEENMWSE	Simulation of Energy Engineering Systems	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	20-2-ENG-LAB	English	MON:15:15-16:00(D216)
Lecture	20-2-ENG-E	English	MON:14:15-15:00(D216)

Simple example, modeling approaches. Phases of setting up lumped theoretical mathematical models. Conservation laws of lumped theoretical mathematical models. Some constitutive equations. Using Matlab interactively. Example: Combustion kinetics. Using Simulink interactively. Simulation options in Simulink. Linearizing a model. Programming Matlab. Example: Handling big measured data set.

Subject code	Subject name	Requirement	ECTS credit
BMEGEENMWTP	Thermal Physics	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	20-2-ENG-LAB	English	THU:17:15-18:00(D216)
Lecture	20-2-ENG-E	English	THU:16:15-17:00(D216)

Physical backgrounds, mechanism and models of heat conduction in solids; measurement of thermophysical properties; steady state and transient methods; numerical modeling of 1D and 2D heat conduction problems, inverse heat conduction problem. Heat conduction review (heat diffusion equation, boundary conditions). What are thermophysical properties? Different heat conduction models. Finite difference and control volume method for the solution of heat conduction problems. Measurement of the thermal conductivity. Measurement of the thermal diffusivity. Measurement of the specific heat capacity; direct determination of the temperature dependency of the properties. Inverse heat conduction problems. 2D steady-state heat conduction with contact boundary condition. Transient heat conduction with different boundary conditions (modeling the laser flash method). Transient heat conduction with contact boundary condition. Transient heat conduction with temperature dependent thermophysical properties (modeling the BICOND method).

Subject code	Subject name	Requirement	ECTS credit
BMEGEENNWAT	Advanced Thermodynamics	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	20-2-ENG-E	English	TUE:10:15-12:00(KF87)
Practice	20-2-ENG-G1	English	THU:08:15-09:00(D318)
Practice	20-2-ENG-G2	English	THU:09:15-10:00(D318)

Subject code	Subject name	Requirement	ECTS credit
BMEGEENNWCO	Combustion	Mid-semester mark	5

Course type	Course code	Course language	Timetable information
Lecture	20-2-ENG-E	English	MON:08:15-10:00(D318)
Practice	20-2-ENG-G	English	MON:10:15-12:00(D318)

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	20-2-ENG-E	English	MON:14:15-16:00(D216)

Subject code	Subject name	Requirement	ECTS credit
BMEGEENNWTP	Thermal Physics	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	20-2-ENG-LAB	English	THU:17:15-18:00(D216)
Lecture	20-2-ENG-E	English	THU:16:15-17:00(D216)

Subject code	Subject name	Requirement	ECTS credit
BMEGEÉPAG61	Heating	Exam	4

Course type	Course code	Course language	Timetable information
Lecture	A10	English	THU:08:15-11:00(D126)
Practice	A11	English	THU:11:15-12:00(D126)

Heating BMEGEEacute;PAG61 6. Main aims and objectives, learning outcomes of the subject: The objective is the introduction to the fundamentals of heating 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. Students attending will have an overview about the most important system elements from the heat supply systems to the heat emitters. In addition, they will be skilled also on a wider perspective: the building will be interpreted as a complex energy system, the fundamentals of human thermal comfort, and the basics of system economics will be learned. By the end of this course students will: - Have knowledge about the aims of heating: providing comfort, reduce energy consumption, increase energy performance etc. - Be able to apply appropriate mathematical and computer-based methods for the calculation of buildingsrsquo; heat loads, sizing of heating elements. - Be able to apply knowledge of techniques, codes and standards of practice to the design of heating components and basic systems. 7. 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. 8. 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 Schedule / Preliminary studies Heat Transfer 1 Week 2 Heat Transfer 2 Thermal comfort 1 Week 3 Thermal comfort 2 Heat load calculation Week 4 Heat load calculation example Week 5 Heat emission devices EPBD Week 6 Surface heating Test1 Week 7 Water heating systems Boilers, combustion calc. Week 8 Chimney Control loops, control valves Week 9 Domestic hot water production Control valves Week 10 Thermostatic valves Heat exchangers Week 11 Pumps Domestic hot water production Week 12 Expansion vessels, deaeration Week 13 Hydraulic calculation, balancing Renewable energy, solar Week 14 Test 2 9. 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/160-heating

Subject code	Subject name	Requirement	ECTS credit
BMEGEGIBXCA	Introduction to cad	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Laboratory	AL1	English	
Lecture	A_EA	English	MON:08:15-10:00(R113)

Subject code	Subject name	Requirement	ECTS credit
BMEGEGTAG01	Manufacturing	Exam	5

Course type	Course code	Course language	Timetable information
Laboratory	A2	English	WED:12:15-14:00; THU:12:15-14:00; THU:12:15-14:00
Lecture	A0	English	THU:14:15-16:00(G113)

Main aims and objectives, learning outcomes of the subject: The basic model of the machining system (WFMTC system), introduction to the part modeling, to the fixturing the parts, to the machine tools and robotics, to the cutting tools and to the controlling of the machine tools. Mechanics of cutting, geometry of the cutting edge, chip breaking, stability of cutting. Tool wear and tool life. Tool materials and cutting fluids. Fundamentals of the measuring techniques and quality control. The main measuring devices. Fundamentals of metal cutting machine tools Detailed thematic description of the subject : Fundamentals of metal cutting machine tools, kinematics and structure. Manually operated, cam controlled and computer controlled lathes. Machining and turning centers. Part and workpiece modelling (geometrical). Engineering and tolerances. CAD modelling, reverse engineering. Metal cutting. Cutting edge geometry. Tool material and cutting fluids. Tooling and fixturing. Positioning and workpiece alignment. Alignment rules. Fixing and clamping. Fixturing solutions. Machining processes. Cutting force, torque and cutting power. Tool failure and tool life. Surface quality and surface roughness. Turning, drilling, milling. Calculation examples. Classification of abrasive machining. Grinding process principles, grinding wheels. Some typical grinding processes. Non ndash; conventional machining processes. Control theory. Control systems for machine tools. PLC programming. Adaptive control systems. NC programming Practical example for NC programming. Robotics. Robot programming Assembling, mounting. Dimension chains and tolerances. Solutions for dimension chains. Assembling tasks. Balancing and adjustment. Industrial metrology principles. Measuring rules. Measuring equipments. Measuring errors and compensations. Measuring machines. Quality control theory. Quality design and inspection. Quality control systems. Manufacturing process analysis and planning. Planning tasks and solutions. DFMA theory. Part classification. Group technology. Computer aided process planning. Processor-postprocessor theory.

Subject code	Subject name	Requirement	ECTS credit
BMEGEGTAG92	Machine tools and manufacturing systems	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	1	English	FRI:12:15-14:00(T47)

Subject code	Subject name	Requirement	ECTS credit
BMEGEGTNWAM	Advanced Manufacturing	Mid-semester mark	5

Course type	Course code	Course language	Timetable information
Laboratory	A2	English	FRI:09:15-12:00(G116)
Lecture	A1	English	FRI:08:15-09:00(G116)

Subject code	Subject name	Requirement	ECTS credit
BMEGEPTAGE1	Composites technology	Exam	4

Course type	Course code	Course language	Timetable information
Laboratory	L	English	MON:14:15-16:00(MT-ép.könyvtar)
Lecture	E	English	MON:10:15-12:00(T200)

Main objective is getting familiar with the matrices and reinforcing materials of polymer composites. Gaining knowledge about the manufacturing technologies of thermoplastic and thermoset matrix composites. Learning the basics of composite mechanics and composite specific design guidelines. Topics: thermoset and thermoplastic composite matrix materials, properties and applications. Typical reinforcing materials of polymer composites. Reinforcing structures, properties and applications. Manufacturing technologies of thermoset matrix polymer composites: overview, typical products, tooling materials. Wet manufacturing technologies of thermoset matrix polymer composites: hand layup, spraying, RTM, pressing, pultrusion, filament winding, braiding, centrifugal casting. Dry manufacturing technologies of thermoset matrix polymer composites: autoclave curing of prepregs, out of autoclave prepreg curing, BMC pressing, SMC pressing, sandwich manufacturing. Manufacturing technologies of thermoplastic matrix polymer composites: extrusion, injection moulding, pressing, vacuum forming, GMT. Damage and failure of polymer composites: testing and approving methodologies. Basics of composite mechanics: types of

material behaviour, rules of mixtures, laminate properties for different stacking sequences, composite plates under tension, composite plates under bending, failure criteria for composites. Example problem solving.

Subject code	Subject name	Requirement	ECTS credit
BMEGEVÉAG03	Processes and Equipment of Chemical Industry	Exam	5

Course type	Course code	Course language	Timetable information
Lecture	A32	English	MON:12:15-15:00(D102)
Practice	A33	English	THU:12:15-14:00(D102)

Aim of the subject: Theory and practice of mechanical, hydromechanical, thermal, and diffusion processes often used in chemical, food industry, biotechnology and environmental protection. Equipment, sizing and operation aspects. Topics of the subject: 1. Size reduction, milling. Liquid mixing. Types of impellers, baffles. Power number function. Example. Non-Newtonian liquids and their mixing. Settling in gravitation. Suspension types, measurement of settling velocity. Example. 2. Settling in centrifuges, Construction and operation of cyclones. Separation efficiencies. 3. Surface filtration. Basic differential equation, solutions. Measurement of filtration parameters. Example. Liquid and gas filters. 4. Heat transfer. Calculation of heat transfer surface. Heat transfer equations for sensible and insensible heat transport. 5. Calculation of heat transfer coefficient. Influence of finned surface. 6. Heat exchanger constructions, operation aspects. 7. Concentration rise of solutions by thermal method: evaporation. Mass and enthalpy balance equations in the case of one-effect evaporator. Determination of heat transfer surface. Vapor reuses facilities. Economical aspects of multi-effect evaporators. Evaporator constructions. 8. Solid handling in dryers. Drying mechanism. Psychometric charts and ratio. Wet bulb temperature. Use of psychometric chart, mixing of gas flows. Drying curves, drying time. Example. 9. Absorption of gases. Application. Equilibrium curve. Material balance. Operating line. Height of packed column. Method of transfer units. Number of theoretical plates. Problem to solve for absorption. Liquid-liquid extraction. Industrial applications. Requirements for the solvent. Equilibrium conditions. Triangular diagram, bimodal solubility curve basic notions: distribution coefficient, mass ratio, liquid (solvent to feed ratio), extraction factor. Solvent recovery. Extraction methods. Single stage batch extraction. Multiple contact batch extraction. Perforation. Countercurrent extraction. Extraction calculations. Extraction equipment. Solid-liquid extraction. Steps of the process. Equipment. Factors determining the method of extraction. Factors influencing the rate of the process. Adsorption. Adsorbents and adsorption processes. Fixed-bed adsorbers. Gas drying equipment. Pressure-swing adsorption. Adsorption from liquids. Adsorption isotherms. Types of isotherms. Concentration patterns in fixed beds. Breakthrough curves. Scale up. Length of unused bed. effect of feed concentration URL: http://www.epget.bme.hu/hu/14-oktatas/bsc/162-processes-and-equipment-of-chemical-industry

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	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;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
BMEGEVGAG06	Independent Study 1.	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Laboratory	AnL	English	

Independent Study 1 BMEGEVGAG06 One-semester long individual project work. 4 hours/4 credits.

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGAG08	Individual project 2.	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Laboratory	AnL	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;lang=EN

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGBG06	Individual project 1.	Mid-semester mark	4

Course type	Course code	Course language	Timetable information
Laboratory	AnL	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;lang=EN Independent Study 1 BMEGEVGAG06 One-semester long individual project work. 4 hours/4 credits.

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGBX01	Fluid Machinery	Exam	4

Course type	Course code	Course language	Timetable information
Laboratory	AnLlan	English	FRI:08:15-10:00(L-HIDROLAB)

Laboratory	AnLpar	English	FRI:08:15-10:00(L-HIDROLAB)
Lecture	AnE	English	WED:08:15-10:00(D327)
Practice	AnGypar	English	FRI:08:15-10:00(D327)
Practice	AnGylan	English	FRI:08:15-10:00(D327)

http://www.hds.bme.hu/oktatas.php?sm=1amp;lang=EN

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGMW02	Unsteady Flows in Pipe Networks	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	AnE_m	English	TUE:10:15-12:00(D327)

http://www.hds.bme.hu/oktatas.php?sm=1amp;lang=EN This course provides basic skills in 1D unsteady modelling and analysis of pipeline systems, for compressible, incompressible and open-surface flows. Besides attending lectures and proving their knowledge in an open-book oral exam, the students will solve a real-life problem in groups of 2 or 3. The preferred programming language is Matlab. Topics covered: * General and brief introduction to numerical methods for solving nonlinear algebraic and differential equations. * 1D unsteady flow of quasy-constant density fluid, Method of Characteristics. Dynamic modelling of pumps and surge vessels. Application on water distribution systems, case studies., water hammer problems. * Unsteady open channel flow, basic equations, Saint-Venant equations. Solution strategy. Case studies (stormwater and wastewater systems). * 1D unsteady gas flow in pipes. Lax-Wendroff scheme and isentropic method of characteristics. Benchmark problems: adiabatic (Fanno) and isotherm flow in a pipe. Case studies. * Convection-diffusion problems. Contamination spread in a pool with crossflow.

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGMW06	Hemodynamics	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	AnE	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;lang=EN Introduction to physiology. Circulation system, arterial and venous system. Blood flow measurement methods, invasive techniques. Non-invasive blood flow measurements, Transmission properties of cuff-systems, estimation of eigenfrequency. Introduction to the method of characteristics (MOC). MOC and Solution for rapid change, Alievi (Joukowsky)-wave. MOC and study of the transmission properties of invasive blood pressure measurement technique (arterial catheter). Models and methods for the de scription of blood flow in blood vessels, material properties, Streeter-Wiley Model 1 and Model 2. Characteristic physiological quantities and their influence in hemodynamics.Flow in aneurysms.

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGMWDA	Final Project A	Mid-semester mark	15

Course type	Course code	Course language	Timetable information
Practice	Gy	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;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	Gy	English	

http://www.hds.bme.hu/oktatas.php?sm=1amp;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=1amp;lang=EN

Subject code	Subject name	Requirement	ECTS credit
BMEGEVGNW21	Unsteady Flow in Pipe Networks	Mid-semester mark	3

Course type	Course code	Course language	Timetable information
Lecture	AnE	English	TUE:10:15-11:00(D327)
Practice	AnGy	English	TUE:11:15-12:00(D327)