

# Faculty of Civil 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
BMEEOAFAT42	Surveying II.		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	MON:12:15-14:00(ONLINE); MON:12:15-14:00(ONLINE)	
Practice	EN6	English	THU:12:15-14:00(KF27k); THU:12:15-14:00(KF27k)	
Practice	EN3	English	THU:08:15-10:00(KF27a); THU:08:15-10:00(KF27a)	
Practice	EN5	English	THU:12:15-14:00(KF27a); THU:12:15-14:00(KF27a)	
Practice	EN4	English	THU:08:15-10:00(KF27k); THU:08:15-10:00(KF27k)	
Practice	EN1	English	THU:10:15-12:00(KF27a); THU:10:15-12:00(KF27a)	
Practice	EN2	English	THU:10:15-12:00(KF27k); THU:10:15-12:00(KF27k)	
Properties of analogue and digital maps, the application of maps in engineering practice. Traversing, the types of traverse lines. Localizing blunder in traverse lines: the linear and angular error. Offset surveys. The determination of the horizontal and vertical positions of detail points: the tacheometry. Total stations and their application in surveying. Topographic surveys: reconnaissance, sketch, detail survey and mapping. Free stationing. The principles of computational adjustments, the law of error propagation. Construction tolerances and the fundamental of geometrical quality control. Horizontal and vertical deformation monitoring. Setting out straight lines, curves, transition curves and points in a given elevation. The global navigation satellite systems (GPS, GLONASS, Galileo, ...) and their application in surveying. Building surveys. The localization of underground public utilities. Mapping public utilities and the public utility register.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOAFAT43	Surveying Field Course		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Practice	EN1	English		
Practice	EN2	English		
Practice	EN3	English		
Using the theoretical background of the courses Surveying 1 and 2 students are required to: assess the existing datasets used for mapping; define the necessary surveying activities; practice the surveying observations, planning, data processing and documentation; practice profile boarding, setting out of roads; learn to use modern surveying instruments (total stations, GPS/GNSS receivers, electronic levels, digital photography).				
Subject code	Subject name		Requirement	ECTS credit
BMEEOAFPRE4	Basic Surveying		Mid-semester mark	0
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	WED:10:15-12:00(ONLINE); WED:10:15-12:00(ONLINE); THU:08:15-10:00(ONLINE); THU:08:15-10:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEODHA-PS	Bachelor Thesis Project		Mid-semester mark	15
Course type	Course code	Course language	Timetable information	
Practice	ENA	English		
Subject code	Subject name		Requirement	ECTS credit
BMEEODHA-PT	Preparatory Course for Bachelor Thesis Project		Mid-semester mark	9
Course type	Course code	Course language	Timetable information	
Practice	ENA	English		

Subject code	Subject name			Requirement	ECTS credit
BMEEODHAS41	Design of Structures Projectwork			Mid-semester mark	6
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	EN1	English	TUE:10:15-12:00(ONLINE); TUE:10:15-12:00(ONLINE)		
Students need to accomplish a complex design projectwork that is based on the knowledge gained through the branch courses. The project work is supervised by three lecturers from three areas of structural engineering.					
Subject code	Subject name			Requirement	ECTS credit
BMEEODHMG-D	Diploma Project Structural Engineering MSc Program			Mid-semester mark	20
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	ENG	English			
Subject code	Subject name			Requirement	ECTS credit
BMEEODHMN-D	Diploma Project Structural Engineering MSc Program			Mid-semester mark	20
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	ENN	English			
Subject code	Subject name			Requirement	ECTS credit
BMEEODHMT-D	Diploma Project Structural Engineering MSc Program			Mid-semester mark	20
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	ENT	English			
Subject code	Subject name			Requirement	ECTS credit
BMEEOEMAS42	Building Construction I.			Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	TUE:10:15-12:00(ONLINE)		
Practice	EN1	English	MON:08:15-10:00(ONLINE); MON:08:15-10:00(ONLINE)		
Students gain knowledge and skills during the semester work in the following topics: Flat and deep foundations, relation to sub-soil insulation of buildings. Masonry works, prefabricated panel systems. Plasters and ETICS. Reinforced concrete, steel and wooden beam slab constructions. Stairs. High roofs. Passable and non-passable flat roofs, green roofs. Insulations against functional water.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOEMAS43	Building Construction II.			Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	TUE:10:15-12:00(ONLINE)		
Practice	EN1	English	MON:12:15-14:00(ONLINE); MON:12:15-14:00(ONLINE)		
Floor structures, finishes, orders of layers: floors on ground, floors of intermediate slabs, floors of attics, terraces, prefabricated concrete and stone pavings. Tile and plate roof claddings, metal sheet seamed strip claddings: orders of layers, materials, rules of technique, details, rainwater gutter systems. Structures of built-in-roofs: structures and roofing of pitched roofs, orders of layers, foils of vapour-/air-/waterproofing. Facade claddings: plastered, thermal insulated, assembled light and heavy claddings. Posterior thermal insulation of facades. Curtain walls, glass roofs. Structures and materials of dry technologies: assembled walls, ceilings, floors. Building physics: thermal and vapour protection. Acoustics, protection against noise. Building construction solutions of building reconstruction, tasks of refurbishment.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOEMAT42	Civil Engineering Representation and Drawing			Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	FRI:10:15-12:00(K174); FRI:10:15-12:00(K174)		
3 main parts of the subject: 1. Descriptive geometry 2. Engineering drawing 3. Freehand drawing. 1. Basics of descriptive geometry course modules: Students gain knowledge and skills in regularities and techniques of descriptive geometry, developing spacial reasoning. Topics: basic constructions in planes of projections, transformations, tasks of intersections, intersections and interpenetrations of plane and curved solids, cast shadows, construction in scale, special revolution solids and skew surfaces. Additional representation systems: dimensioned representations, orthogonal axonometry, perspective projection. 2. Engineering drawing course modules: Students gain knowledge and skills in engineering drawing, specific notations, proportions and scale, magnification, minification, construction of ground plans and sections. 3. Engineering free-hand representation course modules:					

develop free-hand drawing in scale.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOEMAT43	Construction Materials I.		Exam	5
Course type	Course code	Course language	Timetable information	
Laboratory	EN3	English	THU:10:15-12:00(MMFL4); THU:10:15-12:00(MMFL4)	
Laboratory	EN2	English	THU:08:15-10:00(MMFL3); THU:08:15-10:00(MMFL3)	
Laboratory	EN1	English	THU:08:15-10:00(MMFL2); THU:08:15-10:00(MMFL2)	
Laboratory	EN4	English	THU:10:15-12:00(MMFP); THU:10:15-12:00(MMFP)	
Lecture	EN0	English	WED:10:15-12:00(ONLINE); WED:10:15-12:00(ONLINE)	
Basic physical and hydrotechnical characteristics of the most important structural materials: stress, strength, deformation, fatigue, creep, shrinkage, toughness, relaxation, brittleness, hardness. Binding materials: Lime, gypsum, production of cements, the klinker minerals, hydration and properties. Mortar. Concrete: Aggregates, admixtures. Fresh concrete: consistency, mix design. Hardened concrete: Interpretation of strength, and its evaluation. Metals: iron, steel yield strength, ultimate tensile strength, ultimate strain, influence of temperature, weldability. Timber. Mechanical properties, shrinkage, swelling. Bricks and masonry . Main constituents and properties of glass. Types of polymers.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOEMAT44	Building Construction Study		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	TUE:14:15-16:00(ONLINE)	
Practice	EN2	English	MON:10:15-12:00(ONLINE); MON:10:15-12:00(ONLINE)	
Practice	EN1	English	MON:10:15-12:00(ONLINE); MON:10:15-12:00(ONLINE)	
Subject of architectural engineering, fundamental terms and base definitions. relations of buildings and building constructions. Effects on buildings, requirements of building constructions. Building blocks and specific brick connections. Load-bearing wall systems and lintel beams in wall structures. Groups of foundation modes and characteristics. Water insulation of under grade parts of buildings. Slabs and ring beams. Balconies. Basics of mechanical installations of residential buildings. Frame system buildings, construction systems and materials. Structures of stairs, systematization. Railings, main coverings. Types of traditional roof trusses, specialties, rainwater gutters and roof claddings. Order of layers of flat roofs, rainwater drainage, gullies, waterproofing materials. Types and materials of typical external and internal doors and windows. Classic contact facade finishes. Basics of building physics.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOEMK601	Building Materials 2.		Exam	3
Course type	Course code	Course language	Timetable information	
Laboratory	EN1	English		
Lecture	EN0	English		
Subject code	Subject name		Requirement	ECTS credit
BMEEOFTAT42	Civil Engineering Informatics		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Laboratory	EN1	English	MON:14:15-16:00(ONLINE); MON:14:15-16:00(ONLINE)	
Laboratory	EN2	English	MON:14:15-16:00(ONLINE); MON:14:15-16:00(ONLINE)	
Laboratory	EN3	English	WED:14:15-16:00(ONLINE); WED:14:15-16:00(ONLINE)	
Laboratory	EN4	English	WED:14:15-16:00(ONLINE); WED:14:15-16:00(ONLINE)	
Lecture	EN0	English	THU:16:15-18:00(ONLINE); THU:16:15-18:00(ONLINE)	
The course gives an overview on the major areas of informatics, on the components of information technology systems. Besides supporting the labs, some practical problems and particular tasks are also discussed on the lectures. On the labs, students use spreadsheet application to solve different tasks, then learn the basics of numerical and non-numerical methods in mathematical software environment. Students also learn the basics of programming; most of the tasks have to be solved by own scripts, routines, programs. Civil engineering informatics discusses 2D and 3D computer graphics and the basics of database management that supports high level courses involving spatial construction and database systems.				

Subject code	Subject name			Requirement	ECTS credit
BMEEOFTMK51	Numerical Methods			Mid-semester mark	4
Course type	Course code	Course language	Timetable information		
Practice	EN1	English	MON:08:15-10:00(ONLINE); MON:08:15-10:00(ONLINE); FRI:10:15-12:00(ONLINE)		
Practice	EN2	English	WED:10:15-12:00(ONLINE); WED:10:15-12:00(ONLINE); FRI:12:15-14:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMAS41	Rock Mechanics			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Laboratory	EN3	English	FRI:08:15-10:00(KM26Olt)		
Laboratory	EN2	English	FRI:08:15-10:00(KM79)		
Laboratory	EN1	English	FRI:08:15-10:00(KM79)		
Lecture	EN0	English	FRI:10:15-12:00(K234)		
Petrophysical properties of solid rocks, the characterisation of rock blocks and rock masses, the jointing system in the rock environment. The deformation processes and rheological characters in rock mechanics, the influence of joint spacing. The durability and effect of rock environment on the engineering structures. The evaluation of geological conditions in rock environment at tunnels foundations and rocky slopes. The influence of material properties on the petrophysical properties of rocks.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMAS42	Underground Structures, Deep Found.			Mid-semester mark	3
Course type	Course code	Course language	Timetable information		
Lecture	EN0	English	TUE:12:15-14:00(ONLINE); TUE:12:15-14:00(ONLINE)		
Practice	EN1	English	FRI:10:15-12:00(K234)		
Types and field of application of deep foundations (stone columns, diaphragm walls). Load transfer mechanism of deep foundations. Determination of the bearing capacity and settlement by different methods (by theoretical formulas, load tests, sounding). Design and construction of Pedestrian subways, Underground garages. Analysis against uplift. Insulations.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMAT42	Soil Mechanics			Mid-semester mark	4
Course type	Course code	Course language	Timetable information		
Lecture	EN0	English	WED:12:15-14:00(ONLINE); WED:12:15-14:00(ONLINE)		
Practice	EN1	English	TUE:14:15-16:00(ONLINE); TUE:14:15-16:00(ONLINE)		
Origin of soils, soil exploration, soil samples. Components of soils (phase relationships, grain size distribution, consistency limits), soil classification, compaction. Stresses in the soil (under static conditions, conditions of steady vertical flow). Flow of water through soil due gravity (Darcy's law, coefficient of permeability, flow nets). Compressibility of soil (reasons and types of compression). Shear strength of soil (Mohr-Coulomb failure criterion, determination of shearing strength).					
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMAT43	Earthworks			Exam	3
Course type	Course code	Course language	Timetable information		
Lecture	EN0	English	WED:12:15-14:00(ONLINE); WED:12:15-14:00(ONLINE)		
Practice	EN1	English	FRI:08:15-10:00(KF88)		
Practice	EN2	English	FRI:08:15-10:00(KF88)		
Scope of earth works. Plastic limit states, Rankine earth pressures. Earth pressure and passive resistance of „real“ walls. Soilstatical design of retaining structures. Stability of earth works. Construction of earth works. The designal, executional and monitoring questions of construction. Dewatering of earth works. Geosynthetics.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG-1	Engineering Geology MSc			Exam	4
Course type	Course code	Course language	Timetable information		
Lecture	EN0	English	MON:08:15-10:00(ONLINE); MON:08:15-10:00(ONLINE)		
Practice	EN1	English	TUE:08:15-10:00(KF88)		

Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG-3	Geotechnical design			Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	THU:14:15-16:00(ONLINE); THU:14:15-16:00(ONLINE)		
Practice	EN1	English	THU:16:15-17:00(ONLINE); THU:16:15-17:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG-4	Earthworks of Infrastructures			Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	MON:11:15-13:00(ONLINE); MON:11:15-13:00(ONLINE)		
Practice	EN1	English	MON:13:15-14:00(ONLINE); MON:13:15-14:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG61	Tunneling			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	MON:14:15-16:00(ONLINE); MON:14:15-16:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG62	Hidrogeology			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	WED:12:15-14:00(ONLINE); WED:12:15-14:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMG64	Engineering Geology of Hungary			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	WED:08:15-10:00(ONLINE); WED:08:15-10:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMS51	Geodynamics			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	WED:12:15-14:00(ONLINE); WED:12:15-14:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOGMMS5P	Engineering geological and geotechnical project			Mid-semester mark	5
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	EN1	English	THU:12:15-14:00(ONLINE); THU:12:15-14:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOHSA-A1	Steel Buildings			Exam	5
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	THU:10:15-12:00(ONLINE); THU:14:15-16:00(ONLINE); THU:14:15-16:00(ONLINE)		
Practice	EN1	English	THU:10:15-12:00(ONLINE)		
Low rise industrial halls. Lattice girders. Crane girders. Design of secondary members (purlins, sheeting). Analysis and design: Principles, analysis and modelling methods, global analysis of frames. Stability analysis and design of steel structures. Floor systems, design of composite floor systems. Joints and connections in steel and composite building structures. Bracing of steel and composite structures. Seismic design of structures. Fire design. Highrise and tall buildings.					

Subject code	Subject name		Requirement	ECTS credit
BMEEOHSA-A2	Reinforced Concrete Buildings		Exam	5
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:08:15-10:00(ONLINE); TUE:08:15-10:00(ONLINE); THU:08:15-10:00(ONLINE)	
Practice	EN1	English	THU:08:15-10:00(ONLINE)	
Formation of reinforced concrete buildings, loads and effects, basics of earthquake design. Plastic behaviour of flat slabs, prestressing. Structural systems of highrise buildings. structural elements of the stiffening systems: shear walls, flat-slabs, cores, frames with masonry infill. Formation of timber halls, sizing of prefabricated prestressed and glued laminated timber structural elements. Masonry structures.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSA-B2	Reinforced Concrete Bridges		Exam	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	FRI:12:15-14:00(KF88); FRI:12:15-14:00(KF88)	
Practice	EN1	English	FRI:14:15-15:00(KF88); FRI:14:15-15:00(KF88)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAS43	Bridges and Infrastructures		Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:10:15-12:00(ONLINE); MON:10:15-12:00(ONLINE)	
Historical development of bridges. Basic terms of bridges. Classification of bridges. Superstructure systems. Typical superstructures of steel, steel and concrete composite as well as concrete bridges. Composite action between main girders. Basis of bridge design. Traffic load models and their application rules for highway and railway bridges. Testing of bridges. Substructures of bridges: abutments and piers. Bridge equipment. Conceptual design of bridges. Fitting of bridges into environment, bridge aesthetics. Supervision of bridges. Reconstruction and strengthening of bridges. Civil engineering work in traffic infrastructure, systems and hydraulic engineering.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAS44	Timber Structures		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	THU:12:15-14:00(ONLINE); THU:12:15-14:00(ONLINE)	
Introduction and comparative analysis of existing timber structures. Material characteristics and strength grades of timber material. Design of timber structural members for ULS according to EC5 (compression, tension, bending, shear, torsion, combined actions, stability analysis). Design of timber structural members for SLS according to EC5 (deformations, durability). Basis of the fire design of timber structures. Design of single and multiple shear plane connections with metal dowel-type fasteners (nailed and bolted connections). Design of connections with punched metal plate fasteners, split ring connectors and toothed plate connectors. Bonded connections, design of glued-laminated timber structures. Analysis of stress concentration sites in timber structures. Constructive protection methods and typical construction details of timber structures.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAS45	3D Constructional Modelling of Structures		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Laboratory	EN1	English	WED:10:15-12:00(ONLINE); WED:10:15-12:00(ONLINE)	
The aim of the course is to introduce the 3 dimensional detailing of steel-, reinforce concrete- and timber structures to the students. The course intends to develop basic practical skills by real 3D modelling of structures where the model is able to provide drawings and lists automatically for fabrication and construction processes. The course provides insight into the integration of the 3D constructional model of structures with other branches like architectural, mechanical, electrical and plumbing models into a BIM (Building Information Modelling) model. The students will learn the necessary knowledge and also obtain experience for the later project home works and diploma works by the help of presentations, small examples and a modelling home work.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAS47	Steel and Composite Structures		Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:12:15-14:00(ONLINE); MON:12:15-14:00(ONLINE); MON:14:15-16:00(ONLINE)	



Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAT42	Steel Structures		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:08:15-10:00(ONLINE); THU:10:15-12:00(ONLINE); THU:10:15-12:00(ONLINE)	
Lectures of Steel Structures have the general aim to study the basics of the design of steel structures, which consists of the design of simple structural members, simple joints and the investigation of the basic failure phenomenon, which can occur in steel structures. The program consists of the following topics: Steel grades, mechanical properties of the steel material. Calculation of cross sectional properties. Design of centrally loaded tension members. Design of Centrally loaded compression members. Buckling problem – behaviour – design method. Design of beams: construction, behaviour under bending and shear interaction. Beam structural behaviour - design approaches for lateral torsional buckling. Design of bolted connections. Design of welded connections. Fatigue design and brittle fracture. Plate buckling phenomena, basics of the cross section classification.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSAT43	Reinforced Concrete Structures		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:08:15-10:00(ONLINE); WED:08:15-10:00(ONLINE); WED:08:15-10:00(ONLINE)	
Structural safety of reinforced concrete (RC) structures; loads and effects on RC structures, material properties of concrete and reinforcing steel; moment- curvature relation of RC cross sections; Uncracked and cracked cross section; flexural strength theory, strength and ductility; design of RC cross section; eccentric compression; shear failure in beams without and with shear reinforcement; strength in bending and torsion; anchorage and stress development, bar curtailment; deflection and crack width.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSMK51	Methods of Engineering Analysis		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	FRI:08:15-09:00(ONLINE); FRI:08:15-09:00(ONLINE)	
Practice	EN1	English	FRI:09:15-10:00(ONLINE); FRI:09:15-10:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSMS5P	Structures project		Mid-semester mark	5
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Practice	EN1	English	THU:08:15-10:00(K234); THU:08:15-10:00(K234)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSMT-1	Structures 2		Exam	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:12:15-14:00(ONLINE); MON:12:15-14:00(ONLINE)	
Practice	EN1	English	MON:14:15-15:00(ONLINE); MON:14:15-15:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSMT-2	Stability of Structures		Exam	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:08:15-10:00(ONLINE); TUE:08:15-10:00(ONLINE)	
Practice	EN1	English	TUE:10:15-11:00(ONLINE); TUE:10:15-11:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOHSMT-3	Seismic Design		Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	THU:13:15-15:00(KM26OIt); THU:13:15-15:00(KM26OIt)	
Practice	EN1	English	THU:15:15-16:00(KM26OIt); THU:15:15-16:00(KM26OIt)	

Subject code	Subject name			Requirement	ECTS credit
BMEEOHSMT61	Applied Fracture Mechanics			Mid-semester mark	4
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	THU:10:15-12:00(KM26OIt); THU:10:15-12:00(KM26OIt)		
Practice	EN1	English	THU:12:15-13:00(KM26OIt); THU:12:15-13:00(KM26OIt)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOHSMT62	Prestressing Technologies			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	FRI:10:15-11:00(ONLINE); FRI:10:15-11:00(ONLINE)		
Practice	EN1	English	FRI:11:15-12:00(ONLINE); FRI:11:15-12:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOHSMT63	Strengthening of Structures			Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	WED:08:15-09:00(ONLINE); WED:08:15-09:00(ONLINE)		
Practice	EN1	English	WED:09:15-10:00(ONLINE); WED:09:15-10:00(ONLINE)		
Subject code	Subject name			Requirement	ECTS credit
BMEEOTMAS41	Strength of Materials			Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Lecture	EN0	English	WED:16:15-18:00(ONLINE); WED:16:15-18:00(ONLINE)		
Differential equation of the elastic curve, computation of the deflected shape for various boundary conditions. Virtual displacement systems, virtual work. Theorem of virtual displacements. Computation of external and internal forces of statically determinate structures using the theorem of virtual displacements. Concept of potential energy, theorem of stationarity of potential energy, application of the theorem for the computation of displacements of structures. Concept of complementary potential, theorem of minimum complementary potential energy, using the theorem for the computation of reactions of structures. Revision of common work and energy theorems of mechanics. Characterization of equilibrium states, concept of critical load. Methods of stability analysis: statical, kinematical, and energy methods. Elastic Euler buckling.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOTMAT41	Basics of Statics and Dynamics			Exam	6
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	EN1	English	MON:10:15-12:00(ONLINE); MON:10:15-12:00(ONLINE); MON:14:15-16:00(ONLINE); TUE:12:15-14:00(ONLINE); TUE:12:...		
Classification of mechanics, basic vector operations. Kinematics of particles, description of motion in Cartesian coordinate system. Newton's laws of motion. Concurrent and general force systems in the plane, distributed forces: reduction, resultant, centroid, equilibration. Mechanical work. Planar motion of rigid bodies. Centroid and moment of inertia of rigid bodies. Kinetics of rigid bodies moving in the plane. Linear momentum, angular momentum, theorems of change of kinetic energy for particles and rigid bodies. Constraints. External and internal forces of planar structures and trusses. Statical determinacy. Spatial force systems: reduction, resultant, equilibration. Spatial structures. Internal force diagrams of statically determinate planar bar structures, relationships between internal force diagrams. Sliding friction and rolling resistance.					
Subject code	Subject name			Requirement	ECTS credit
BMEEOTMAT42	Introduction to Strength of Materials			Mid-semester mark	6
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>		
Practice	EN2	English	THU:12:15-14:00(K174); THU:12:15-14:00(K174); THU:14:15-16:00(K174); FRI:08:15-10:00(K174); FRI:08:15-10:...		
Practice	EN1	English	THU:12:15-14:00(K234); THU:12:15-14:00(K234); THU:14:15-16:00(K234); FRI:08:15-10:00(K234); FRI:08:15-10:...		
Internal forces and internal force diagrams of planar and spatial structures (revision, generalization). Moments of inertia and principal directions of planar figures. Strength properties of materials. Concept of stresses and deformations. Material models: linearly elastic material and linearly elastic and perfectly plastic material. Beam element, beam model composed of elastically connected cross-sections. Computation of normal stresses in beams for centric tension/compression, simple bending, skew bending, and tension/compression combined with bending. Computation of shear stresses in beams for pure shearing, torsion, and shearing combined with bending. Eccentric					



compression of cross-sections of no tension materials. Shear centre of thin-walled cross-sections. Displacements of bent beams with straight axis. Principal stresses and principal directions.

Subject code	Subject name		Requirement	ECTS credit
BMEEOTMAT43	Structural Analysis I.		Exam	4
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	FRI:10:15-12:00(KM26OIt); FRI:10:15-12:00(KM26OIt); FRI:12:15-14:00(KM26OIt); FRI:12:15-14:00(KM26OIt)	
Principle of small displacements: displacements of rigid body chains using small displacements. Computation of displacements of statically determinate simple and compound structures using displacement equivalency statements. Virtual force systems, concept of virtual complementary work, theorem of virtual forces. Computation of displacements of statically determinate simple and compound structures using the theorem of virtual forces. Influence lines of internal forces and displacements of statically determinate structures. Maximal internal forces. Concept of envelope curves. Computation of statically indeterminate planar structures under fix loads using the force method. Computation of statically indeterminate planar structures under moving load using the force method: influence lines. Computation of statically indeterminate planar structures under fix loads using the displacement method.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMN-1	Structural Dynamics		Mid-semester mark	4
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	THU:16:15-18:00(ONLINE); THU:16:15-18:00(ONLINE)	
Practice	EN1	English	THU:18:15-19:00(ONLINE); THU:18:15-19:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMN61	Plasticity		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	MON:10:15-11:00(ONLINE); MON:10:15-11:00(ONLINE)	
Practice	EN1	English	MON:11:15-12:00(ONLINE); MON:11:15-12:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMN62	Nonlinear FEM		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	TUE:11:15-13:00(ONLINE); TUE:11:15-13:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMN63	Analysis of Rods and Frames		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	MON:15:15-16:00(ONLINE); MON:15:15-16:00(ONLINE)	
Practice	EN1	English	MON:16:15-17:00(ONLINE); MON:16:15-17:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMN64	Discrete Element Method		Mid-semester mark	3
Course type	Course code	Course language	Timetable information	
Lecture	EN0	English	MON:17:15-18:00(ONLINE); MON:17:15-18:00(ONLINE)	
Practice	EN1	English	MON:18:15-19:00(ONLINE); MON:18:15-19:00(ONLINE)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMMS5P	Numerical modeling project		Mid-semester mark	5
Course type	Course code	Course language	Timetable information	
Practice	EN1	English	MON:08:15-10:00(ONLINE); MON:08:15-10:00(ONLINE)	

Subject code	Subject name		Requirement	ECTS credit
BMEEOTMOM04	Biomechanics		Exam	5
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	00	English		
Practice	01	English		
Subject code	Subject name		Requirement	ECTS credit
BMEEOTMPRE3	Basic Mechanics		Mid-semester mark	0
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	FRI:08:15-10:00(K389); FRI:08:15-10:00(K389); FRI:10:15-13:00 (K389); FRI:10:15-13:00(K389)	
Subject code	Subject name		Requirement	ECTS credit
BMEEOUVAT41	Railway Tracks		Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:14:15-17:00(ONLINE); MON:14:15-17:00(ONLINE)	
Basic concepts of the railway tracks and vehicles, most important technical parameters. Features of normal railways, suburban railways, urban railways, classification of different types of railways. Speed, acceleration, changing of acceleration. Horizontal and vertical alignment of the railway tracks, straights, circular curves and transition curves, superelevation, vertical curves. Elements of the substructure and superstructure. Rails, sleepers, rail fastenings, ballast, subgrade, strengthening of the subgrade. Setting out major and detail points of curves and transition curves. Structures and solutions of dewatering and drainage of railway tracks. Basic concepts of conventional and continuously welded rail tracks. Types of turnouts and simple track connections. Basic concepts of railway stations, platforms, passenger access.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOUVAT42	Roads		Mid-semester mark	2
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:14:15-16:00(ONLINE); MON:14:15-16:00(ONLINE)	
History of transportation. Sustainable transportation and transportation policy. The system of tracks, vehicles and drivers/passengers. Design and behavioural patterns and self-explaining roads. Transport facilities. Elements of the alignment in cross sections, horizontal and vertical alignment. Basic rules and disciplines of planning and design. Transition of superelevation. Planning process: planning, design project, construction, operation. Traffic operation basics: measures of traffic, traffic operation and management. Intersections and junctions. Urban transportation planning, the concept of accessibility. Characteristics, production and installation of asphalt pavements. Types of tracks, layers, materials. Design of new pavement structures. Construction, management and operation of road networks. Project 1: Authorization plan of a curved section of a secondary main road with transition curves: site plan on a contour line map with long section and cross sections. Drainage, earthwork, road marking. Project 2: Feasibility study of a main road between two point on a contour line map.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVKAT41	Basics of Environmental Engineering		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	THU:14:15-16:00(ONLINE); THU:14:15-16:00(ONLINE)	
The aim of the course is to provide basic scientific and engineering background for further studies in environmental engineering by giving introduction to the following subjects: basics of ecology, the natural cycle of ecologically important elements and substances, the environmental effects of human activities, the ecological footprint, energy consumption patterns and energy production technologies, renewable energy sources. Selected environmental problems associated with civil engineering activities (water, air and soil pollution), with focus on the urban environment. Tools and methods for conducting environmental impact assessment.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVKAT42	Public Works I.		Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:16:15-18:00(ONLINE); TUE:16:15-18:00(ONLINE)	
Practice	EN1	English	WED:14:15-16:00(ONLINE)	
The main goal of the subject is to provide information about the most important features of the public works. The subject is also including the connections between the different public works and other establishments. Further aim is to provide knowledge for the future general designers and technical managers to make the right decisions on the				

underground infrastructure of settlements. Main scopes are: system knowledge and design of different public work types like water acquisition, drinking water supply, waste water networks, storm water networks and public works asset management.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVVAT41	Hydrology I.		Mid-semester mark	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	MON:10:15-12:00(ONLINE); MON:10:15-12:00(ONLINE)	
Practice	EN1	English	WED:14:15-16:00(ONLINE)	
The global water cycle. The water balance. Basic elements of hydrometeorology. Evaporation and its main features. The origin of the precipitation, quantitative characteristics, principles of precipitation. Weather, weather conditions, climate. The concept and principles of runoff. Infiltration. runoff estimation on small and large catchments. Elements of hydrography. Exploration of natural streams. Characterisation of subsurface waters and their principles. Characterisation of groundwater regime.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVVAT42	Hydraulics I.		Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	TUE:10:15-12:00(ONLINE); TUE:10:15-12:00(ONLINE)	
Practice	EN2	English	WED:12:15-14:00(ONLINE)	
Practice	EN1	English	WED:12:15-14:00(ONLINE)	
Physical properties of water. Hydrostatics: pressure distribution, absolute and relative equilibrium. Equilibrium of submerged and floating bodies. The flow of fluids: velocity, discharge, continuity, specific energy head, other properties. Laminar and turbulent motion. Behaviour of ideal and real fluids. Outflow, through-flow. Channel flow. Hydraulic jump, energy breaker. Weirs, sluice-gates. Steady-state flow in pipes. Seepage in porous media. Wells. Turbo-machines.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVVAT43	Hydraulic Engineering, Water Management		Exam	3
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	THU:08:15-10:00(ONLINE); THU:08:15-10:00(ONLINE)	
Practice	EN2	English	THU:16:15-18:00(ONLINE)	
Practice	EN1	English	WED:10:15-12:00(ONLINE)	
The tasks, methods and tools of water management. Hungarian and European specialities of water management. Types and tasks of hydraulic engineering structures with the following topics: Watershed management of lowland and hilly areas, regulation of lakes and rivers, reservoirs and storage, flood control and land drainage, inland navigation, water power development, water intake and pumping stations, small hydraulic engineering structures, characteristic environmental impacts of hydraulic engineering structures. During the practical lessons four design works will be elaborated.				
Subject code	Subject name		Requirement	ECTS credit
BMEEOVVPRE5	Basic Hydraulics		Mid-semester mark	0
<b>Course type</b>	<b>Course code</b>	<b>Course language</b>	<b>Timetable information</b>	
Lecture	EN0	English	WED:15:15-17:00(ONLINE); WED:15:15-17:00(ONLINE)	
Basic knowledge on the mechanics of fluids: basic physical quantities and their measurement, standard units of measurements, behaviour of fluids at rest and in motion, fundamental laws of hydrostatics and fluid dynamics /* 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:0cm; mso-para-margin- bottom:.0001pt; mso-pagination:widow-orphan; font-size:10.0pt; font-family:"Times New Roman",serif;}				