

„Budapest” Architecture
 Program offered for Exchange Students
 in the 2016/2017 Academic Year

Fall semester 2016/2017

RECOMMENDED UNIT

subjects	cr	code	type	
Interdisciplinary, Project based Design I.	16	BMEPTCEP01	practice	
<p>The subject is based on the cooperation of the departments of the Faculty of Architecture. Students work in studios in groups with individual tasks as well instructed by teachers of the departments involved. There are two design tasks to be solved during the semester, that can be chosen freely from the offered opportunities. Each task is to solve in seven weeks. Some of the tasks are: sport hall for Olympic Games in Budapest, Dwelling Underground, Suspension in Architecture, The Green in the Metropolitan Area (green walls, green roofs) etc.</p>				
Drawing 7. – Color Dynamics	2	BMEEPRAO702	practice	
<p>The Identity Design is an unavoidable phase of the selfmanaging of an architect nowadays. Identity Design determines the whole carater of business’s efficiency. It shows the carater, the personallity of the author and also symbolizes the quality of the work at the same time as well. On this course the students would have a chance to design their own first logo, business card and portfolio. These parts have to be unified by the graphic layout. However it needs to reflect the originality too. The use of wide range of graphical tools are available for all of the participants.</p>				
History of Hungarian Architecture 2.	2	BMEEPETO901	theory	
<p>The subject History of Architecture in Hungary II. aims to present and analyze the architecture of historic Hungary in European and domestic context from the history of Pannonia to the end of Baroque. The principle of the presentation is the chronological interdependence, however, particular attention is given to the main trends within the different periods as the main stylistic tendencies or external and internal factors that determine the historical and architectural context. A great emphasis is given to the exploration of the connections between the European and Hungarian history of architecture. Lecture topics include: The beginnings of architecture in the Carpathian Basin. Roman architecture in Hungary. Early medieval architecture in Hungary - Christian Architecture between West and East. The flourishing Romanesque and the beginnings of Gothic Architecture. The rise of Gothic Architecture - architecture in towns and Gothic architecture of the orders. The beginning and the first period of the renaissance till the middle of th 16th century. The architecture of fortified palaces and fortifications. The renaissance architecture in Transylvania. The beginnings of the baroque in Western Hungary in the 17th century. The High Baroque in Hungary.</p>				

ELECTIVE PART

depending on the timetable, since many courses will overlap in time / see timetable in September

Architectural Research for Exchange Students	6 tp	BMEEPIP0995 BMEEPEG0995 BMEEPUI0995 BMEEPET0995 BMEEPKO0995 BMEEPLA0995 BMEEPEK0995	100 % max. 5 max. 12 max. 15 max. 6 max. 2 -	Minimum of 4 semesters architectural and engineering studies, specified background during the registration. See the topic list proposal
<p>Similar to the international practice aims the course primary research activity on architecture and its documentation. The possible horizon of the research topics is determined by the course lists of the departments and the personal interest of the students. Beside the architectural topics will give the course an appreciation of interdisciplinary and special fields in international environment too. The project work demonstrating generic and specific skills and understanding of the open and synthetic character of the research.</p> <p>The objective of this course is to hone the skills of analysis and abstraction in order to develop a framework for research. The student should be able to draw from precedent in both art, architecture and engineering in the development of this framework, which will act as scaffolding for the theoretical, experimental and creative decisions. This course will consist of a series of consultations to the teachers, but the essay should be written by the student. The available topics are given by the Departments of the Faculty. The student can propose also a special topic for research during the course, but the teacher has to agree with the proposal.</p>				
Introduction to Constructions	2 tp	BMEEPESA101	max.10	Construction Study En1
<p>This subject introduces all major building construction components (walls, foundations, floors, roofs, skeleton frames, stairs, ramps, doors and windows) and primary building engineering service systems. During lectures, the building is considered as a composition of spaces with different functions, separated by special surfaces. The course aims to introduce and explain the grammar of architectural design through practical tasks, such as the survey of one's own flat. Concurrently, the basic dependant factors of the creative design process are described. Students are acquainted with technical terminology as well as the role and use of various construction solutions including their classifications. The above shall assist students with both starting independent design exercise work and the continuing of building construction studies in greater detail.</p>				
Building Constructions 2	4 tp	BMEEPESA301	max. 10	min. 1 semesters Const. Study En2
<p>The subject deals mainly with pitched roof constructions, roof coverings and different types of foundations - the latter with consideration to waterproofing solutions. During seminar lectures the principles and details of shallow and deep foundations are introduced, according to functional and load bearing requirements of various building constructions as well as subsurface water and soil type effects. Also introduced are the functions and primary principles of different pitched roof constructions such as: traditional roof, rafter type (modern) roof, purlin and truss type roof as well as contemporary methods of carpentry. Further explanation is provided on occupied (built-in) attic constructions with focus on principles, layers, ventilation, windows and lighting. The main types of roof coverings are shown, such as concrete and clay tiles, flashings and metal roof coverings with special attention to principles and details.</p>				
Building Constructions 4	4 tp	BMEEPESA501	max. 10	min. 3 semesters Const. Study En4
<p>Flat roofs. Classification, general design aspects, basic construction principles (inclination and geometry of the water collecting areas) according to the impacts on the roofs. Arrangement of roofing layers. Requirements concerning to the different constructions, layers, materials, building physics. Waterproofing (membranes, coatings), applied materials and their features. Technologies and details. Tracking type and terrace roofs, green roofs. Flooring. Effects and requirements. Layers, subsystems, acoustical evaluation. Substructures of floor coverings and their technical features. Classification according to the materials, specifications. Waterproofing against domestic and industrial wet effects. Drywalls, suspended ceilings, internal wall coverings. Labelling systems, design aspects, effects, requirements, basic structural principles. Internal separating structures of residential buildings satisfying acoustical requirements, connecting details of slabs, floorings and stairs. Principles of primary building engineering service systems and building constructions of sanitary block.</p>				
Building Physics	2 th	BMEEPEGA301	max.15	
<p>Heat and moisture transfer: Concept of conduction coefficient, thermal resistance, surface convection, overall heat transfer coefficient. Calculation of temperature distribution and overall heat transfer coefficient of multilayer walls. Calculation of the necessary insulation breath. Thermal bridges, two dimensional heat transfer. Concept of linear heat transfer coefficient. Calculation of temperature distribution of thermal bridges. Estimation of critical surface</p>				

temperatures. Heat flow paths to the ground. Calculation of equivalent U-value. Radiant heat exchange. Spectral distribution of solar radiation, green house effect, energy balance of transparent and opaque elements. Sun path, sun path diagrams. Calculation of shading. Shadowing devices. Energy collecting walls. Mass walls, Trombe walls, transparent insulation, sunspaces, Heat storage capacity, heat loss, heat gain. Effective thickness. Calculation of a heat storage capacity. Air gaps. Concept of equivalent thermal resistance of air-gaps Psychometrics. Daltons's Law, moisture content, Relative humidity. Energy content of moist air. Dry and wet bulb temperature. Psychometric chart. Saturation-temperature diagram Vapour transfer through walls, the Glaser model. Distribution of saturation pressure and partial pressure distribution of multilayer walls. Capillary and surface condensation, mould growth, moisture balance of room, sorption isotherms. Design consideration, place of the moisture resistant and thermal resistant. Acoustics: External and internal noise sources. Radiation and propagation of sound, sound pressure level, sound power level, "level arithmetics", sound field around a point source, sound field around an infinite line source; The characteristics of environmental noise: A weighted sound pressure level, equivalent. A weighted sound pressure level; Sound insulation against airborne sound, sound reduction index, weighted sound reduction index, product data, field data; Sound insulation against impact sound, normalised impact, sound pressure level, weighted normalised impact sound pressure level; product data, field data; Sound insulation, requirements, analyse the plan of a multi-storey dwelling.

Building Service Engineering I.	2 th	BMEEPEGA501	max. 15	
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Water supply: The physical and chemical properties of water. Obtaining of water from the nature. Mechanical, chemical and biological treatment of water. Water treatment process of swimming pools. Transport of water. Characteristics of water pumps. Fresh water demand and production, hydrofoms and hydroglobes. Cold water distribution network in a building. Metering of water consumption. Pipe materials and appliances: valves and taps, safety equipments. Fire protection networks. Domestic hot water demand and production. Domestic hot water networks in a building. Boiler types. Circulation. Appliances: toilets, baths, showers, washing machines, etc. Legionella.

Waste water systems: Requirements of waste water networks. Traps and syphons. Sanitary rooms for disabled people. Waste water networks. Rain water networks. Pipe materials and fittings.

Gas supply: Physical properties of natural and PB gas. Dangers of gas supply. Safety requirements. Gas supply networks outside and inside the building. Gas meters. Materials and fittings of gas networks. Gas appliances: boilers, stoves, ovens. Categorisation and safety requirements of appliances. Chimneys: types and requirements. Parameters of drought. Drought diverter.

Artificial lighting: Visual environment and its components. Characteristics of the human vision. Essential ideas of lighting technique: luminous flux, luminous intensity, illuminance, luminance. Characterisation of surfaces: reflection and transmission, spreading of light, colour. Requirements concerning the lighting. Average illuminance and its uniformity. Colour rendering. Modelling – shadows effect. Limitation of glare. Colour appearance. Balanced ratio of luminance. Cost efficiency. Artificial light-sources. Incandescent lamps. Fluorescent tubes. Compact tubes. HID lamps: mercury lamps, metal halide lamps and sodium lamps. Meeting of requirements. Efficiency-method. Proposed setting of luminaries. Electric network of buildings Parts of the network. Characteristics of the network: form, nominal voltage. Typical installations: lighting, building services and technology. Connection of building to public network. Transformers and its placing. Required areas of switchboards and transformers. Indirect contact..

History of Architecture 1. The Beginnings – Vernacular Architecture	3 th+p	BMEEPETA101	-	
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Basics of architectural forms and structures – Architecture of Palaeolithic's – Architecture of Neolithic's – Architecture of bronze and iron age in the Middle East and in Europe - Vernacular architecture of Africa, Asia, America and Europe.

History of Architecture 3. Medieval Architecture	3 th+p	BMEEPETA301	-	
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The architecture of the Late Roman Empire. The born of Christianity and its „Necessity architecture“. The born of the monumental Christian architecture – Early Christian architecture in Rome. – Early Christian architecture in the eastern Provinces: Palestine, North Africa, Syria – Late Roman and Oriental traditions. Early Byzantine architecture in Thessalonica and in Constantinople. Load bearing structures of the Early Christian period. Different types of barrel vaults, Roman-type cross vault. – Syrian influences in Armenia. The „Iconoclasm“ and the aftermath in Greece.

Architecture in the radius of influence of Byzantium. The comparison of the basilicas in Rome and in Syria. – Ravenna. The penetration of Christian architecture into barbarian Europe – „Scattered monuments“. Byzantine vaulting systems. The main stream of the Romanesque architecture: the Carolingian architecture with the „evangelizer“ Benedictine movements, the three periods of the German-Roman Empire. The Langobard architecture in North-Italy. The Romanesque vaulting systems: Romanesque cross vault, Sexpartite vaulting, „groin-rib“ vaulting. Squire-bayed and free vaulting systems – the pointed arch. Basilica and „false basilica“ type space organization. –

The retrospective interregional influences in Romanesque architecture. – Antique influences. Byzantine influences. The progressive interregional influences in Romanesque architecture – monastic movements: Benedictine and Cistercian, Norman „Imperial“ Romanesque architecture. Morphology of Medieval detailing. The Early French Gothic cathedrals. – The flourishing period of the French cathedrals, and its influences in South-France, in England, in Germany and in Italy. Interregional influences in gothic architecture: Cistercian gothic formations, the Franciscan and Dominican movements. – The special characteristics of English and German gothic architecture. Late gothic vaulting systems: Cylindrical (or net vaults) and Spherical (or stellar) vaults. Halls and false-halls – Civic movements in Late gothic in Germany and the proto-renaissance in Italy. Medieval secular architecture.

History of Architecture 5. 19th Century Architecture	3th	BMEEPETA501	-	
<p>The period of this History of Architecture subject is the "long nineteenth century" from the 1750s to the 1910s. In this era the architecture and the art turned to the past, to the previous styles using them in a new approach. The architects had discovered the history of art and artistic liberty at the same time. At the turn of the 20th century the art and also the architecture searched for new ways instead of using historical architectural elements or motifs. The changes led to the Modern Movement when buildings were being erected without decoration or ornaments in the first quarter of the 20th century.</p> <p>This period was divided into different eras, but these types of periodization were different in different countries and changed in the course of the 20th century. Beside the question of styles 19th century is important not only because of the appearing of new structures and materials in the architecture but because of the great development in the field of the functional planning. This subject surveys the development of the styles in several areas of Europe (Great Britain, France, Germany, Russia) looking out to the United States of America too, because there the styles reflected the European ones.</p>				
Theory of Architectural Design	2th	BMEEPETO921	-	
<p>The course gives an overview of theory of design from 1968 to the present. It picks up specific themes of architectural design and puts them into broader cultural context. Themes include but not limited to: 1. history, memory, tradition, 2. autonomy, pleasure, deconstruction, 3. place, material, experience, 4. Tectonics, ornament, image, 5. City, metropolis, pragmatism, 6. practice, production, diagram, 7. digital technology, 8. landscape, topography, 9. responsibility, sustainability. To bring the theoretical problems of design closer to practice the course uses the writings of leading practicing architects as case studies. The aim of the course is to emphasize the importance of thinking on design, and to enrich the students' vocabulary of architectural discourse.</p>				
History of Art	2th	BMEEPETT721	-	
<p>Beginnings of the art: the pictures of the cavemen. – Ancient art of the East: Egypt. – Classical art of the Antiquity: Greek and Roman art. – Early Christian and Medieval art. – Renaissance and Baroque art. – The art at the age of Enlightenment: Gothic revival, Classical revival, Classicism. – Romanticism, Realism, Impressionism, Post-Impressionism. Bibliography: Ernst H. Gombrich: The Story of Art, Phaidon, 1995; Michael Levey: A History of Western Art; and other (selected) books of WORLD OF ART series: Thames and Hudson, Oxford University Press; etc.</p>				
History of Theory of Architecture 1.	2th	BMEEPET0407	-	
<p>Categories and concepts of theory in the history of architecture from antiquity to the raise of modernism in the beginning of the 20th century. Vitruvius and his interpretations. Architectural theory in the Middle Ages from early Christianity to late Gothic period. Humanism and the revival of antique architecture in the 15th. The column orders and commentaries on Vitruvius; the theory of the ideal city. Baroque in the reform of the Catholic church. Academic movement in France and Classicism in Italy in the 17th. Theory of architecture in France in the 18th century. Enlightenment and revolutionary architecture. 19th century theories in England, France and Germany; the interpretation of medieval and classical heritage. The dilemma of eclecticism. Pioneers of modernism and their manifests. The pluralism in the interpretation of architectural space; architecture and philosophy.</p>				
Introduction to structural design	2th	BMEEPSTA101	-	
<p>The most important methods of analysis and design of engineering structures are presented, together with their modelling, and the applied approximations. It is shown how high school statics (and math) can be applied to engineering structures. The understanding of the behaviour of structures is emphasized.</p>				
Urban Design 1	2th	BMEEPUIA501	max. 50	
<p>The subject is the theoretical course of the fifth semester, with 2 hours lecture weekly. Man during historical times has always lived in communities, so his life has been determined by his relation to the rest of the community, while at the same time a house erected is also determined by its built environment. The same way as a man cannot be separated from his community, a building cannot be separated from its urban environment. The architectural quality can be well described by relation of the building to its environment. The main scenes of the lives of communities are the settlements, where the most developed examples are cities. Why are settlements formed or deserted, why are they developing or declining? What should be the ratio of planned and unplanned elements in a settlement? What is the role of private and public interests, of private and public properties in the development of a settlement? How is a city functioning and what are the most efficient means of its operation? We are looking for the answers to these - sometimes philosophical - questions and looking for the relation between the inseparable categories of building and city, architecture and urban development.</p>				
Departmental Project 2 Interior Design	3^{tp}	BMEEPRA701	max. 10	
<p>The course is in strong relationship with the sixth semester's other course "Department's Design I". There are three small exercises in this term, based on the theme of: modeling, construction, visuality. All three of these exercises are based on the exercises made during "Department's Design I", by solving or developing some parts of those. Thus the students has the opportunity to experience more the richness of the design process. The first exercise deals with the question of creating a model and its role in the architectural praxis and in the experience in the human cognition. The second exercise is construction, this one is examining the relationship between the already made model and the main space-structure of the ongoing design "small complex". The third small exercise is called visuality, during which the student makes a detailed drawing of an ornament chosen by the consultant and the student together.</p>				

Strength of Materials 1	2 th	BMEEPSTA301	-	
<p>Basic concepts of strength of materials. Behavior of solid bodies. Material laws, constitutive equations: elasticity and plasticity. Central tension and compression. Design criterion. Pure shear. Steel and carpenter joints. Pure bending. Second moment of inertia. Bending in elastic stress state. Symmetric bending and skew bending. Eccentric tension and compression. Core of section. Materials not having tensile strength. Bending in plastic stress state. Bending combined with shear. Calculation of shear stresses. Design for bending. Normal force – moment interaction curve. Torsion. Plane stress state. Possible failure conditions: rupture and yield. Elastic energy.</p> <p>Basic concepts of strength of materials. Behavior of solid bodies. Material laws, constitutive equations: elasticity and plasticity. Central tension and compression. Design criterion. Pure shear. Steel and carpenter joints. Pure bending. Second moment of inertia. Bending in elastic stress state. Symmetric bending and skew bending. Eccentric tension and compression. Core of section. Materials not having tensile strength. Bending in plastic stress state. Bending combined with shear. Calculation of shear stresses. Design for bending. Normal force – moment interaction curve. Torsion. Plane stress state. Possible failure conditions: rupture and yield. Elastic energy.</p>				
Design of Load-Bearing Structures	6 th+p	BMEEPSTA501	-	
<p>Basic conceptual and computational design methods of load-bearing structures are discussed for reinforced concrete-, steel-, timber and masonry buildings.</p> <p>The main goal is to gain knowledge about structural design problems and principles of structural design in order to understand how and why the l</p>				
Design of Reinforced Concrete Structures	2 th	BMEEPST0655	-	
<p>The subject introduces students into the way of design of approximate dimensions, joints and structural solutions of reinforced concrete structures. Invited lecturers expose some of the most significant recent investments in reinforced concrete in Hungary. The aim of the course is to develop the ability of students - on the basis of EUROCODE 2 - to adopt architectural dimensions and to evaluate the effect of the chosen architectural lay-out onto the structural solution.</p>				
Urban Infrastructure – Smart city Budapest	2 th	BMEEPUI0633	-	
<p>Following lectures about the smart city concept and its relation to datasets and information modeling, students will explore the methods of 3D building detection, the interoperability of BIM and GIS datasets, the practical application of 3D city models through the model of a medium-sized Hungarian city. Each student will work on a chosen topic of Budapest, exploring the research - possibilities of geotagged data and the connection of the 3D cityscape to different problematics (crime, circulation, tourism, etc) through analysis of different datasets.</p>				
Cities of the World	2 th	BMEEPUI0893	-	
<p>Elective course of the Department of Urban Planning and Design dealing with current trend of Urbanisation around the world focusing on the topics:</p> <ul style="list-style-type: none"> - Global cities and contemporary urbanisms – an introduction to the course - De-industrialization and urban dynamics - Politics and markets shaping the form of the global city - Urban sprawl and the regeneration of the inner city - Sustainable urban futures and the quality of life 				
Construction Management 1 - Basics of Construction	2 th	BMEEPEKA501	-	
<p>The goal of the subject is to present basic information on the technologies and organization of construction work, with special respect on construction activities of sub and superstructures. Considering the character of the subject both theoretical and practical knowledge is essential, therefore besides the lectures the site visits play emphasized role as well.</p> <p>Main topics:</p> <p>The construction process. Phases and participants of the construction process (roles, responsibilities, connections, etc.).</p> <p>Technical preparation and controlling of the construction. Handover – take-over of the building (reviewing the constructions – quality and quantity – and the plans)</p> <p>Introduction to construction technologies, conditions, requirements. Aspects of selecting the technology. Sequence of construction works (the follow-up of processes).</p> <p>Main equipment of construction (earthwork, foundation work, construction of loadbearing structures, etc.) Material supply on site – to the site.</p> <p>Informations about the construction site. Construction site planning.</p> <p>Time scheduling. Types, realations. List of operations, survey for quantities, labour schedule, plant schedule, material schedule..</p>				

Construction Management 3 - Planning of Construction Technology	4 th+p	BMEEPEKA701	max. 15	
<p>The goal of the subject is to present information on the planning of elementary construction technologies related to superstructures and finishing work.</p> <p>The subject introduces how to apply recent innovations of building technologies during design and realisation. It gives a basic knowledge to evaluate construction options and make appropriate decisions about technology. There are case studies of building technologies used in construction of loadbearing structures, finishing and cladding works. The practical part contains workshops on planning of construction technologies: connection of structures and technologies: connection of structures and technologies, volume calculation, resource estimation, scheduling and construction site planning.</p>				
Construction Management 5. – Special construction projects	2 th	BMEEPEKS901	max. 60	
<p>The course's aim is to give up-to-date information on different special fields of construction in three blocks. In the first block the construction technologies of special, sub- and superstructures are shown, involving topics like metro tunnels, metro stations, special slurry walls, special reinforced concrete superstructures and formwork systems. In the second block traditional and modern materials and technologies are presented regarding to eco- and green architecture, like construction technologies of the passive buildings, or green facades. In the third block students get information on the application of traditional construction technologies, restoration methods and the maintenance of monuments and historic buildings. Besides the theoretical lectures many site visits are organized to present the practical as</p>				
Architectural Informatics 3 – CAD for Architects	3 th+p	BMEEPAGA501	max. 20	
<p>Use of state-of-the-art CAAD software to develop professional architectural solutions. Extensive use of 3-D computer model development. Architectural documentation with computers. Computer animation and fly-through pictures for architectural space</p>				
Constructive CAAD CE – 3D Modelling in AutoCAD	2 tp	BMEEPAG0249	max. 20	
<p>Advanced CAD modelling course for students who are familiar with AutoCAD. The course deals with modeling concepts and techniques, texture, lighting and rendering. In the second part of the semester students work more or less autonomously (with occasional one-on-one consultations) on a model of their choice. See: http://www.epab.bme.hu/en/?ccce/</p>				
CAAD and Architects Informatics F – Building Information Modelling (BIM) / ArchiCAD	3 tp	BMEEPAG0236	max. 20	
<p>This course aims to expand the existing CAD knowledge of students to be able to create and modify complex CAD models easily. During the course, we use ArchiCAD, so a basic knowledge of the program is expected.</p>				