FACULTY OF CIVIL ENGINEERING

Please note! This is a preliminary list of courses for the study year 2016/2017. Changes may occur!

SPRING 2017
BACHELOR COURSES

BBK381 Reinforced Concrete Structures (Part 2)
2.00 CP (3.00 ECTS)
Properties of materials for reinforced concrete and masonry. Design codes and limit state calculation principles. Classification of reinforced concrete and masonry structures, typical cross sections, detailing and behavior. Behavior, design and detailing of pre-stressed reinforced concrete elements.

BBM210 Structural Analysis (general course) (Part 2) (can be selected ONLY if Part I studied within Autumn semester 2016/2017)
3.00 CP (4.5 ECTS)
Mechanics of bars and statically determinable bar systems. Theory of displacements. Method of forces. Method of displacements. Finite element method. Continuous beams, calculation of statically indeterminable frames, arches, trusses. Influence diagrams.

BBR223 Construction Technology and Safety (Part 1)
2.00 CP (3 ECTS)
General conception of building technology. Preparation of the building site. Transportation, earth moving, drilling, blasting, piling and grooved piling works. Masonry, reinforcing, concreting, assembling and carpenters works. Finishing, flooring and suspended ceiling works. Special industrial safety.

BBK210 Metal Structures (Part 1)
2.00 CP (3.00 ECTS)
Materials for metal structures and its properties. Assortment of steel products. Structural design codes. Basis of analysis of load - bearing capacity of structures and joints. Design of steel beams, columns and trusses. Framework of one-story industrial buildings, design of its units. Special steel structures (frameworks of multistory, suspended and sheet-type structures, high-rise structures), structural solutions and design principles.

BRC303 Basic Course of Geotechnics (Part 2) (can be selected ONLY if Part I studied within Autumn semester 2016/2017)
2.00 CP (3.00 ECTS)
1.d.) Basic physical properties and classification parameters of different soils. Deformative and permeability properties of soils. Laboratory test methods of soils. Stress distribution in soil massifs below the different loads. Deformation calculations of forend foundation bases.
2.d.) General positions in design of soil bases and foundations. Technical and economical parameters for choice the type of foundations. Calculations of shallow foundation bases with using the criterion of limit deformation state. Calculations of ultimate bearing capacity of foundation bases. Pile and deep foundations. Reconstruction of foundations.

BRC304 Basic Course of Geotechnics (Study project)
2.00 CP (3.00 ECTS)
Course project consists of calculation part and drawing part for industrial building. In calculation part estimation of the stability and settlement of shallow foundation is performed for side column. Pile foundation is designed for central columns. Low load bearing strata bearing capacity is calculated.

Shallow and pile foundations are designed acc. to resistance and deformation limit states. Results of calculations shown in drawing part including foundation and pile plans and detail drawings.

BRC396 Basic Course of Architectural Design (Part 2) (can be selected ONLY if Part I studied within autumn semester 2016/2017)
2.00 CP (3.00 ECTS)
The course provides the students with the basic knowledge of architectural design of buildings, and develops their basic skills in this field. The students also get a thorough insight into the functions and interdependence of the functions of all the building elements. Special attention is paid to enclosure building elements and their functions are viewed from the point of view of building physics.

BTG242 Computer Graphics (For civil engineering)
2.00 CP (3.00 ECTS)
Representation of three dimensional building objects on the plane: theoretical basis and special methods. Theories of pictorial view, perspective and shadow. Projections with digital marks and their application in surveying projects. Application of computer aided drafting and design in architectural and civil engineering projects. Solution of practical tasks using both traditional methods and computers.

BGE298 Practical Geodesy
2.00 CP (3.00 ECTS)
The course "Practical classes of Geodesy" is based on theoretical knowledge of surveying principles, measurement methods and applications spheres. To meet the practical work are used Laboratory work on the skills and teachers instructions. Geodesy practical classes (practicum) covers a wide range of applications - geodetic network creating and/or surveying, linear building surveying, building axis and other building elements of targets in the area, engineering communication network inspection and surveying, production wells passport, topographic relief plan drawn up. Geodesy practicum can include technical and high-precision measurements performance of the analytical processing and analysis of the results.

BBK383 Timber and Plastic Structures (Part 1)
2.00 CP (3.00 ECTS)
Peculiarities of timber and plastic structures. Design codes, loads and load combinations, the calculation principles of structural elements. Wall and ceiling structures. Composite cross-section struts, beams, panels, trusses, arches and frames. Spatial strengthening of plane structures. Design of plastic elements.

BMT363 Concrete Science (Part 2) (can be selected ONLY if Part I studied within Autumn semester 2016/2017)
3.00 CP (4.5 ECTS)
The structure of concrete (definitions, complexities, structure of the aggregate phase, structure of hydrated cement paste, transition zone in concrete). Strength. Dimensional stability. Elastic behavior of concrete. Thermal shrinkage. Drying shrinkage and creep. Durability. Permeability. Factors influencing on the deterioration. Hydraulic and non-hydraulic cements. Portland cement. Hydration of Portland cement. Aggregates. Aggregates from recycled concrete and municipal wastes. Admixtures. Proportioning normal-weight concrete mixtures. Segregation and bleeding. Early volume changes. Setting time. Testing and control of concrete quality. Progress in concrete technology.

BMT403 Reinforcement of Structures
2.00 CP (3.00 ECTS)
Subject "Structural Reinforcement" gives a real insight into the existing structure renovation, improvement or capacity building. Is addressed in a broad range of structural materials (wood, metal, concrete, composite materials). Describes the various approaches to gain implementation. Defined in practical action, from the design and operation of up to provide. Analysis of the technological issues, gain controls as possible.

BMT456 Protection of Environment in Civil Engineering
2.00 CP (3.00 ECTS)
Protection of environment, claims to building production. Building pollution and its inspection. International requirements to the pollution degree, methods of inspection. Systems and equipment for reducing the pollution degree. Industrial waste processing and appliances.

BRC549 Regulations and Rules of Buildings in Latvia
2.00 CP (3.00 ECTS)
The course provides the students with a thorough insight into the system and the development of normative acts in building and the basic knowledge of Building Code in spheres which are not covered in other courses. Particular attention is paid to how the new Construction Law is observed and to how the European Standart (EN) is adapted.

BKA306 The Finite Element Method (Introduction)
2.00 CP (3.00 ECTS)
Today the finite element method (FEM) is considered as one of the well-established and convenient technique for the computer solution of complex problems in different fields of engineering: civil engineering, mechanical engineering, nuclear engineering, biomedical engineering, hydrodynamics, heat conduction, geo-mechanics, etc. From other side, FEM can be examined as a powerful tool for the approximate solution of differential equations describing different physical processes. The success of FEM is based largely on the basic finite element procedures used: the formulation of the problem in variational form, the finite element discretization of this formulation and the effective solution of the resulting finite element equations. These basic steps are the same whichever problem is considered and together with the use of the digital computer present a quite natural approach to engineering analysis. The objective of the course for Buchelor study is to present briefly each of the above aspects of the finite element analysis and thus to provide a basis for the understanding of the complete solution process. According to three basic areas in which knowledge is required, the course is divided into three parts. The first part of the course comprises the formulation of FEM and the numerical procedures used to evaluate the element matrices and the matrices of the complete element assemblage. In the second part, methods for the efficient solution of the finite element equilibrium equations in static analysis will be discussed. In the third part of the course, some modelling aspects and general features of some Finite Element Programs (ANSYS, NASTRAN, LS-DYNA, ABAQUS) will be briefly examined.

BMT251 Building Materials (basic course)
3.00 CP (4.50 ECTS)
Building materials: basic properties, fields of application in different building departments. Natural and artificial store materials, wood, polymeric and metal ware. Lacquer and color materials: properties, acquisition and application in practice.

BBM110 Introduction to Structural Analysis
3.0 CP (4.5 ECTS)
General notions and axioms of statics. Forces, systems of forces and operations with them. Ties (supports) and their reactions. Equilibrium of bar systems. Calculations of forces under tension, compression, bending. Mechanical properties of materials. Geometric specifications of bar sections. Strength estimation of bar systems in case of static loading. Kinematic and structural analysis of systems.

BMT305 Building Chemistry
2.00 (3.00 ECTS)
Mortars and concretes: increasing of longevity, variable properties of cohesive substances. Effect of chemical additives on turning and binding in unsettled weather. Production of Waterproof mortars and concretes. Prevention of metal corrosion, protective colors. Longevity increasing methods and constructions.

BRC110 Basics Course of Engineering Geology
2.00 (3.00 ECTS)
Composition of the Earth. Minerals and rocks. Underground water. Engineering Geology surway. 1. iving fundamentals of Earth structure, soils and rocks in the outer shell, horizons of ground water, geological and possible man-made geological process and phenomena.
2.Development of skills in selection of ground investigations performed in phases depending on the questions raised during planning, design and construction of the actual project .

BBK382 Reinforced Concrete (study project)
2.00 (3.00 ECTS)
Design of reinforced cast-in-place floor (slab, beam, column, basement) and precast pre-stressed covering. Calculation of ground and underground story masonry wall. Detailed design of structures main parts - choose of cross-section, limit states verifications and development of working drawing (1.5 to 2,0 sheets of A1 format).

BBM103 Computer Science (special course for civil engineering)
2.00 (3.00 ECTS)
Modeling of design elements for civil engineers projects by using the Windows environment graphical programs and program batches. Solution of problems showing up in engineering practice by program MathCad. Drafting of graphoanalytical project model for students of civil engineering speciality. Solution of the simplest problems of structural analysis by finite element program Analysis 1.9.

BMT410 Maintenance of Buildings
2.00 (3.00 ECTS)
Theoretical basis of longevity of various building structures.Moraland physical wear out of building.Factors defining longevity. Combine deffect of surrounding and load.Principles of protection variants. Cons-tructional,physical and chemical methods for increasing longevity.

BBK204 Metrology, structural research and testing
2.00 (3.00 ECTS)
Theoretical principles of structures and structural experimental invesigations.Methodology.Methods and means for carrying out engineering experiments.Non-destructive testing methods.Modelling principles of building structures.

BMT463 Technological design
4.00 (6.00 ECTS)
Technological design pinciples and tasks. Constructions and their elements. Design documentation un project management. Project preparation processes. Selection of industrial methods. Comparing factors and version analysis. Technological schemes and work on them. Technological maps. Technological calculations. Substandart equipments and communications. Selection of optimal equipment. Technical and economic study of the project. Modular systems, elements and blocks. Sanitation norms and requirements in design, environmental impacts. Safety problems in project. Computer designing technology and using of computer programs for designing.

IBO491 Economics of Building Construction
3.0 CP (4.50 ECTS)
Systematization, consolidation and development of practical and theoretical knowledge in the field of civil construction as well as in the field of economics of construction products manufacturing.
Establishment of costs of building construction jobs. Competitiveness of prices for executing building construction projects in tenders. Cash flow forecast.

BTB707 Foundations of Transportation Infrastructure [2/2]
4.0 (6.0 ECTS)
The course includes the main design aspects of bridge foundations. It deals with the selection of the structural system, the main dimensions of foundations, the structural material, and the construction technique and design criteria. The foundation design methods are based on Eurocodes.

BBK708 Building Structures [1/3]
6.00 (9.00 ECTS)
Types of plane and spatial building structures. Structural materials: general properties, advantages and drawbacks. Structural design building codes. Loads and actions, combinations. Steel, timber and reinforced concrete structural elements behaviour, load bearing calculation principles and detailing. Design of structural elements connections.

BŪK403 Hydraulics, Hydrology, Hydrometry
2.00 (3.00 ECTS)
Fluid statics - concepts and laws. Hydrodynamics - principles and laws. Hydraulic losses. Steady flow in pipes and open channels. Unsteady flow. Hydraulic calculations. Overfalls - types, characteristics. Hydrology. River morphology and river response. Discharge evaluation. Hydrometry, fluid flow measurement.

BTB452 Highway Design (basic course) [2/2]
4.0 (6.0 ECTS)
The course includes the main road design aspects. It contains basic issues of selection principles of road structure, safety solutions, and choose of structural material. The criteria for choose of appropriate construction technique. The road design methods are based on European and Latvian design codes.

BTB457 Highway (study project II) ([2/2]
2.00 (3.00 ECTS)
Study work includes road pavement and road junction design theoretical and practical issues: the fixing of initial parameters, the determination of functional significance, design and estimating of the pavement and road junction parameters and an examination of all relevant criteria. Should be developed a unique solutions for pavement and road junction designs, which must be proved.

BTB460 Steel Bridges (study project)
2.00 (3.00 ECTS)
The course includes the main design aspects of bridges. It deals with the selection of the bridge structural system, the main dimensions of structural elements, the structural material, and the construction technique and design criteria. The bridge design methods are based on Eurocodes.

EEM262 Electrical Engineering and Electronics (for construction engineers)
2.00 (3.00 ECTS)
Issues on generation, transmission and distribution of electricity are discussed on the base of the basic laws of electrical circuits. Fundamentals of electrical machines and apparatus are given, focusing more on electrical equipment for construction as well as on the latest achievements in semiconductor protection devices and electrical safety issues. A short insight in use and savings of electrical energy in domestic field is given.