International Programme

List of English taught courses offered to Erasmus+ programme and international exchange students

Building Construction

WINTER 2025

Building Construction

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Building Information Management I (Code: AN_BIM_a) | Number of credits: 5

Course objectives

Learning outcomes of the course unit The aim of the subject is to teach the students to understand the importance of management of "building" knowledge "(perhaps better knowledge of investment, construction and operational processes of construction). Students will be able to work with the data model of the building, created in the classical way of 3D modeling, so that the model is able to support other subsequent building processes on the basis of information management - coordination of the building project to the building permit design phase, support of the quality selection of the supplier, controlling the construction work, staging it and minimizing collisions, managing the logistics of building elements for the construction (selection of subcontractors, delivering the right quality, quantity and time), managing the information necessary for handover to the investor after approval. Students will also learn to understand the level of detail and necessary information on building elements throughout the process - LOD Level of Development - and its standardization for the needs of the designer, investor, contractor and facility manager. He / she will also understand and practice communication (eg SW 4projects) throughout the BIM team, ie from investor to contractor and ways of working the BIM manager who methodically coordinates and supervises the team. A short introduction to the students will take place over the IFC data format in the version available for the given year of teaching. The student understands the importance of managing "building" knowledge. It is able to work with the data model of the building, created in the classic way of 3D modeling, so that the model is able to support on the basis of information management other subsequent building processes - coordination of the building project to the building permit design phase, support of the quality selection of the supplier, its phase-in and minimization of collisions, the management of logistics of building elements for construction (selection of subcontractors, delivery of the right quality, quantity and time), management of the information necessary for handover to the investor after approval. The student understands the degree of detail and the necessary information on the building components throughout the process - LOD Level of Development - and its standardization for the needs of the designer, investor, supplier and facility manager. The student understands and has practiced ways of communicating across the BIM team. Further, the student is briefly familiar with the IFC data format in the version available for the given year of teaching

Topics

1. Introduction to BIM in the sense of Management 2. Basic orientation in BIM - long-term benefits 3. General issues of working with BIM 4. From 3D models to BIM models 5. BIM and life cycle of buildings 6. Information

modeling processes 7. BIM - management of life cycle processes 8. BIM - LOD, importance for standardization 9. BIM - LOD - specifications 10. Information and knowledge management in BIM 11. Key topics related to BIM 12. BIM implementation and further development 13. Repetition

Building Materials (Code: AB_STH) | Number of credits: 4

Course objectives

The subject provides a basic overview of the structure and properties of building materials and their use. There are presented laboratory tests during exercises. After successful completion of the course, the student can describe the basic raw materials and production techniques of classical building materials, and define the physical properties and the units. The student can characterize different types of cement, lime, plaster, mortar, plaster and concrete, their composition and technical characteristics and their behavior. Student can find the technical data sheets, and work with them, and explain their designation. The student orientates in the offer and can explain special adaptations of materials such as steel, wood, glass, asphalt and plastics. S/he can describe the principles of selection and ordering of building materials and knows how to describe the processes of measuring, weighing, design of concrete mixture and determining concrete strength.

Topics

Physical quantities and units

Element as the basic building unit

Binders, Mortar, Concrete, Stone, Ceramic

Materials: Wood, Glass, Metals, Asphalt, Plastics, Durability and stability of construction materials.

Building Typology I (Code: AB_TYB_1) | Number of credits: 3

Course objectives

Students will learn types of load structures, and will know when to apply them. S/he will learn the problems of the dynamic behavior of structures. After successful completion of the course the student is able to: - calculate the cross section center of gravity and determine the ellipse of inertia, and degrees of width to determine the static structure certainty - to determine response of beams and compute their size - to calculate the axial forces in the rods of a statically truss - to determine the internal forces in statically determinate full beams (console, a simple beam, angle beam, refracted beam, slab and wall) - statically determine the action of certain complex structures (triple articulation arch, gerber`s beam) - to explain the behavior of statically indefinite structures and s/he will theoretically know the ways of their calculation. Based on the information and skills s/he will be able to decide on the choice of a supporting structure.

Topics

1. Introduction to the issue, the concept of typology in architecture
2. Aspects of housing, location of buildings
3. Definition of an apartment and its fragments
4. Zoning the apartment
5. Historical development of a family house
6. Family houses - typological types
7. Historical development of an apartment building
8. Apartment houses - typological types
9. Apartment buildings - exterior and interior spaces
10. Residential buildings
11. Multifunctional houses
12. Social construction, buildings for temporary accommodation
13. Housing of old people

Civil Engineering I. (Code: AB_POS_1) | Number of credits: 5

Course objectives

The aim is to obtain professional knowledge of foundations, substructure, vertical supporting structures, chimneys, expansion and construction systems. After successful completion of the course the student: a) knows to determinate a module coordination and to determine and define the structural systems of multi-storey buildings (structural wall system, skeleton, and combined), structural systems of hall buildings (construction systems stressed primarily in bending, compression mostly, mostly drawn) and the superstructure. b) knows the principles of dilated and non-bearing structures, and s/he can suggest expansion in terms of differential subsidence and volume changes. c) is able to describe the type of shallow and deep foundations and explain the underlying load distribution in the soil and its effect on settlement construction. d) is able to resolve the skeleton and massive bottom structure, lighting, underground construction, insulation and construction of underground structures without a basement. e) can apply the knowledge of the vertical supporting structures (technological point of view, design of structural walls and columns, openings in bearing walls). f) is able to characterize the types of chimneys, assess the impact of location on the stack is functioning correctly. Students can also evaluate the chimneys of the physical and chemical point of view and to propose a reconstruction or repair of the chimney.

Topics

1) Structural Systems I - multi-storey buildings 2) Structural Systems II - Indoor buildings

3) Dilation of buildings 4) Excavation and earthworks

5) Foundations I 6) Foundations II 7) Foundations III

8) Substructures 9) Vertical load-bearing structures I

10)Vertical load-bearing structures II

11) Vertical load-bearing structures III

12) Vertical load-bearing structures IV

13) Chimneys.

Czech Language for Foreigners (Code: AB_CZE | Number of credits: 5

Course Objectives

The course is prepared for foreign students. The aim of the course is reaching of A1 level of their Czech language according to the descriptor of the Common European Framework of Reference for Languages. After the completion of the course, the students will gain the following language skills:

- the students understand basic phrases which are needed for everyday communication and can use these expressions and phrases

- can introduce themselves and other people and ask simple questions concerning well known: places, people and things and react to similar questions

- they can read simple texts (notices, signs, etc.)

- they can write a simple text in Czech language (holiday postcard, fill in a simple form, etc.)

- they are introduced with culture and everyday life in the Czech Republic

- they are able to perceive the intercultural differences between their native country and the Czech Republic

Topics

1. Who is who? Verbs: to be, to have. 2. How are you?

3. People, things, relations – nouns. 4. How much is it? Money.

5. Where am I? 6. The Czech Republic, Budweis.

7. At school, at the school canteen -prepositions, conjunctions.

8. Time, days, months. 9. My family.

10. Signs. 11. Food and drink.

12. Travel. 13. Services, shopping.

German Language I (Code: AB_GLE) | Number of credits: 5

Course objectives

The aim of the course is to provide the students with the basic competencies necessary for normal communication in the language studied. The course aims to gradually achieve the specified output level A1 according to the Common European Framework of Reference in the range of specified thematic areas (lessons 1 - 4). After completing the course, the student has knowledge at the A1 level and masters the basic grammatical structures and vocabulary necessary for communication in a foreign language. At the end of the course, the student masters the principles of pronunciation of the German language and has knowledge of German language at the A1 level according to SERR for languages: masters the basic vocabulary necessary for understanding in basic communication, knows the basic grammatical structures necessary to compose a simple sentence, masters basic phrases and phrases - greetings, introductions, basic information.

Topics

1. Principles of German pronunciation
2. Introduction
3. Everyday life
4. Asking for information. Questions
5. In a town
6. At a party
7. Transport, means of transport
8. Prepositions I, Prepositions II
9. Imperative
10. In a hotel
11. Travelling
12. Family, social life

Engineering Materials for Economists (Code: AN_SMT) | Number of credits: 5

Course objectives

The course aims to familiarize students with the essence of conventional and progressive metallic materials used in engineering practice. Graduates can orient themselves to the basic outlines of key metallic materials, their structural properties, mechanical behaviour, and testing methods. Emphasis is placed on metals' crystalline structure, lattice defects, metallographic analysis, and mechanical testing. The course also includes a basic understanding of the sustainable aspects of metallic materials, especially their long-term stability, resistance to degradation, corrosion, and recycling possibilities. Students will gain a basic overview of the relationship between the structure of metals and their properties, learn to critically evaluate material characteristics within a basic framework and correctly interpret the results of laboratory tests. The graduate will gain general and basic knowledge and skills that will enable him to orient himself from the perspective of metallic materials in the effective management of material flows and in the basic outlines to evaluate the suitability of metallic materials for various applications regarding technical and environmental requirements. After completing the course, the student: 18.1 Understands the basic classification of metallic materials and their mechanical, physical and chemical properties. 18.2 Can, in a limited manner, describe the internal structure of metals, crystal structure and crystal lattices. 18.3 Knows on a light level the principles of basic metallographic methods and mechanical testing of metallic materials. 18.4 Can explain in general terms the influence of microstructure on the mechanical properties of metals and their stress resistance. 18.5 Has a basic overview of commonly used alloys of ferrous and non-ferrous metals and their applications. 18.6 Understands in an introductory manner the issue of corrosion of metallic materials and the possibilities of their protection. 18.7 They have a basic awareness of the influence of the structure of metallic materials on their service life, as well as their degradation and fatigue properties. 18.8 Can, in a limited manner, discuss, simplify, and assess the ecological and economic aspects of metal recycling and their influence on the properties of materials.

Topics

Lectures: 1. Introduction to materials, basic classification and their use in engineering practice. ♻ (The influence of the life cycle of materials on their properties - degradation and ageing of metals in practice.) 2. Matter, its internal structure, the crystal structure of metals, point, line, area and spatial disorders of the crystal lattice. 3. Fundamentals of thermodynamics, kinetics and diffusion of metallic systems. 4. Phase transformations in metals. Basic types of binary systems. Connection of binary diagrams with the *properties of alloys.* ♻ *(Stability and durability* of materials -

how do binary diagrams affect the long-term properties of metals?) 5. Solidification and crystallization of metals and alloys, segregation phenomena. Phase transformations in the solid state. 6. Metallography. Light microscopy, macrostructure, purity of metals, grain size. 7. Mechanical properties of metals and their alloys: influence of microstructure on mechanical properties, types of deformation. 8. Testing of mechanical properties of metals and their alloys. Static, hardness and impact tests in bending. 9. Iron-steel alloys. Their characteristics, properties and uses. ♻ (Steel service life – factors influencing the degradation of materials in long-term use.) 10. Iron-cast alloys. Their characteristics, properties and uses. ♻ (Wear and fatigue properties of cast irons - how to choose the right materials for long-term applications?) 11. Brief characteristics of selected non-ferrous metal alloys and their uses, part 1. ♻ (Resistance of aluminium and copper alloys to corrosion and mechanical degradation.) 12. Brief characteristics of selected non-ferrous metal alloys and their uses ♻ (Stability of titanium and nickel in extreme conditions - advantages of sustainable materials with long service life.) 13. Corrosion of metals. Types of corrosion and consequences. Active and passive corrosion protection of metals. ♻ (Ecological alternatives for corrosion protection – eliminating toxic inhibitors and their impacts on material properties.) Seminars: 1. Introductory information. Safety regulations and methods of working in laboratory conditions. ♻ (How does material degradation affect their safety and operational reliability?) 2. Excursion to materials laboratories and testing facilities of VŠTE's industrial partners. 3. Basic calculations in the field of thermodynamics of metals and alloys. 4. Basic binary equilibrium diagrams. ♻ (Relationship between binary diagrams and the stability of materials during long-term use.) 5. Light microscopy and optical emission spectrometry. 6. Light microscopy: practical exercises. 7. Optical emission spectrometry: practical exercises. ♻ (Comparison of the microstructure of primary and recycled materials - influence on properties.) 8. Tensile and impact tests in bending. ♻ (Comparison of mechanical properties of recycled and primary materials.) 9. Tensile test: practical exercises. 10. Impact test in bending: practical exercises. ♻ (Influence of material composition on long-term fatigue of a material.) 11. Binary diagrams of iron alloys. ♻ (Influence of phase transformations on materials' service life and resistance.) 12. Selected binary diagrams of non-ferrous metals. ♻ (Recycling of selected alloys and its influence on material properties.) 13. Final test and evaluation of semester work.

Excursion (Code: AB_EXK_ps) | Number of credits: 2

Course objectives

The objective of the Excursion course is primarily aimed at providing students with practical experience and deepening their theoretical knowledge in the field of civil construction. This course is designed to give students direct exposure to construction project implementation, understanding of technological procedures, safety regulations, and construction process management. The excursions offer a unique opportunity to meet with professionals in the field, discuss current challenges and trends in construction, and apply theoretical knowledge to practical examples. In this way, the course supports the development of professional competencies, critical thinking, and practical skills that are crucial for students' future professional life in civil construction.

Topics

- The student is able to identify and summarize key technologies and methods used in civil construction, including historical development and current trends.

- The student is able to determine and describe current standards and regulations regarding work safety and environmental protection in the field of civil construction.

- The student is able to write a structured analysis or report defining and addressing a specific construction or engineering problem, applying theoretical knowledge and methodologies in the process.

- The student is able to describe factors affecting teamwork and communication on construction sites and in design teams, including proposing solutions for improving team collaboration.

- The student is able to design and explain how to apply theoretical knowledge to specific construction projects, including selecting appropriate materials, technologies, and methods for the project.

1. - 4. Preparation for the excursion

5 - 8. Participation in the excursion

9. - 13. Preparation of the final report from the excursion

Facility Management (Code: AB_FAM) | Number of credits: 3

Course objectives

The aim of the course is to obtain basic information and knowledge about the provision of services and management of processes and activities in administration and operation of buildings. Mastering the system of pre-design, project and operational evaluation of buildings will enable students to design buildings and manage operations in buildings in order to reduce the total cost of life of the building and increase the quality of their use.

After completing the course, the student is able to master the system of pre-project, project and operational evaluation of buildings.

Topics

1. Facility management, concepts, content and application, legislation ČSN EN 15221
2. Integration of activities, security and development of services, increasing efficiency
3. Space and infrastructure, space services, workplaces, technical infrastructure, maintenance
4. People and organizations, health, safety and protection, focus on users of objects
5. Computer and communication technology - ICT, logistics
6. Quality of services, strategic level, tactical level and operational level
7. Service level agreement (SLA)
8. Key performance indicators - KPIs (Key performance indicators)
9. Risks, monitoring and control of service delivery processes
10. Systems of evaluation and certification of building sustainability, building quality certificate
11. Evaluation criteria, environmental, social, economics and management
12. Basic principles of multicriteria evaluation, linear balance model GEMIS
13. Environmental criteria, LCA - life cycle assessment of buildings

History of Architecture (Code: AB_DAR) | Number of credits: 3

Course objectives

After completing the course, the student will be able to understand the history of architecture, especially in view of the relation of structure, spatial and architectural design in various stages of history. Architecture development is presented in the major concrete structures. The course also includes a summary of the prominent representatives of various periods and styles in the Czech Republic, with particular reference to the fund of South Bohemia. Based on acquired knowledge, students will be able to understand the value structure of historic buildings with which they will encounter in practice and to include these buildings in a development context. Course should initiate a dialogue between architecture, urbanism and art. Students will learn the basic procedures for analyzing individual buildings in terms of its development and context.

Topics

1. Concepts, categories, the beginnings of architecture

2. Antiquity

3. Greek, Etruscan and Hellenistic architecture

4. Roman and Byzantine architecture

5. Pre-Romanesque and Romanesque architecture

6. Gothic architecture

7. Renaissance architecture

8. Baroque architecture

9. Classicism

10. Romanticism, Art Nouveau 11. Modern architecture

12. Functionalism, neoclassicism 13. Postmodern and current trends

Physics (Code: AB_FYZ_1) | Number of credits: 7

Course objectives

The aim of this subject is to repeat the basic knowledge from grammar school mechanics, thermodynamics, acoustics and optics; • - define and characterize the basic physical principles and laws; • - solve simple problems and discuss their results. The student can explain and apply the fundamentals of physics from the following fields: mechanics, thermodynamics, optics and hydromechanics. The student can use common sense to estimate the nature of physical processes.

Topics

1. System of physical quantities and units; Time and Distance

2. Kinematics of Mass Point

3. Dynamics of Mass Point

4. Work, Power, Energy

5. Mechanics of the System of Particles and Rigid Body

6. Gravitational and Gravity Field

7. Mechanical Oscillations

8. Mechanical Waves

9. Acoustics 10. Hydromechanics

11. Kinetic Theory of Matter

12. Thermodynamics 13. Optics

Sustainable Construction of Buildings (Code: AN_UVB) | Number of credits: 5

Course objectives

The aim of the course is to introduce students with sustainable construction. Fundamental principles and objectives of sustainable development are formulated in the document Agenda 21. The course deals mainly with environmental and energy aspects of building and possibilities or recycled materials in building construction. The aim of the exercise is to obtain basic knowledge and an overview of the complex evaluation of the quality of building in terms of criteria of sustainable construction.

Students will be able to

- identify and summarize important features of sustainable development
- explain basic principles of green building design
- Compare rating systems for sustainable buildings
- Design an energy- efficient building (passive house).

Topics

1. Principles of sustainable development, Agenda 21, the context and scope

2. Systems of environmental assessment of buildings in the Czech Republic and abroad

3. Principle of multi-criteria evaluation of building by national method SBToolCZ (methodology, environmental criteria).

4. Principle of multi-criteria evaluation of building by national method SBToolCZ (socio-cultural criteria, economy and management)

5. Urban concept of sustainable construction, factors of site selection

6. Green concept of sustainable human settlements planning

7. Sustainable design of buildings