

# University of Bielsko-Biala

## Civil Engineering Summer School 2018

The outstanding and amazing **Summer School Civil Engineering 2018** in University of Bielsko-Biala is entirely carried out in English and is cut out for those who are keen on in various aspects of civil engineering with the laboratory and computer analyses and design engineering solutions on the the following courses. Staying in our charming city in the South of Poland with its modern engineering solutions and marvellous architecture would be of a great value and contribution to this course.

### Summer School Civil Engineering 2018 in University of Bielsko-Biala

#### Application Information

#### Important Dates

Application system opens: **February 04, 2018**

Application system closes: **April 10, 2018**

Acceptance notification to participants: **April 20, 2018**

Czerwiec						
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#### Module No 1

18 June 2018 - 29 June 2018

Course no 7. Summer School of Concrete Structures

Course no 8. Summer School of Roads and Motorways

Course no 10. Summer School of Geosynthetics

#### Module No 2

02 July 2018 - 20 July 2018

Course no 1. Summer School of Soil Mechanics

Course no 4. Summer School in Environmental Chemistry

#### Module No 3

23 July 2018 - 10 August 2018

Course no 2. Summer School of Building Construction

#### Course no

- 13a. Summer School of Nanotechnology in Environmental Engineering
- 13b. Summer School of Structural Health Monitoring of Building Constructions
- 13c. Summer School of "Water around us"

#### Module No 4

13 August 2018 - 31 August 2018

Course no 6. Summer School of AutoCAD in Civil Engineering

Course no 5. Summer School of European Union construction law

Course no 11. Summer School of Water and Wastewater Technology

#### Module No 5

03 September 2018 - 15 September 2018

Course no 3. Summer School of Building Construction - Bridges

Course no 9. Summer School of Green Infrastructure

Course no 12. Summer School - Workshop on Design Thinking

#### Who can attend?

The Summer School is a highly selective civil engineering program with civil engineering aspect.

#### How to apply?

Dear applicant: Please go to the registration page...

#### Selection Procedure

Successful candidates will be announced on the website & communicated through email by April 20, 2018

CESS 2018			
Date	Module	Course no	
18.06.2018. 08:00 - 09:00			
Registration on: <b>COURSE no 7 or COURSE no 8 or COURSE no 10</b>			
18.06.2018.	30.06.2018.	M_01	7 8 10
Course no 7 - SS of Concrete Structures			
Course no 8 - SS of Roads and Motorways			
Course no 10 - SS of Geosynthetics			
30.06.2018. Official and ceremonial end of selected course with Module M_01 (7 or 8 or 10 in CESS 2018)			
02.07.2018. 08:00 - 09:00			
Registration on: <b>COURSE no 1 or COURSE no 4</b>			
02.07.2018.	21.07.2018.	M_02	1 4
Course no 1 - SS of Soil Mechanics			
Course no 4 - SS in Environmental Chemistry			
21.07.2018. Official and ceremonial end of selected course with Module M_02 (1 or 4 in CESS 2018)			
23.07.2018. 08:00 - 09:00			
Registration on: <b>COURSE no 2 or COURSE no 13</b>			
23.07.2018.	11.08.2018.	M_03	2 13a 13b 13c
Course no 2 - SS of Building Construction			
Course no 13a - SS of Nanotechnology in Environmental Engineering			
Course no 13b - SS of Structural Health Monitoring of Building Constructions			
Course no 13c - SS of "Water around us"			
11.08.2018. Official and ceremonial end of selected course with Module M_03 (2 or 13 in CESS 2018)			
13.08.2018. 08:00 - 09:00			
Registration on: <b>COURSE no 5 or COURSE no 6 or COURSE no 11</b>			
13.08.2018.	01.09.2018.	M_04	5 6 11
Course no 5 - SS of European Union construction law			
Course no 6 - SS of AutoCAD in Civil Engineering			
Course no 11 - SS of Water and Wastewater Technology			
01.09.2018. Official and ceremonial end of selected course with Module M_04 (5 or 6 or 11 in CESS 2018)			
03.09.2018. 08:00 - 09:00			
Registration on: <b>COURSE no 3 or COURSE no 9 or COURSE nr 12</b>			
03.09.2018.	15.09.2018.	M_05	3 9 12
Course no 3 - SS of Building Construction - Bridges			
Course no 9 - SS of Green Infrastructure			
Course no 12 - SS Workshop on Design Thinking			
15.09.2018. Official and ceremonial end of selected course with Module M_04 (3 or 9 or 12 in CESS 2018)			

## **Course no 1.**

### **Summer School of Soil Mechanics**

when 02 July 2018 - 20 July 2018

language English

duration 3 weeks

fee 750 EURO

30 hours of lectures and exercises plus 30 hours of visits in the companies (KELLER POLSKA, SOLEY or GEOBRUGG POLSKA) and b-learning

**more about this course ...**

## **Course no 2.**

### **Summer School of Building Construction**

when 23 July 2018 – 10 August 2018

language English

duration 3 weeks

fee 563 EURO

30 hours of lectures plus 15 hours of visits in the companies plus b-learning

**more about this course ...**

## **Course no 3.**

### **Summer School of Building Construction - Bridges**

when 03 September 2018 – 15 September 2018

language English

duration 2 weeks

fee 288 EURO

15 hours of lectures plus one day trip to selected European company (~8 hours of total trip time from and to Bielsko-Biała) dealing with bridge construction or bridge components design and production.

**more about this course ...**

## **Course no 4.**

### **Summer School in Environmental Chemistry**

when 02 July 2018 - 20 July 2018

language English

duration 3 weeks

fee 475 EURO

15 hours of lectures plus 15 hours of a laboratory plus one-day (visit in a technology park (Euro-Centrum Park Przemyslowy) in Katowice to get known studies on novel energy-solving technologies.

**more about this course ...**

## **Course no 5.**

### **Summer School of European Union construction law**

when 13 August 2018 - 31 August 2018

language English

duration 3 weeks

fee 563 EURO

30 hours of lectures plus 15 hours of visits in companies

***more about this course ...***

## **Course no 6.**

### **Summer School of AutoCAD in Civil Engineering**

when 13 August 2018 - 31 August 2018

language English

duration 3 weeks

fee 563 EURO

30 hours of lectures plus visits in companies 15 hours

***more about this course ...***

## **Course no 7.**

### **Summer School of Concrete Structures**

when 18 June 2018 - 29 June 2018

language English

duration 2 weeks

fee 563 EURO

30 hours of lectures plus 15 hours of visits plus b-learning

***more about this course ...***

## **Course no 8.**

### **Summer School of Roads and Motorways**

when 18 June 2018 - 29 June 2018

language English

duration 2 weeks

fee 563 EURO

20 hours of lectures and 10 hours of projects plus 15 hours of visits plus b-learning

***more about this course ...***

**Course no 9.**  
**Summer School of Green Infrastructure**

when 03 September 2018 – 15 September 2018  
language English  
duration 2 weeks  
fee 375 EURO  
15 hours of lectures plus 15 hours of field course  
**more about this course ...**

**Course no 10.**  
**Summer School of Geosynthetics**

when 18 June 2018 - 29 June 2018  
language English  
duration 2 weeks  
fee 563 EURO  
30 hours of lectures plus 15 hours of visits in the European companies dealing with geosynthetics  
**more about this course ...**

**Course no 11.**  
**Summer School of Water and Wastewater Technology**

when 13 August 2018 - 31 August 2018  
language English  
duration 3 weeks  
fee 375 EURO  
10 hours of lectures, 10 hours of laboratories and 10 hours of project;  
**more about this course ...**

**Course no 12.**  
**Summer School - Workshop on Design Thinking**

when 03 September 2018 - 15 September 2018  
language English  
duration 2 weeks  
fee 188 EURO  
15 hours of lectures;  
**more about this course ...**

**Course no 13a.**  
**Summer School of Nanotechnology in Environmental Engineering**

when 23 July 2018 - 28 July 2018

language English

duration 1 weeks

fee 188 EURO

15 hours

***more about this course ...***

**Course no 13b.**  
**Summer School of Structural Health Monitoring of Building Constructions**

when 30 July 2018 - 04 August 2018

language English

duration 1 weeks

fee 188 EURO

15 hours

***more about this course ...***

**Course no 13c.**  
**Summer School of “Water around us”**

when 06 August 2018 - 11 August 2018

language English

duration 1 weeks

fee 188 EURO

15 hours

***more about this course ...***

## Course no 1.

### Summer School of Soil Mechanics

A university lecturer: **Professor Giang Nguyen,**  
**PhD Eng. Monika Gwozdz –Lason**

Duration: 30 hours of lectures and exercises plus 30 hours of visits in the European companies dealing with geotechnical and engineering aspects - KELLER POLSKA ([www.keller.com.pl](http://www.keller.com.pl)), SOLEY ([www.soley.com.pl](http://www.soley.com.pl)) or GEOBRUGG POLSKA (current investments) . The course lectures aims and objectives:

To acquaint students with the basic properties of soils and methods for their determination; with classification of soils; with application of filtration, strength and deformation characteristics of soils to solve geotechnical practice tasks connected with the bearing capacity of foundation soils, slope stability, earth pressure, compressibility and consolidation of foundation soil, settlement of foundations and also with soils compaction and its control.

Course lectures indicative content:

- 1) Soils formation, soil model, plasticity of fine-grained soils and density of coarse-grained soils. Grain size analysis, soil classification.
- 2) Water in the soil, soils permeability. Methods for determination of soils permeability. Force effects of groundwater to soil skeleton.
- 3) Geostatic stress and stress from external loadings in soils. Total and effective stress in soil.
- 4) Deformation characteristics of soils. Primary and secondary consolidation. Settlement of foundation and their assessment.
- 5) Mohr-Coulomb failure criterion, shear strength of soils. Methods of soils shear strength determination.
- 6) Subsoil bearing capacity.
- 7) Slope stability in various kinds of soils. Methods to ensure stability of slopes.
- 8) Earth pressures, application of theory of earth pressures in designing retaining structures.
- 9) Soil compaction and methods of compaction control.
- 10) Some cases of structures damage occurred by geotechnical.
- 11) Designing spread foundation on inhomogeneous subsoil by various approaches.
- 12) Sensibility of soils shear strength parameters on the size of spread foundation.
- 13) Differences in designing spread foundation.
- 14) Differences in determination of bored pile compressive resistance.
- 15) Analysis of chosen factors influencing stability of slide.

Course laboratory exercises aims and objectives:

- a. Classification of soil and type of the soil according European standards
- b. Methods of soil macroscopic diagnosis
- c. Determination of physical characteristics of soil (density, humidity, porosity, ....)
- d. Granulometric analysis
- e. Cohesive soil, Attembers boundaries, the degree of plasticity
- f. Cohesion soil, the degree of compaction, optimal moisture
- g. Soil mechanical properties.
- h. Shear strength and compressibility of the soil
- i. The water in the soil and filtration
- j. Model of soil - linear- elastic half-space Boussinesq problem
- k. Model of soils three-phase - the main hypothesis in the theory of plasticity
- l. Plane strain and 3D stress models of soil

Student gives the name of building soil with varying composition of the fractions, defines the physical characteristics of the soil and knows the granulometric analysis apparatus. Student is able to give the name of building soils on the basis of macroscopic diagnosis, student can define the physical

characteristics of the soil, perform grain size analysis (sieve and hydrometer analysis) in the laboratory. Student gives the limits of cohesive soils, the degree of plasticity and determines the degree of compaction for cohesionless soil. Student is able to define in laboratories the Atterberg boundaries and can define the optimum density of the soil in the Proctor cylinders. Student gives the constitutive model of soil shear and compression. Student in the laboratory is able to calculate cohesion and angle of internal friction in the direct shear test or in the triaxial compression test and compression modulus in oedometer. Student gives the hypothesis of soil strength as a three-phase material. Student obtains knowledge of the strength of materials, can explain the mechanisms of destruction of soil as the three-phase material. Student is able to work as a team and is able to explain practical examples of the implementation of the foundation or ground reinforcement. PN EN ISO 14688; 2004 { $w$ ,  $C_u$ ,  $c'$ ,  $I_D$ ,  $I_c$ ,  $k$ ,  $F_i$ ,  $F_i'$ ,  $M$ ,  $M_o$ , ...} – laboratory

After successful completion of this course student will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics.

Student will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday.

It is necessary to attend at least 85% of the course lessons to receive credit points.

## Course no 2.

# Summer School of Building Construction

A university lecturer: **Ph.D. Eng. Waław Brachaczek**

Duration: 30 hours of lectures plus 15 hours of visits in the European companies dealing with building construction (current investments)

Clarification of terms: building object, building, building structure, small architectural object, construction equipment related to the object, permanent building, temporary building. Definitions of concepts: construction, modernization, repair, and the works associated with them, e.g. building construction works, modernization works, repair works, and installation works.

The applied criteria used for division of construction, including social, economic, ownership, and environmental criteria. The basic characteristics of the investment process in the construction industry. Design in construction, conceptual design, construction design, executive design, post-completion documentation. Fundamentals, including the division of foundations, depth of foundation of buildings and buildings structures. Shallow foundations (benches, plates, feet), and deep foundations, (piles, wells, caissons). External partitions of residential and industrial buildings, and their technical and utility requirements. The exterior walls made of small dimension elements. External walls with skeleton construction. External walls of concrete construction with monolithic and prefabricated division. Types of ceilings in residential and industrial buildings. Beam ceilings, ribs ceilings, and plates ceilings. Structural steel roofs. Roofs and flat roofs. Staircases. Roofs and flat roofs. Staircases. Roofs and flat roofs. Plastering, and painting. Fire resistance, water resistance, thermal insulation.

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics.

Participants will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday.

It is necessary to attend at least 85% of the course lessons to receive credit points.



## Course no 3.

# Summer School of Building Construction - Bridge

A university lecturer: **Ph.D. Eng. Piotr Owerko**

Duration: 30 hours of lectures plus 15 hours of visits in the European companies dealing with bridge construction or bridge components design and production.

Conditions for creating the course:

Acceptance of a written contract with a detailed scope of responsibility and salary information. Providing the necessary tools to conduct work (rooms, software, funds, etc.).

Insurance and protection of course participants, eg during commuting and participation in visits to selected enterprises.

The trainer does not take any responsibility for the students of the course in any scope.

Clarification of terms:

- types of bridges, bridge materials and types of used static schemes,
- technology of bridge construction (span by span, incremental launching, cantilever concreting, hybrid technology, steel bridges building technology),
- bridge elements (span, abutments, pillars, piles),
- bridge loads,
- idea of prestressed and post tensioned bridges,
- design process of bridges (load capacity, serviceability, reliability, FEA modelling of bridges),
- Bridge Information Modelling (BrIM).

After completing the course student will have basic knowledge on bridge contraction types and materials used in bridge engineering. During the course a description of most commonly used building technologies in bridge construction will be introduced. Typical and novel solutions of bridge components will also be described. Part of lectures will focus on reviewing of bridge design process, types of loads, limits states, design situations and issues connected with reliability, serviceability, sustainability of bridges. Important examples and strategies regarding Finite Element Method Analysis of bridge structures will be shown and explained. Finally very important topic of Bridge Information Modelling and its current state of implementation will be discussed.

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics.

Participants will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday. It is necessary to attend at least 85% of the course lessons to receive credit points.

## Course no 4.

# Summer School in Environmental Chemistry

A university lecturer: **Ph.D. Mirosław Wyszomirski**

Duration: 15 hours of lectures plus 15 hours of a laboratory plus one-day visit in a technology park (Euro-Centrum Park Przemysłowy) in Katowice to get known studies on novel energy-solving technologies.

The aims of the course:

You will study selected topics on the chemistry of the air, water, and soil, as well as the effects of anthropogenic activities on their chemistry. You will also learn about sustainability, organic pollutants and biofuels.

The content of the course, main topics and key ideas:

- an introduction to the lithosphere and its erosion and pollution;
- the chemistry of the atmosphere and its pollution;
- the properties of natural waters and their pollution;
- organic chemicals and their environmental effects;
- biofuels – production, environmental impact.
- renewable energy sources.

The effects of education:

- knowledge: has ability to understand chemical transformations and mass transfer occurring in the environment,
- skills: knows the methods and their extent to measure important environmental parameters,
- social competences: can work and cooperate in a group during experimental activities.

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics. Participants will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday. It is necessary to attend at least 85% of the course lessons to receive credit points.

## Course no 5.

# Summer School of European Union Construction Law

A university lecturer: **Ph.D. Eng. Andrzej Harat**

Duration: 30 hours of lectures plus 15 hours of visits in the European companies

Contents of the teaching programme:

1. History of the European Union
2. Enlargement of the European Union
3. Treaty on European Union, Treaty on the Functioning of the European Union
4. EU's institutions: European Council, European Commission, European Parliament, European Central Bank, European Court of Justice
5. European Union legislative procedure
6. Legal Acts of the European Union: regulations, directives, decisions, recommendations and opinions
7. Primacy of European Union law
8. European Single Market
9. Construction Products Directive (Council Directive 89/106/EEC)
10. Regulation (EU) No. 305/2011 - Construction Products Regulation (CPR)
11. Environmental Impact Assessment
12. EU Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
13. Environmental product declarations for construction products, application of ISO 14000 family of standards
14. Health and Environmental Criteria in Technical Specifications for Construction Products
15. New Concepts for European Construction Product Standards
16. European Climate Change Programme
17. Renewable Energy Directive (2009/28/EC)
18. Directive on the energy performance of buildings (2010/31/EU)
19. Directive 89/391/EEC - on the introduction of measures to encourage improvements in the safety and health of workers at work - "Framework Directive"
20. Directive 92/57/EEC on the implementation of minimum safety and health requirements at temporary or mobile construction sites

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics. Participants will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday.

It is necessary to attend at least 85% of the course lessons to receive credit points.

## Course no 6.

# Summer School of AutoCAD in Civil Engineering

A university lecturer: **Ph.D. Eng. Kondrad Sikora**  
**MSc. Eng. Hubert Walusiak**

Duration: 30 hours of lectures plus 15 hours of visits in the companies

The purpose of the course is to prepare students to use Autodesk's AutoCAD. During the lectures, techniques of designating basic elements on surface will be presented. Other basic functions of AutoCAD will be presented as well: saving the picture to the pdf, printing options, exporting the picture to other formats, etc. The course familiarises students with the issues of Engineering Graphics orientated towards designing objects on surface. Knowledge of basic AutoCAD functions increases one's ability of computer-assisted design.

### **List of topics on realized exercises with AutoCAD program**

<b>No.</b>	<b>Subject</b>
1.	Getting to know the Autocad program. Introduction to the basic principles of program operation, main menu, cards and panels. Coordinates of points, viewing the drawing.
2.	Creating a drawing, drawing episodes, configuration scale, operating units, using zoom options, creating and editing drawing layers, creating a template - practical exercises.
3.	Tools used to draw basic objects such as: segment, rectangle, arc, ellipse, polygon, orthogonal sections ... [creating 2D objects].
4.	Precision drawing - using characteristic points, auxiliary and editing commands - practical exercises.
5.	Tracking characteristic points jump and grid - practical exercises.
6.	Modification of objects - methods of selecting and selecting objects. Tools for selecting and modifying objects - practical exercises.
7.	Removing objects from the drawing, moving and copying, extending objects, cutting off pieces of elements, rounding and cutting of corners, copying - practical exercises.
8.	Scaling objects, rotating and mirroring - practical exercises.
9.	Practical application of modification tools - practical exercises.
10.	Configuration of line width, scale, change of line type - practical exercises.
11.	Circular pattern, rectangular pattern - practical exercises.
12.	Handles of objects drawing information - exercises.
13.	Hatching the selected drawing area - exercises.
14.	Property manager change selected objects - practical exercises.
15.	Inscriptions and modification of subtitles - practical exercises.
16.	Dimensioning, creating styles and families of dimensioning, combined dimensioning - practical exercises.
17.	Practical application of dimensioning - exercises.
18.	Creating blocks and inserting blocks, editing blocks, breaking blocks - practical exercises.
19.	Print - the print style page setup manager, preparation of the drawing for printing, configuration print on the model and paper area - practical exercises.

## Course no 7.

# Summer School of Concrete Structures

A university lecturer: **MSc. Eng. Aneta Žmij**

Duration: 30 hours of lectures plus 15 hours of visits in the European companies dealing with bridge construction.

Duration: The subjects – matter of lectures

1. Introduction to the RC structures design
2. One-way slabs; 3. Beams
4. Beam and slab floors
5. Two-way slabs
6. Flat slabs
7. Beam and slab floors
8. Columns and cantilevers
9. RC stairs
10. Wall beams
11. Foundations
12. Retaining walls
13. 2D frames.

The subject "Concrete structures" includes information on the concept and characteristics of reinforced concrete structures, design and execution of simple reinforced concrete structures, as well as proper assessment of load bearing capacity and serviceability of elements and structures.

The objective of concerned lectures is to familiarise participants of the course with the designing process of reinforced – concrete (RC) structures on the basis of some often applied and relatively simple structural elements.

Within the project classes, the task involving the design of reinforced concrete monolithic beam - and - slab floor, located inside the industrial hall, will be carried out. The scope of the project will include preliminary calculations and drawings for preliminary design, as well as static calculations and dimensioning of chosen structural elements.

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics. Participants will earn 3 and 3 credit points (ECTS).

The course takes place all day from Monday until Friday. It is necessary to attend at least 85% of the course lessons to receive credit points

## Course no 8.

# Summer School of Roads and Motorways

A university lecturer: **Anna Žak, PhD Eng.**

Duration: 20 hours of lectures and 10 hours of projects plus 15 hours of visits to companies involved in road building.

1. Road location, ownership, categories and technical classification
2. Geometry of roads (horizontal and vertical alignment, cross sections)
3. Drainage
4. Pavement
5. Intersections
6. Motorways and interchanges
7. Streets, pedestrians, cyclists
8. Traffic engineering and road safety

Students know terrain and road classification and adequately select technical parameters for geometric design. Students are able to describe the design standards and procedures for establishing horizontal and vertical alignments and cross sections. Students get to know the characteristics of drivers, pedestrians and cyclists which are of interest to the designer. Students can define the basic types of drainage for rural roads and city streets. Students acquire knowledge of culverts as well. Students name intersections and interchanges that provide for changes in travel directions. Students describe types of road pavements and their construction (layers). Students are able to consider the suitable type of pavement construction for different transportation areas (carriageway, sidewalk, cycle path, parking spaces) based on principal factors. Students recognize threats and know ways to prevent traffic accidents which made the road traffic more safe (traffic control devices, information). After successful completion of this course, you will receive a certificate of participation. It will show the course title, date and duration of the course, number of contact hours as well as the main content and topics.

Participants will be awarded with 4 credit points (ECTS).

It is necessary to attend at least 85% of the course classes in order to receive credit points.

## Course no 9.

# Summer School of Green Infrastructure

A university lecturer: **Associated Professor Damian Chmura Ph.D.**

Duration: 15 hours of lectures plus 15 hours of field course (visits at protected sites, parks on the territory of Bielsko-Biała).

9. Summer School of Concrete Structures

A university lecturer: Associated Professor Damian Chmura Ph.D.

Duration: 15 hours of lectures plus 15 hours of field course (visits at protected sites, parks on the territory of Bielsko-Biała).

The concept of green infrastructure (history of the concept of green infrastructure, different views of green infrastructure: network, integrated, hydrological, way of development)

Ecology of the city (the city as an ecosystem, anthropocenosis, urban heat island, human-made changes in ecosystems, threat to biodiversity in urban conditions, degeneration of the abiotic environment in cities.

Types of urban greenery (areas designed and natural), examples.

Ecosystem services of green areas in cities (introduction to ecosystem services, types of ecosystem services, the role and importance of trees in the city, an attempt to value the ecosystem services of trees in the city.

Elements of green infrastructure and other forms of nature protection (object protection: natural monuments, ecological lands, area protection: nature reserves, nature and landscape complexes, protected landscape area and others).

Legislation and financing of the European Union (structural and cohesion funds, common agricultural policy, LIFE program and green infrastructure).

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics. Participants will earn 3 and 3 credit points (ECTS). The course takes place all day from Monday until Friday. It is necessary to attend at least 85% of the course lessons to receive credit points.

## Course no 10.

### Summer School of Geosynthetics

A university lecturer: **PhD Eng. Remigiusz Duszyński**

Duration: 30 hours of lectures plus 15 hours of visits in the European companies dealing with geosynthetics:

1. Raw materials for geosynthetics – kinds of polymers and main properties
2. Classification and detailed description of geosynthetics.
3. Production technologies
4. European standards for geosynthetics
5. Applications and functions of geosynthetics in civil, environmental and hydro engineering
6. Construction works with geosynthetics – retain walls, embankments on soft soil, waste landfills
7. The quality control and monitoring of soil structures with geosynthetics
8. Principles of design for reinforced soil with geosynthetics according to Ebgeo 2010 and BS 8006
9. Laboratory tests of geotextiles and related products– physical, hydraulic and strength characteristic
10. Durability of geotextiles and related products – resistance to chemical and microbiological influences, weathering and damage during installation
11. Selection and dimensioning of geotextiles for separation, filtration and drainage layers
12. Geosynthetic barriers: types, applications, tests, durability and design

After successful completion of this course you will receive a certificate of participation. It will show the course title, the date and duration of the course, the number of contact hours as well as the main contents and topics.

Participants will earn 3 and 3 credit points (ECTS). It is necessary to attend at least 85% of the course lessons to receive credit points. The course takes place all day from Monday until Friday.



# Course no 11.

## Summer School of Water and Wastewater Technology

A university lecturer: **Prof. ATH Bozena Mrowiec** (lectures); **Lucyna Przywara, PhD** (laboratories); **Prof. ATH Bozena Mrowiec** (project);

Duration: 30 hours 10 hours of lectures, 10 hours of laboratories and 10 hours of projects;

<p>The content of the course: main topics and key ideas</p>	<p><b>Lectures:</b> Quality characteristics of surface and ground waters Basic indicators of water quality – national and EU requirements. Wastewater treatment basic processes Coagulation of water and wastewater, processes. Suspended solids sedimentation and settling tanks characterization. Filtration processes and filter types. Water and wastewater disinfection.</p> <p><b>Laboratories:</b> Introductory classes: health and safety rules, regulations in chemistry laboratory, first aid instructions, the scope and schedule of the course - 2h.</p> <p>1. Coagulation of water (part 1) - determination of optimum dosage of the coagulant and the flocculation time. After familiarizing with the water coagulation process, students determine practically the most appropriate dosage of coagulant (FeCl<sub>3</sub>) and the flocculation time for established (assumed) - optimum pH of the reaction. Analysis of the results achieved - 4h.</p> <p>2. Coagulation of water (part 2) - determination of the most appropriate pH value ensuring the effective coagulation process. Determination of the optimum pH value of the coagulation (specifically flocculation) based on physical and chemical analysis carried out for the raw and treated water with a given dose of ferric chloride - 4h.</p> <p>3. Water Softening by means of phosphate method. The hardness of water and the disposal methods. Determination of reagent (sodium phosphate); the effect of temperature on the effectiveness of the process – based on physical and chemical analysis of the raw and treated water - 4h.</p> <p><b>Project:</b> Determination of coagulants dosages and supporting substances based on water quality parameters. Removal of corrosive properties and chemical water stabilization. Project of horizontal and vertical flow clarifiers.</p>
<p>Didactics methods</p>	<p>Lecture: presentation Project: calculations, team work Laboratories: performing experiments</p>
<p>Course requirements</p>	<p>Lecture: Exam Project: attendance, final report (based on calculations) Laboratories: attendance, written reports based on knowledge (connected with particular experiments) and performed experiments</p>

The title of the course - CE Summer School of Water and Wastewater Technology

The number of ECTS 6

The aims of the course - Students become familiar with the commonly applied processes (mechanical – physical treatment and chemical treatment) used for water and municipal wastewater treatment. Students perform laboratory tests to characterize the quality of water and wastewater as well as evaluate the effectiveness of selected technologies on the basis of studies carried out on model stands.

## Course no 12.

# Summer School - Workshop on Design Thinking

A university lecturer: **Monika Rom, PhD**

Duration: 15 hours

Workshop on Design Thinking is a way to built a creative approach to problem solving. You will learn that creativity and innovation are the key drivers of success of leading companies. You will get numerous examples of companies which changed through design thinking. In order to facilitate your creative thinking, we will introduce you to the mental models and processes of creative thinking. Finally you will prototype your ideas and learn how to present your concept according to the rules of elevator pitch.

## Course no 13a.

# Summer School of Nanotechnology in Environmental Engineering

A university lecturer: **Anna Rabajczyk, Assoc. Prof.**

Duration: 15 hours - Lectures 5 hrs; Seminars Classes 10 hrs;

The aims of the course	The course provides in-depth knowledge of nanotechnology used in water and wastewater treatment processes, soils and remediation processes as well as threats resulting from the growing number of nanocompounds in the environment. The course gives insight into basic nanotechnologies using in environmental engineering, including the nanobiotechnology.
The content of the course: main topics and key ideas	<ol style="list-style-type: none"> <li>1. Nanomaterials in the environment - benefits and risks.</li> <li>2. Nanotechnology in building construction .</li> <li>3. Nanotechnology in air protection.</li> <li>4. Application of nanomaterials in the protection of waters and soils.</li> <li>5. Nanobiotechnology.</li> </ol>
Didactic methods	Lecture: presentation, seminar: discussion, problem tasks, work with text, case study; group work, individual work student's presentation
Course requirements	Attendance, project work, final exam
Literature (basic and supplementary)	<p>Sung Hee Joo, Applying Nanotechnology for Environmental Sustainability, Advances in Environmental Engineering and Green Technologies. IGI Global, 2016.</p> <p>Mark R. Wiesner, Jean-Yves Bottero, Environmental Nanotechnology: Applications and Impacts of Nanomaterials, McGraw-Hill Education, 2017.</p> <p>Selected Articles in Journal: Nanotechnology for Environmental Engineering</p>
The effects of education - Knowledge - Skills - Social competences	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> <li>- can describe and characterize the connections between nanotechnology and environment</li> <li>- can describe basic technological processes based on nanotechnology in environmental engineering</li> </ul> <p><i>Skills:</i></p> <ul style="list-style-type: none"> <li>- can explain the equipment design and process conditions of different environmental engineering</li> <li>- can assess the techniques and research tools of nanotechnology appropriately to the environmental problem</li> </ul> <p><i>Social competences:</i></p> <ul style="list-style-type: none"> <li>- understand the importance of nanotechnology in environmental engineering</li> <li>- can work with cross-cutting problems related to nanotechnology in environmental engineering as a team member</li> </ul>

**Course no 13b.**  
**Summer School of Structural Health Monitoring of**  
**Building Constructions**

A university lecturer: **Associated Professor Janusz Juraszek, Ph.D.**  
**MSc. Eng. Paulina Cygan**

Duration: 15 hours

1. Invisible areas of the stress concentration zones - MPM method.
2. Measurements of the strains with an invisible light - FBG method.
3. Permanent magnets and their application in the NDT rope test techniques - LRM method.
4. Three Musketeers in the fight against displacements - ARAMIS system.

## Course no 13c.

### Summer School of “Water around us”

A university lecturer: **MSc. Eng. Ewa Suchanek-Gabzdy**

Duration: 15 hours

Classes consist in discussing meaning of rain water in the city and developing water on the area of College. Students will be shown around the area of the College and there will be discussed possibilities of developing and using rain water.

1. Discussing meaning of water in the city
2. Developing water in the city
3. Walk in the area of the College along with ideas for developing water on the area of the College
4. Creating the plan of the area of the College and showing suggested solutions of developing water

# COMPANY VISITS

## **KELLER POLSKA** ([www.keller.com.pl](http://www.keller.com.pl))

This is leading international concern in the geotechnical field, listed on the London Stock Exchange. Keller has started its history since 1860 and currently operates in Europe, the USA, South America, Africa, Asia and Australia - in more than 40 countries worldwide. There are professional geotechnical services with the lowest possible risk for Clients, Employees and Nature. Keller Polska, as a company conducting a wide range of construction activities, and has no impact on the environment. The efforts of Company's staff in the area of nature conservation are an inspiration to create an environmental program and to set the basic goals in this area.

## **SOLEY** ([www.soley.com.pl](http://www.soley.com.pl))

Company has specialization in construction work, initially the work was narrower than the current and covered the full range of underwater works and injection sealing works that we used most often in hydro technical works. Company's commitment to continuous improvement of knowledge, efficiency and quality of services.

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## **GEOBRUGG POLSKA** ([www.geobrugg.com](http://www.geobrugg.com))

Company globally develops and manufactures protection systems made of high-tensile steel wire. These safety systems are used for reliable protection against natural hazards such as rockfall, debris flow, landslides, avalanches, or as a safety measure in building and mining tunnels, in fish farms, motorsports, architecture, and proving grounds. Company's high-tensile steel wire nets and meshes are characterized by their strength, high energy absorption capacity and supreme durability. More than 65 years of experience and close collaboration with research institutes and universities make us the leading expert for safety solutions.

## **INORA** ([www.inora.pl](http://www.inora.pl))

An independent Polish expert and engineering company established 1991. They are the partner of HUESKER Synthetic GmbH, the very well-known European geosynthetics company. They design, advise and consult in the field of geotechnics, with particular emphasis on modern technologies in difficult and complicated ground conditions - mainly in road, rail and hydro engineering construction.

## **TECHNICAL UNIVERSITY of OSTRAVA** ([WWW.VS.CZ](http://www.vs.cz))

Technical University Ostrava was founded in 1849 and has since grown into a modern institution of higher learning, offering the highest levels of education in technical and economic fields, based on the interconnection of science, research, education, and the creative activity that binds and enhances them. In 2006, the construction of a new conference building at VSB - Technical University of Ostrava was finished. The building has installed a unique system of heating and cooling. The system is based on application of heat pump. The installed heat pump system is the biggest in Czech Republic. The system contains 6 heat pumps with overall power 700kW. The heat pumps use 110 boreholes in

surrounding of the building. The depth of boreholes is 140m. The system is used for heating during winter period and for cooling during summer period. The investment process was financially supported by EU funds. Described system can be considered as an excellent example of the practical implementation of EU directives (e.g. Renewable Energy Directive).

## **Intercor SP z o.o.**

### **Aapect / IMP**

**EVATRONIX** Evatronix S.A. was established in Bielsko-Biala in 1991. Since then, it has been concentrating on supplying computer-assisted design and manufacturing systems in mechanics and electronics, as well as in similar services and technical assistance. Evatronix S.A. offers the newest IT solutions for CAD/CAM and automation of the electronic design systems EDA. The company is the main Polish distributor of the programs that set the world-wide standards – Altium Designer for designing electronic circuits or HyperMill for controlling machine-tools. The company offers as well Autodesk's CAD programs.

**University of Bielsko-Biala** We offer a tour around the laboratories of the Institute of Civil Engineering to show the projects and miniature models created by the students of the Faculty of Materials, Civil and Environmental Engineering. The main assumption is to show the works of the Civil Engineering students. Selected design company, investment or institution using CAD for its purposes (further information to be announced).

**Euro-Centrum in Katowice** a technology park in Katowice to get known studies on novel energy-solving technologies.

# Summer School Professors



**Associated Professor Janusz Juraszek, Ph.D.** is Dean of the Faculty of Civil Engineering, Head of the Institute of Civil Engineering of the University of Bielsko-Biała. He deals with issues concerning operational safety in technology, including civil engineering and machine construction. He has proposed a system based on fiber bragg grating (FGB) sensors and optical fibres using the optical time domain (OTDR) technology intended for monitoring the safety of structures used in civil engineering, machine construction and power, thermal, environmental engineering. The system is based on the residual magnetic field sensors and allows an analysis of operational safety of ferromagnetic civil engineering structures, which is very important before first micro cracks arise. In 2014 he received the prestigious Horace Pubs award in the USA for the best publication on wire ropes (FEM analysis). He also deals with smart materials with optical fibres using the FBG and the OTDR technology.



**Associated Professor Giang Nguyen, Ph.D.** at the Faculty of Materials, Civil and Environmental Engineering, University of Bielsko-Biała, Poland and at the Faculty of Civil Engineering, University of Žilina, Slovakia. He has 20 years teaching experience of various Geotechnical courses, including teaching courses Soil Mechanics and Foundation Engineering for Erasmus students. He has supervised tens of Bachelor and Master diploma works. His research focuses on soil laboratory testing, harmonization of geotechnical design in Europe and using geosynthetics in Civil Engineering. He has published more than 60 publications including text books, journals and conferences papers. He has presented research results at tens of conferences in Slovakia, Poland, Czech Republic, Russia and Vietnam. He has completed research stays in Poland and Vietnam. He was involved in various national and international educational and research projects in Slovakia, Czech Republic and Poland.



**Monika Gwóźdź -Lasoń, Ph.D. Eng. REV**  
She is scientifically and teaching employee in Institute of Civil Engineering of University of Bielsko-Biała from 2016 and in Institute of Geotechnic of Cracow University of Technology from 2001. She has 18 years teaching experience of various Geotechnical Engineering, Soil Mechanics, Geotechnical Documentation, Foundation, Real Estate Evaluation, General Building Construction, Technology of Concrete, Technology of Construction Works according to the current regulations and the competent EC norms and standards in Poland and in European Union. The author or co-author of more than 45 scientific articles, monographs or chapters in co-author books. She is assistant and lecturer since 2001; Valuer Experts no 3541 in Poland since 2001; The Expert Witness since 2004 in the field of estimation of real estate property valuation, construction and mining damage; Doctor of Technical Sciences since 2007 in CUofT; European Recognised Valuer Cert. 107 since 2008; University Assistant Professor since 2009; Headmaster of Postgraduate Studies (2009-2012) „Geotechnical engineering in the construction industry and environmental engineering” at CUofT; Associate Dean at CUofT (2012-2016);





### **Waclaw Brachaczek, Ph.D. Eng.**

He is a lecturer at the Institute of Building at University of Bielsko-Biala. He is a science employee at Faculty of Materials, Civil and Environmental Engineering. He received a Ph.D. in Civil Engineering from the Faculty of Civil Engineering, Architecture and Environmental Engineering from Lodz University of Technology. He is the supervisor of the "Budonierzy" scientific circle. The head of numerous research projects on innovative building materials technology. The author of many conservation and renovation projects of historic buildings. He conducts the lectures as well as laboratory exercises on building materials, concrete technology, and building installations. The author and co-author of more than 50 scientific articles and monographs concerning building chemicals, in particular: construction coatings, building mortars, mortars for special applications. Besides these, he also writes about restoration of historical objects, analysis of causes of moisture and salinity of the walls. He often takes part in international conferences as a speaker.



### **Piotr Owerko, PhD. Eng.**

Certified engineer with full rights to design and manage construction of bridges. Extensive experience in management and design of bridges, regarding especially: incremental launching technology, post-tensioned members and arch bridges. Author and co-author of several prestigious publications and one patent regarding bridge analysis.



### **Aneta Żmij, MSc. Eng.** is a scientific - teaching employee in Institute of Civil Engineering of University of Bielsko - Biala.

Her teaching experience is related with the courses of Structures of Buildings (Concrete Structures), Engineering Calculations, including both theoretical and practical components.

She has graduated Faculty of Civil Engineering of Silesian University of Technology in the specialization of Structural Engineering and diploma profile: Civil and Industrial Structures. The master thesis of the title: "Polymer – Portland cement concrete – properties, opportunity and applications" let her obtain the professional title: "Master of Science" with the final grade: very good with distinction. As the continuation of the specialization of Structural Engineering, currently, she is involved in the research associated with the topic of her PhD thesis entitled: "Numerical study on early age thermal - shrinkage stress in massive foundation slabs". She got also professional experience during her staying in Portugal at Beira Serra Association and Minho University.



### **Andrzej Harat, Ph.D. Eng.**

He is scientific and teaching employee at Institute of Civil Engineering of University of Bielsko-Biala since 2016. He has over 10 years teaching experience of various law and management courses including construction law, organization of building production, spatial planning, environmental law as well as European Union law and management for Erasmus students. He has supervised over twenty Bachelor and Master diploma works. His research activity is focused on the legal system of the European Union and the last mentioned binding force on the member states, applying EU law as national law, as well as practical application of ISO standards. The author or co-author of over 40 publications, including 2 monographs, journals and conferences papers. He has presented research results at tens national and international scientific conferences in Poland and other countries.



### **Kondrat Sikora, Ph.D. Eng.**

I am a graduate of the University of Bielsko-Biała – M. Sc., Eng. of Environmental Engineering, Monitoring and Computer Methods (2005). I have been a trainer and instructor of IT workshops for various companies since 2005, as well as a computer programmer and instructor in DocuSoft sp. z o.o in Bielsko-Biała since 2006. In the years 2007-2016, I was an assistant in the Department of IT Appliance; presently, I am an Assistant Professor in the Institute of Civil Engineering in the Faculty of Materials, Civil and Environmental Engineering. During my work, I was a visiting scholar at the University of Science and Technology in Kraków in 2011 and at VSB Technical University of Ostrava, in the Institute of Geological Engineering in 2014. I have participated as well in Erasmus+.

The course is for the students of the Faculty of Materials, Civil and Environmental Engineering and covers:

- Engineering Graphics with elements of CAD,
- Descriptive Geometry,
- Information Technology,
- Introduction to IT Design.



### **Hubert Walusiak, MSc. Eng.**

Education: Silesian Polytechnics in Gliwice, Faculty of Architecture

Specialization: Architecture and Urbanization, Master of Degree in Architecture

Experience in a variety of projects including one-off houses, residential, industrial, commercial, retail and general master planning, interior design, graphic design.



### **Anna Żak, Ph.D. Eng.**

She is a member of research and teaching staff at the Institute of Civil Engineering at the Faculty of Materials, Civil and Environmental Engineering at the University of Bielsko-Biała. She graduated from the Civil Engineering Faculty at the Silesian University of Technology in Gliwice as M.Sc., specialization in "Roads, Streets and Airports" and was then awarded the Ph.D. degree. She has thirty seven years' teaching experience, comprising 34 years of teaching experience at the Civil Engineering Faculty at the Silesian University of Technology in Gliwice. She has supervised over a hundred Bachelor's and Master's theses, and conducted lectures in the field of Road Engineering, Transportation Engineering for Erasmus students for many years. She has published over 28 publications in journals and presented 52 papers at conferences, has been an author and co-author of many research works as well as 57 expert opinions and designs. She holds a national building licence and is an expert for the SITK in Poland. Her research area is traffic engineering and road safety.



### **Remigiusz Duszyński, Ph.D. Eng.**

assistant professor at the Faculty of Materials, Civil and Environmental Engineering, University of Bielsko-Biala, and at the Faculty of Civil and Environmental Engineering, Gdansk University of Technology. He has 18 years teaching experience in civil, environmental, hydro and maritime engineering. His scientific and engineering activity is connected with the broadly understood construction and geotechnics. His research interests are focused on the application of geosynthetics for reinforced soil, steep slopes as well as the use of environmentally friendly technologies in construction. He is the author or co-author of 3 technical books, more than 30 scientific papers books and over 150 projects and scientific opinions. He was involved in many national and international research projects concerning geotechnics and geosynthetics.



**Monika Rom, PhD** is a vice Dean for Students at the Faculty of Materials, Civil and Environmental Engineering, University of Bielsko-Biala. She is dealing with issues of biodegradation of polymeric materials and she is working on new knowledge-based innovative textile products. Alumnus of the of the Top 500 Innovators Program at the University of California Berkeley (2012), intensive program on focused on business creation and management, creative thinking, commercialization, innovative entrepreneurship and management.

Member of The Association of Top 500 Innovators and the Association of Geotextiles Producers. Mentor and initiator of the TopMinds mentoring and training program.

**Associated Professor Damian Chmura, Ph.D.** at the Faculty of Materials, Civil and Environmental Engineering, University of Bielsko-Biala. He is a botanist, plant ecologist. His research interests are focused on the biology and ecology of invasive alien species, forest ecology, anthropogenic wetlands, population ecology, numerical methods in ecological research and nature conservation. The author and co-author of more than 180 publications including monographs, scientific papers, scientific-popular and conference papers. He realized 9 scientific grants financed by Polish State Committee for Scientific Research and Ministry of Science and Higher Education. The expert of database NOBANIS (European Network on Invasive Alien Species; [www.nobanis.org](http://www.nobanis.org)) and co-author of expertise commissioned by Ministry of Environment, about management on species of alien origin in Polish flora and fauna. He has supervised more than 70 Engineer, Bachelor and Master diploma works. He has presented research results at tens national and international scientific conferences in Poland and other countries. Besides, He wrote more than 70 reviews for international and country scientific journals.



### **Mirosław Wyszomirski, Ph.D. Eng.**

He is a member of teaching and scientific staff at the Institute of Environmental Protection and Engineering at the University of Bielsko-Biala. He has been working in chemistry for over 40 years and for 5 years he has been giving lectures and labs in Erasmus programme. His main scientific areas are organic and environmental chemistry. He supervised over 20 Master degree theses.

### **Prof. ATH Bożena Mrowiec**

(...)

### **Lucyna Przywara, PhD**

(...)

### **Anna Rabajczyk, Assoc. Prof.**

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### **MSc. Eng. Paulina Cygan**

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### **MSc. Eng. Ewa Suchanek-Gabzdy**

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