The Faculty of Civil and Environmental Engineering and Architecture
Wydział Budownictwa, Inżynierii Środowiska i Architektury

The list of subjects available for foreign students
Lista przedmiotów dostępnych dla studentów zagranicznych

General information:

Subjects from winter semesters are only available in winter semesters, subjects from summer semesters are only available in summer semesters.

Participation in part 2 of the subject is possible:
- if the student passed part 1 of the subject,
- has a basic knowledge of a particular module obtained at the home University.

Architecture and Urbanism
Architektura i Urbanistyka

No.	Course name in Polish	Course name in English	Short description	Study cycle	Semester
1.	Rysunek oraz malarstwo. Techniki warsztatowe	Drawing and painting. Craft techniques	Quick drawing efficiency, spatial observation and faithful copying of objects on two-dimensional surface, purposefulness of applying light and shadow, building shapes of varied structure and in different configuration.	Bachelor's degree studies	Winter
2.	Historia urbanistyki	History of town planning 1	Student learn about first settlement forms and early towns to the systems of medieval towns. Course content include urban planning periods from Ancient civilizations such as Mesopotamia, Egypt, Greece and Rome to the Middle Ages in Europe. On continuation of History of urban design classes discus the next stages of urban development. Students learn plans of ideal cities and forms of fortifications from the Renaissance era, garden assumptions and ways of shaping squares in the Baroque and Classicism, and also urban planning of the first industrial cities in Poland.	Bachelor's degree studies	Winter

3.	Historia architektury powszechnej	History of architecture	The history of world architecture classes are focused to teach students about the development of architecture in various historical periods. Students learn how to understand all styles, architecture details, also how to distinguish and recognize them on examples of the most valuable architectural objects in the world.	Bachelor's degree studies	Winter
4.	Projektowanie architektoniczne wstępne	Preliminary architectural design	The aim of the module is to gain theoretical and practical knowledge in the field of basic principles of ergonomics and the function in architectural designing. There are two projects during the semester: 1. Architectural intervention – designing a small architectural form that positively changes the quality of urban space. 2. A project in the field of small architecture, landscape architecture or design that favors human integration. Projects include analyzes, plans, sections, visualizations, axonometry and model.	Bachelor's degree studies	Winter
5.	Budownictwo ogólne i materiałoznawstwo 1⁄2	Building engineering and building materials part 1	Lectures: General information about buildings. Basics of architectural design. Architectural elements of buildings. Solutions foundations of buildings, foundation walls, excavations at the foundation of the building. Wall materials used in buildings. Curtain walls and opaque glass. Lintels and ring beams. Timber - types and shapes of windows and doors. The types of floors used in buildings - rules of construction, the criteria for selection of elements. Roofs and flat roofs and balconies and terraces of buildings - types, forming roofs, roofing, drainage of rainwater. Communication in the building, construction and design guidelines of the stairs, rules for the selection and implementation of the chimney in buildings. Project: Detailed design architectural and construction connections of individual elements in the building - the foundation walls, floors on the ground, terraces, external walls, ceilings, roofs, slanting roofs according to individual assumptions.	Bachelor's degree studies	Winter

	Budownictwo ogólne i materiałoznawstwo 2/2	Building engineering and building materials part 2	Lectures: General information on the classification, test methods and standards of materials and building products. The technical characteristics of building materials. Classification, raw materials and production technology, general characteristics, properties and possible applications in building of selected building materials such as of building ceramics, stone materials and aggregate, binding materials and mortar, timber, metals, glass, plastic, thermal- and hydro- insulating materials and acoustic insulating materials. Laboratory: Research of selected physical and mechanical properties of basic building materials such as: selected masonry components, stone materials, aggregates, building mortars, metals. Project: Making drawings by the student: a vertical and horizontal projection of a part of the building with details.	Bachelor's degree studies	Summer
6.	Geometria wykreślna 1/2	Descriptive geometry part 1	**Semester I – Descriptive geometry part 1:** The subject deals with various method of projections that is different ways of representation of spatial forms onto a flat projection plane. During a winter semester mostly perspective projections are considered, that is: - classical perspective (three point perspective) - vertical perspective (two point perspective) - so –called parallel perspective (axonometry orthogonal and oblique). Moreover, the aspects of shadow construction are realized both in vertical and oblique perspective. Lecture – the theoretical background is given Exercises – various drawing problems are solved and discussed Projects - students prepare drawing sheets by themselves	Bachelor's degree studies	Winter

	Geometria wykreślna 2/2	Descriptive geometry part 2	**Semester II – Descriptive geometry part 2:** Application of descriptive geometry in engineering is considered. The subject includes following issues: − construction of auxiliary views in order to find metric properties of objects − solving pitched roofs − topographic projection − shaping roofs composed of various elements of ruled surfaces Lecture – the theoretical background is given Projects - students prepare drawing sheets by themselves	Bachelor's degree studies	Summer
7.	Projektowanie architektoniczne - dom jednorodzinny	Architectural design - Single-family house	Students will learn how to design single-family houses, together with the immediate environment.	Bachelor's degree studies	Summer
8.	Geodezja i kartografia	Geodesy and cartography	Geodesy module provides information about what is and what role the surveying and mapping does in the architecture and urbanism. Students learn methods of measurement, geometrical calculation of project and how to work with map. Generally half of classes take the form of field works at the University campus, the results of which are later developed in classroom during the next lesson.	Bachelor's degree studies	Summer
9.	Projektowanie urbanistyczne - kompozycja urbanistyczna	Urban Design - Urban Composition	Students will learn how to determine the basic principles of the impact of composition forms on the possibility of creating social bonds and how to design a simple urban complex.	Bachelor's degree studies	Summer

10.	Statyka i mechanika budowli 1⁄2	Statics and Structural Mechanics part 1	Elements of vectorial bill. Basic notions and qualification in mechanics. Axioms of statics. Moment of strength in relation to point and in relation to axis. Statement about peers of strengths. The reduction of arrangement of strengths to any pole and to the simplest figure. Elements of graphic statics. Conditions of equilibrium of arrangement strengths. The equation of equilibrium in individual cases of arrangements of strengths. Models of fetters and their reactions. Calculation in arrangements reaction. Degrees of liberty of arrangement stiff bodies. Conditions of geometrical invariability and static definability. Calculation in folded rod arrangements reaction. Grates. Analysis of building of grate. The calculation in rods of grates the strengths the method of balancing the knots. Zero rods. The calculation in rods of flat grates the strengths the method Rittera. Method Cremony.	Bachelor's degree studies	Summer
	Statyka i mechanika budowli 2⁄2	Statics and Structural Mechanics part 2	The notion of internal strength. The notion of the rod. Reduction of the arrangement of external strengths to sectional strengths. Notion of the arrangement of the own transverse section. The convention of marking. Points and characteristic compartments in flat rod arrangements. Sectional strengths in flat rod constructions. Exert oneself the principles of constructing graphs sectional on examples: simple beams, frames. Differential relationships for the simple rod. The geometrical profiles of flat figures, the definitions of basic geometrical profiles, statement Steinera, the central and main axises of inertia, calculation of the central and main moments of inertia. The condition of the tension – basic definitions and notions. The matrix of tensions, the graphic painting of the matrix of tensions. The tensor of tensions, the transformation of the tensor of tensions. Aksjator and the dewiator of the tensor of tensions. The flat condition of the tension: the main tensions, near Mohra. .The condition of the deformation. Physical equations. Relationships between the condition of deformation and tension. And and II the figure of equations Hooke’a. Stamina cases. Axial expansion and grip of the rods, the static test of the expansion. Simple curving. Transverse curving. Stamina cases. Curving slant. Stability of structure.	Bachelor's degree studies	Winter

11.	Rysunek architektoniczny, techniki warsztatowe, modelowanie, modelarstwo 1⁄3	Architectural Drawing, Craft Techniques, Modeling, Painting part 1	Quick drawing efficiency, communicate by drawing and by pictorial language, spatial observation, faithful copying of objects in different scale, purposefulness of shaping by applied light and shadow, consciousness of human body structure, shape and proportions (antique and contemporary sculpture), interior- and architectural drawing in natural context (landscape).	Bachelor's degree studies	Summer
	Rysunek architektoniczny, techniki warsztatowe, modelowanie, modelarstwo 2⁄3	Architectural Drawing, Craft Techniques, Modeling, Painting part 2	Creating greater sensitivity to beauty, a 'designer' sense of aesthetics, an ability to appraise the investor's needs and project in a creative manner (through proper selection of artistic values), the ability to treat the addressee and user of architecture as subjects (through the proper selection of artistic means), the ability to present the project in an impressive and spectacular way (through the choice of artistic technique and medium).	Bachelor's degree studies	Winter
	Rysunek architektoniczny, techniki warsztatowe, modelowanie, modelarstwo 3⁄3	Architectural Drawing, Craft Techniques, Modeling, Painting part 3	Mastering drawing techniques and their effective use as professional architectural tools, acquiring a sense of space, size and proportions as well as an artist's sense of perspective and applying the rules of descriptive geometry; learning the fundamentals of architectural design, aesthetic sensitivity, artistic refinement and acquiring an ability to perceive the outside world in an abstract and philosophical way.	Bachelor's degree studies	Summer
12.	Projektowanie architektoniczne - zabudowa mieszkaniowa 1	Architectural design - Residential housing 01	Students will learn how to design multi-family houses, together with the immediate environment.	Bachelor's degree studies	Winter

13.	Projektowanie energooszczędne w architekturze i urbanistyce	Energy saving design in architecture and urban planning	Lectures: Principles of design of energy efficient buildings, energy-efficient building body shaping and building environment due to its energy efficiency. Functional zoning of the temperature in the building. The possibilities of using alternative energy sources in buildings and architecture. Centralized and individual systems using renewable energy sources. The use of energy in buildings solar, wind, geothermal and hydropower. Passive buildings. Reducing heat loss from the building and the components of the heat balance of buildings. Project: The practice of designing the right solution for functional and energy-efficient building technology in relation to the environment and to consider the applicability of energy systems using renewable energy sources in architecture and urbanism.	Bachelor's degree studies	Winter
14.	Historia architektury polskiej 1	History of Polish architecture 01	Romanesque art in Poland - architecture, sculpture and painting. Gothic architecture in Poland - sacral and defensive structures. The analysis of typical monumental structures from different periods discussed during the lectures.	Bachelor's degree studies	Winter
15.	Architektura krajobrazu i terenów zielonych	Landscape and green area design	Project: Practice of designer fragment of landscape, projection, view, elevation and perspective view. Design configuration square (with flowers), lawn and selection choice of habitat plants or design landscape square (market) of a small town.	Bachelor's degree studies	Winter
16.	Projektowanie urbanistyczne 1	Urban design 01	Students will learn how to apply in practice the basic knowledge of urban composition and methods of designing urban complex of single-family houses.	Bachelor's degree studies	Winter
17.	Instalacje budowlane 1/2	Building installations part 1	Acquainting with issues related to the design and implementation of building installations. Presentation of the methodology for determining the heat load of a building. Acquainting with the principles of designing building installations (central heating, water supply, sewage and rainwater harvesting systems). Familiarization with technologies and materials used in building installations.	Bachelor's degree studies	Winter
	Instalacje budowlane 2/2	Building installations part 2		Bachelor's degree studies	Summer

18.	Historia architektury polskiej 2	History of Polish architecture 02	The History of Polish architecture classes are developed to teach students about all the important historic periods in Polish architecture. Students learn how to understand all the styles, architecture details, also how to distinguish and recognize them on the chosen examples of buildings from Poland.	Bachelor's degree studies	Summer
19.	Projektowanie osadnictwa wiejskiego	Rural settlements design	Students will learn how to design a multi-generational house and livestock buildings in rural areas.	Bachelor's degree studies	Summer
20.	Projektowanie urbanistyczne 2	Urban Design 02	Students will learn how to apply in practice the knowledge of urban composition and methods of designing urban complex of multi-family houses.	Bachelor's degree studies	Summer
21.	Teoria i projektowanie architektoniczne - usługi 1	Architectural design - Services 01	Service buildings in urban and suburban areas. Types and spatial and functional combinations. Underground car parks in urban buildings. The types of technical solutions (e.g. elevator), standards and their importance for the security of users. The importance of ventilation, air conditioning, filtration and purification of air in underground car parks. The economic importance of the application of new environmentally friendly technologies (e.g. recuperators) in service buildings (eg urban stations). Pre design works and establishment of functional and spatial conditions and relations. Work on the project - architectural and construction project (concept phase) a trading house building with an underground car park. Work on the project - architectural and construction design (concept phase) of the department store building with underground parking - technical and construction refinement, architectural detail development, graphic design and project presentation.	Bachelor's degree studies	Summer

22.	Teoria i projektowanie architektoniczne - usługi 2	Architectural design - Services 02	The location of the building and the rules for plot development. Service buildings in the urban area. Rules for the design of car parks and multi-seat garages. Requirements for hotels in terms of aesthetics, functionality and technology. Architectural solutions used in existing hotel buildings and buildings with a conference function. The importance of communication in the town/city. The economic importance of the application of new environmentally friendly technologies. Works on the project - architectural and construction project of a service building with underground parking.	Bachelor's degree studies	Winter
23.	Projektowanie urbanistyczne 3	Urban Design 03	Students will learn how to define and solve basic urban design problems in the city centers.	Bachelor's degree studies	Winter
24.	Projektowanie architektoniczne w obiektach historycznych	Architectural design in historical buildings	Characterize the modern rules of conduct conservation. Understanding the methodology of restoration works. Getting to know the methods and ways of conservation work. Gaining the ability to properly diagnose the condition of the monument and a program of restoration work.	Bachelor's degree studies	Summer
25.	Projektowanie architektoniczne z elementami konserwacji i modernizacji	Architectural design with elements of conservation and modernization	Definition of basic terms: relic, architectonic work, historical monument, preservation, protection, cultural landscape, cultural ambient, conservation. Principles of the maintenance of the cultural legacy, conservator's doctrines. Socioeconomic role of historic buildings. Methods and manners of the conservation, kinds and scopes of works. Contemporary architectural performances in art conservation studies. Methodology of conservation works and methodology of preparing documentation. The technology and principles of conservation works with historical buildings of architecture.	Bachelor's degree studies	Summer

26.	Fizyka budowli	Building physics	Lecture: Indoor climate. The parameters of humid air. Condensation on the surface of the partition. Characteristics of Polish climate. Discussion of climate data in the heating season. Physical properties of construction materials. Dampness in building envelopes. Forms of occurrence of dampness in materials and building envelope. Diffusion and condensation in the partitions. Calculation of humidity building partitions. Heat transfer through building partitions in the one-dimensional. Conduction. Convection. Radiation. Heat transfer through the transparent barrier. Thermal insulation of barrier and building elements. Principles of design of building partitions. Rules for designing of building partitions. Thermal bridges in building envelopes. Profits and heat loss through the building envelope. Heat balance of the building. Thermal performance of the building. Interior lighting works. Basic concepts of building acoustics. Sound insulation of airborne and impact sound. Exercises: Calculation to avoid condensation of water vapor on the surface of the barrier construction, air data and partitions, resulting in condensation of water vapor surface. Calculation of heat transfer coefficients of various building partitions, in contact with air and soil, building components. Thermal and humidity calculations of building partitions. Project: Project energy balance of the building partitions and the building.	Bachelor's degree studies	Summer
27.	Projektowanie wnętrz i form przemysłowych	Interior and industrial design	Principles of making interior architectural issues comprehensively, interior features and functionality. Basis of presentation elements shaping the architectural interior flat technical drawings. Finishing materials - the role of light, texture, color and space in the interior of the users perception. Mechanics subject - relationships useful in designing material and industrial forms. drawing workshop.	Bachelor's degree studies	Summer
28.	Praca dyplomowa - projekt inżynierski	Diploma thesis - engineering project	In the frame of the course Diploma thesis - engineering project, the student realizes an individual students work during the one semester (winter or summer), for example: project of building, agreed with the teacher after arrival at the beginning of the semester.	Bachelor's degree studies	Winter or Summer

Master’s degree studies					
1.	Projektowanie architektoniczne i urbanistyczne w krajobrazie kulturowym	Architectural and urban design in the cultural landscape	The subject concerns the complexity of the relationship between modern infill architecture and historic context. The aim of the course is provide students with knowledge and skills to be able to design infill architecture in the historic areas. Students improve their skills of designing in historic areas in accordance with formal procedures in relation to infill developments.	Master's degree studies	Winter
2.	Historia sztuki	History of art	Art history classes bring closer the history of art from prehistoric times to the present day. Basic concepts and trends reflected in artistic activity in subsequent epochs are discussed. Students learn about the most important artists and their works.	Master's degree studies	Winter
3.	Teoria i historia architektury powszechnej	Theory and history of general architecture	The History of general architecture classes are focused to teach students about the development of architecture in various historical periods. Students learn how to understand all styles, architecture details, also how to distinguish and recognize them on examples of the most valuable architectural objects in the world.	Master's degree studies	Winter
4.	Teoria i historia urbanistyki	Theory and history of Town Planning	The module concerns the issues of history of town planning - it focuses on the principles of construction, composition and location of human settlements. The range of topics includes the urban planning of ideal cities, fortifications in the Renaissance, reconstruction cities in Baroque, to the first industrial cities. Knowledge of the history of town planning facilitates understanding of the complex mechanisms governing the urban organism in the past and now, and helps to properly design contemporary urban planning.	Master's degree studies	Winter
5.	Planowanie regionalne	Regional planning	Issue of in-depth knowledge on the analysis of spatial planning in Poland due to the analysis of regional planning, urban planning analyzes and analyzes on a regional scale, the use of work in an interdisciplinary team.	Master's degree studies	Winter

6.	Zaawansowane technologie budowlane	Advanced construction technologies	Technological solutions for walls and ceilings. Technological solutions for roof and terraces. Modern facades. Flooring, subsoil and building insulation. Repair elements of construction and dehumidify of wall. Wall structural glazing. Solar energy systems in architectural applications. Installation solutions. Making analysis of the of exemplary design of buildings using modern materials and technologies. Design and manufacture of building composites that meet selected innovation criteria.	Master's degree studies	Summer
7.	Projektowanie architektoniczne - użyteczność publiczna	Architectural design - public utility	Students will learn how to design public building, together with the immediate environment.	Master's degree studies	Summer
8.	Pracownia projektowa - zaawansowane projektowanie urbanistyczne	Design studio - advanced urban design	Students will learn how to urban design in various scale and complexity, in particular: building complexes, local spatial development plans, taking into account local conditions and connections.	Master's degree studies	Summer
9.	Pracownia projektowa - miejsca pracy/architektura monumentalna	Design studio - Places of work/Monumental architecture	This module is concerned with architectural design has been designed to help developing architectural design skills in monumental architecture and places of work. The module discusses contemporary monumental architecture as an architectural typology with specific aesthetic and formal priorities. It introduces principles that enable designing monumental architecture as a contribution to the social, economic and environmental sustainability of a city. The module introduces the design of places of work in monumental architecture as a modern working environment developed according to the building codes and ergonomics. The module is based on the principles of studio learning which will involve students in group discussions, presentations, peer assessment and reflection. The student will be asked to respond to a given brief which will involve him in researching precedents, analysing context and brief, and developing and communicating design proposals. Students will receive feedback on developing work during regular design tutorials and assessment is by means of submission of design work.	Master's degree studies	Summer

Civil Engineering
Budownictwo

No.	Course name in Polish	Course name in English	Short description	Study cycle	Semester
1.	Chemia	Chemistry	Object provides information about the properties of matter, the fundamentals of thermodynamics and chemical kinetics and electrochemistry. It includes information on metals, minerals and organic building materials, their corrosion processes and chemical analyses.	Bachelor's degree studies	Winter
2.	Geologia	Geology	Geology module provides information about the geological processes occurring in the interior and on the surface of the Earth's crust. The student should obtain knowledge on: origin of rocks and building soils, rocks recognition, macroscopic investigation of soils properties, using of geological archival materials (maps, reports etc.).	Bachelor's degree studies	Winter
3.	Historia architektury	History of architecture	The scope of the program covers the history of architecture and fine arts from antiquity to the eighteenth century and selected aspects of the history of Polish architecture and art.	Bachelor's degree studies	Winter
4.	Geometria inżynierska	Engineering geometry	The module provides knowledge and abilities in the field of geometric modelling of engineering objects and presenting information about their spatial structure in graphic notation realised with the use of Monge's method, axonometry and map projection, in the field of typical applications in building engineering.	Bachelor's degree studies	Winter
5.	Materiały budowlane	Building materials	Lectures: General information on the classification, test methods and the normalization of materials and construction products. The technical characteristics of materials and selected aspects of construction chemicals. Classification, raw materials and production technology, general characteristics, properties and possible applications in the construction of selected building materials such as construction ceramics, stone and aggregate materials, adhesives and mortar, wood, metal, glass, plastic materials, thermo-and hydro-insulation and sound insulation. Laboratory: The study of selected physical and mechanical properties of basic building materials such as: selected wall components, stone materials, aggregates, construction adhesives, wood, asphalt, metal.	Bachelor's degree studies	Summer

6.	Grafika inżynierska	Engineering graphics	The module provides knowledge about the principles of preparation of technical drawings, including architectural drawings and structural drawings in the field of concrete, steel and wooden structures, as well as abilities of using the computer aided design software (CAD) in preparation of drawing documentation.	Bachelor's degree studies	Summer
7.	Geodezja	Geodesy	Geodesy module provides information about what is and what role the surveying and mapping does in civil engineering. Students learn methods of measurement, calculation, mapping of terrain details and staking out small objects according to its project. There are also some geodetic measurements that are carried out during construction. Generally half of classes take the form of field works at the University campus, the results of which are later developed in classroom during the next lesson.	Bachelor's degree studies	Summer
8.	Mechanika teoretyczna	Theoretical mechanics	The course includes selected topics of statics, kinematics and dynamics. Course content includes the basis of vector math, reduction systems of forces, equilibrium equations and calculating reaction of statically determinate systems, the calculation of forces in truss rods, the analysis of the geometric invariance. Determination of velocity and acceleration in plane and complex motion, laws and rules of behavior. Free, forced and damped oscillations, dynamics of motion, kinetic and potential energy.	Bachelor's degree studies	Summer

9.	Fizyka budowli	Building physics	**Lecture:** Indoor climate. The parameters of humid air. Condensation on the surface of the partition. Characteristics of Polish climate. Discussion of climate data in the heating season. Physical properties of construction materials. Dampness in building envelopes. Forms of occurrence of dampness in materials and building envelope. Diffusion and condensation in the partitions. Calculation of humidity building partitions. Heat transfer through building partitions in the one-dimensional. Conduction. Convection. Radiation. Heat transfer through the transparent barrier. Thermal insulation of barrier and building elements. Principles of design of building partitions. Rules for designing of building partitions. Thermal bridges in building envelopes. Profits and heat loss through the building envelope. Heat balance of the building. Thermal performance of the building. Interior lighting works. Basic concepts of building acoustics. Sound insulation of airborne and impact sound. **Exercises:** Calculation to avoid condensation of water vapor on the surface of the barrier construction, air data and partitions, resulting in condensation of water vapor surface. Calculation of heat transfer coefficients of various building partitions, in contact with air and soil, building components. Thermal and humidity calculations of building partitions. Calculation of the energy balance of the building partitions and the building. **Laboratory:** Testing of humidity, water absorption, humidity sorption, hygroscopic and capillary water in building materials. Specifying the relative humidity in the Assman psychrometer (test method). Specifying the air temperature and surface building partitions temperature (types of measuring instruments). Specifying the heat transfer coefficient U of building partitions method for measuring the temperature and heat flux. The measurement of light intensity areas. Measurement of noise in the room.	Bachelor's degree studies	Winter
10.	Wytrzymałość materiałów	Strength of materials	Course main content: Basic assumptions, External and internal forces, Axial forces, shear forces and bending moments in beams and frames (2D statically determinate structures), Cross-sectional properties, Stress analysis in members under axial loading, torsion, shear and bending, Triaxial and plane stress, Principal stresses and maximum shear stresses, Deflection of beams, Hooke's law. Prerequisites: passed course of Theoretical Mechanics or Statics	Bachelor's degree studies	Winter

11.	Budownictwo ogólne 1⁄2	Building engineering part 1	**Semester I – Building engineering part 1** Lectures: General concepts: building construction, building, construction engineering, landscape architecture. The technical conditions to be met by buildings and their location on the basis of implementing provisions of the Building Act. Integrated design - terminology, parts of buildings and structures, buildings implementation stages. Solutions foundations of buildings, foundation walls, earthworks at the foundation of buildings. The walls of buildings, elements shaping the surface of the walls. Communication in the building, construction and principles of forming stairs, rules for the selection and implementation of the chimney in buildings. Project: Project of a single-family residential building according to individual assumptions.	Bachelor's degree studies	Winter
	Budownictwo ogólne 2⁄2	Building engineering part 2	**Semester II – Building engineering part 2** Lectures: Grid load capacities - classification, the rules for determining load combinations. Construction of ceilings in buildings, Ceilings - principles of design and construction, criteria for selecting items. Roofs and flat roofs as well as balconies and terraces of the buildings made in traditional technology - the types of construction, development of roofs, roofing, drainage of rainwater. Basic dimensioning of timber structures. Project: - calculation of loads values and their combinations, - calculation of the cross-section of the collar-beam roof.	Bachelor's degree studies	Summer
12.	Mechanika gruntów i fundamentowanie 1⁄2	Soil mechanics and building foundations part 1	**Semester I – Soil mechanics and building foundations part 1:** lectures and laboratory exercises. The classes provides information about determination of geotechnical parameters, cohesive soil states and states of granular soils, compactibility of soils, filtration, mechanical properties of soils: compressibility, shear strength. Information about determination of the basic stresses in the foundation of the buildings, resistance and formability of the ground are also presented.	Bachelor's degree studies	Winter

	Mechanika gruntów i fundamentowanie 2/2	Soil mechanics and building foundations part 2	**Semester II – Soil mechanics and building foundations part 2:** lectures and designing exercises. The classes provides information about general terminology, structure of geotechnical norms, geotechnical categories, soil conditions and classification of foundations and checking of selected limit states. Direct and indirect foundations are designed on practical exercises.	Bachelor's degree studies	Summer
13.	Hydraulika i hydrologia	Applied hydraulics and hydrology	Applied hydraulics and hydrology module is conducted in the form of lectures and exercises. Lecture's part of the course presents the basic law of hydrostatics and defined: the pressure and hydrostatic pressure on flat surfaces and curved, fluid hydrodynamics and fluid excellent real, the base hydronomia and hydrography, description of the characteristics of water levels in the river channel, hydrographic curves, the base in the field of hydrology and hydrodynamics of liquid in terms of the actual liquid flow underground in soils. Exercise's part include the determination of pressure losses in a closed system (pipeline), lowering the groundwater table using the well of depression and to determine the range of backwater and determination the curve of dimming.	Bachelor's degree studies	Summer
14.	Mechanika budowli	Structural mechanics	Introduction to the design of computational models, giving the distribution of mechanical fields essential to the design of simple engineering structures. Statically determinate and indeterminate structures, calculation of displacements, basics of structure dynamics and buckling analysis. **Prerequisites:** passed courses of "Strength of materials" and "Mechanics" (or similar: necessary basic knowledge concerning calculation of support reactions and drawing of section forces diagrams for determinate, plane structures)	Bachelor's degree studies	Summer
15.	Konstrukcje betonowe 1/2	Concrete structures part 1	**Semester I – Concrete structures part 1:** Preliminary remarks, objectives of design, materials: concrete, reinforcing steel. Limit states design of concrete structures. Ultimate limit states: flexure, axial load and bending, shear, torsion. Serviceability limit states. Design of RC beams, one-way slabs and columns, arrangement of reinforcement and details	Bachelor's degree studies	Summer

	Konstrukcje betonowe 2/2	Concrete structures part 2	**Semester II – Concrete structures part 2:** Design and detailing of common reinforced concrete structures: floors, staircases, foundations, deep beams, retaining walls, frame and wall building structures.	Bachelor's degree studies	Winter
16.	Instalacje budowlane	Building installations	The aim of the subject is to provide students with knowledge about designing, execution and operation of water supply installations (cold water, hot water, circulating) and wastewater installations (sanitary and rainwater sewage) in single-family residential.	Bachelor's degree studies	Winter
17.	Metody obliczeniowe	Computational methods	Mathematical modeling and modeling theory. Mathematical and numerical models of physical problem. Local and global formulation of boundary problem. Interpolation and approximation. Approximated solving of mechanical problems: Rayleigh-Ritz method, method of weighted residuals. Introduction to finite difference method. Introduction to finite element method. Geometrical and physical assumptions. Local approximation. Shape functions for finite elements. Finite elements in 1D, 2D and 3D. Algorithm of FEM. Errors and convergence problems in FEM. Analysis of 2D rod structures. Requirements: passed the courses of Strength of Materials and Structural Mechanics	Bachelor's degree studies	Winter
18.	Budownictwo mostowe 1/2	Bridge engineering part 1	**Semester I – Bridge Engineering part 1** Lecture: Bridge as the road element. The main parts of bridge and their functions. Clearance in bridge design. Classification of bridges. The specific of the bridges loads. Classes: The rules of shaping of bridge cross section: concrete, steel, composite. The design procedures for bridges, main rules. Project: The initial project of concrete or steel bridge: conceptions, drawings.	Bachelor's degree studies	Winter
	Budownictwo mostowe 2/2	Bridge engineering part 2	**Semester II – Bridge Engineering part 2** Lecture: Bridges history. Rules of bridge design in Poland. The modern types of beam, frame, arch, suspension and cable stayed bridges. The modern solutions of pedestrian bridges. Classes: Methods of bridges construction. Project: The initial project of frame concrete bridge: conceptions, calculation, drawings.	Bachelor's degree studies	Summer

19.	Konstrukcje metalowe 1⁄2 oraz 2⁄2	Metal structures part 1 and 2	**General information**: The registration of students for a course "Metal structures part 2" is only possible after passing "Metal structures part 1".		
	Konstrukcje metalowe 1⁄2	Metal structures part 1	**Semester I – Metal structures part 1:** Lectures: Mechanical properties of structural steel. Connections - types, characteristic and application. Welded connections - technology and quality requirements for welding. Categories of bolted connections. Design and detailing of connections. Structural analysis - idealization of structures, loads and methods of analysis. Resistance of cross-sections. Local stability. Classification of cross-sections. Global stability of elements – buckling and lateral torsional buckling. Imperfections in steel structures. Columns, beams. Classes (exercise): Design and detailing of welded and bolted connections. Project: Project of floor structure in industrial building. Laboratory: Examination of geometrical imperfections of hot rolled sections, destructive testing of welded connections, destructive testing of end plate bolted connections (T-stub type), execution of bolted connection (C category), examination of hardness in welded connection.	Bachelor's degree studies	Winter
	Konstrukcje metalowe 2⁄2	Metal structures part 2	**Semester I – Metal structures part 2:** Lecture: Single story industrial buildings. Actions, building envelope, types of primary steel structures. Beam-column elements. Trusses. Overall stability of structure, roof and wall bracings. Fatigue. Brittle fracture. Corrosion and fire protection of steel elements. Execution of steel structures. Short characteristic of other types of steel structures: framed structures, structures with tension components, thin-walled structures, plated and shell structures. Project: Project of industrial single story building.	Bachelor's degree studies	Summer

20.	Budownictwo drogowe 1/2	Road engineering part 1	Lecture: The main rules of the road geometry designing. The types crossings and roads connections. Modern paving. New methods of testing materials for road paving. The functional approach to the material properties and pavement. The human factor in road engineering. Project: Simple design project of road	Bachelor's degree studies	Winter
	Budownictwo drogowe 2/2	Road engineering part 2	Lecture: Outline of measurement and control traffic The parking policy and the preference of public transport Transportation hubs in the cities Modern diagnostics of roads and road network management systems Projects: Conceptual design of simple intersections	Bachelor's degree studies	Summer
21.	Podstawy drogownictwa	Basic knowledge of road engineering	Lecture: The components of the road. Distribution, classification and characteristics of the roads in Poland. Bike paths, sidewalks. The car-speed in road design. Traffic and road capacity. Horizontal and vertical arcs. Road ramps. The human factor in traffic. Surface or pit drainage. Methods of making and earthmoving equipment. The construction and classification of the surface. Subsoil natural and artific. Projects: Simple design project of road	Bachelor's degree studies	Summer
22.	Podstawy mostownictwa	Basics of bridges	Lecture: Bridge as the road element. The main parts of bridge and their functions. Clearance in bridge design. Classification of bridges. The specific of the bridges loads. Classes: The rules of shaping of bridge cross section: concrete, steel, composite. The design procedures for bridges, main rules. Project: The initial project of concrete or steel bridge: conceptions, drawings.	Bachelor's degree studies	Summer

23.	Technologie energooszczędne	Energy-saving technologies	Lectures: Principles of design of energy efficient buildings. The heat demand for heating buildings. Standard requirements related to energy-saving construction. The possibilities of using alternative energy sources in buildings. Technologies for the realization of energy efficient buildings, energy saving finishing materials. Solar construction. Economic issues in energy efficient construction. Optimizing building solutions for the criterion of the least energy consumption. Project: Analysis of buildings in terms of their thermal characteristics. The possibilities of using alternative energy sources in energy efficient construction. Dimensioning of active and passive systems using solar and other non-conventional energy systems in buildings energy efficient. Exercise: project of Energy efficient building.	Bachelor's degree studies	Summer
24.	Konstrukcje murowe	Masonry structures	In the framework of the masonry structures are walling information about designing and construction of masonry, due to compression, shear and bending. The assessment of capacity and serviceability of elements and structures made from various masonry units.	Bachelor's degree studies	Summer
25.	Konstrukcje drewniane	Timber structures	Properties of wood, design values of material properties, design for Ultimate Limit States: bending, compression, shear. Design for Serviceability Limit States. Design of members subjected to axial actions and members subjected combined bending. Execution of design calculations – checking the ultimate and serviceability limit states for three simple wood structural elements (members): 1) Designing a bending beam bi-directionally, 2) Designing an axially compressed column, 3) Designing an eccentrically compressed column – combined axial and flexural actions).	Bachelor's degree studies	Summer

26.	Urbanistyka i architektura	Urban planning and architecture	Knowledge of architectural design issues. The Ability to solve technical problems in the concept of the architectural design. The acquisition of conceptual skill development of small teams building construction in the context of the environment and the correct resolution of a typical residential architectural scale.	Bachelor's degree studies	Summer
27.	Ekonomika budownictwa	Economics of civil engineering	Basic definitions. Analysis of costs in different phases of investment process. Kinds of cost calculation. Bases of cost calculation. Calculation methods – detailed and simplified method. Computer methods in cost calculation. Public orders. Rules of payment.	Bachelor's degree studies	Winter
28.	Remonty, modernizacje i przebudowy	Repairs, upgrades and remodelling	The causes of damage to the buildings. Poor place in buildings. Evaluation of the technical state of buildings. Disaster and building failures. Repair and strengthening of foundations, in masonry, reinforced concrete, steel, wood; repairs of roofs, the vertical and horizontal insulation, dryers and pest extermination of the walls. Repairs of floors, roofs, floors, facade. Legal aspects of living buildings, periodical reviews, the book of the building structure. Technical documentation - ratings, reviews, expert opinion.	Bachelor's degree studies	Winter
29.	Praca dyplomowa	Diploma thesis	In the frame of the course 1st step Diploma Project, the student realizes an individual students work during the one semester (winter or summer), for example: project of building, laboratory studies, etc., agreed with the teacher after arrival at the beginning of the semester.	Bachelor's degree studies	Winter or Summer

Master's degree studies					
1.	Złożone konstrukcje betonowe	Complex concrete structures	The module "Complex concrete structures" includes the classification and principles of shaping of two-way flat plate and foundation slabs. The student obtains the ability to design and shape reinforcement in buildings with a reinforced concrete wall structure and gets to know the flat and spatial elements of stiffening systems. The student gets to know the theoretical basis of the application of the ST method in the analysis of reinforced concrete structures, methods of modelling reinforced concrete structures using computer methods and concrete models in selected computer programs.	Master's degree studies	Summer
2.	Złożone konstrukcje metalowe	Complex metal structures	The course provides information on the concept and characteristics of steel structures, such as: tanks and silos; steel chimneys; masts, radio and TV towers; structural roofs. The main aim of the course is to present advanced analysis of framed steel structures, in particular: stability analysis of steel framed structures, application of second order analysis, imperfections, nonlinear analysis and effects of semi- rigid connections on structural responses. The course also provides information on calculation and design of steel-concrete composite structures.	Master's degree studies	Summer
3.	Inżynieria materiałowa	Materials engineering	Course provides knowledge in the area of materials science, applied to engineering materials. - Linear elastic fracture mechanics, the basic concepts, theory Irwins and Griffith, the critical stress intensity factor K_{Ic} and fracture energy G_{Ic} and their compounds, cracking models, research methods, resistance to cracking. - Application of fracture mechanics parameters in engineering practice, the requirements for sample sizes. - Stereology of materials, classification of stereological parameters of the structure of materials. Volumetric composition of the composite structure, the principle of Cavalieri and Cavalieri-Hacquerth. Microscopic methods for determining the grain size. Determining the average number of flat grains N_A: Comparative, Jeffries, nodal, planimetric. - Factual material: kinds of breakthroughs, the basic parameters-factor de-velop breakthrough R_L line profile and the surface area of the turn of the R_S.	Master's degree studies	Summer

4.	Budowa dróg I	Roads construction I	Role of construction manager and inspector. The acquisition of the site. Organization of earthworks. Methods of soil compaction. Making embankments and excavations. Mechanized earth-moving technology. Calculation of surface earthworks. Dehydration road corps. Road engineering structures - retaining walls. Soil stabilization technology road surface.	Master's degree studies	Summer
5.	Technologia BIM w projektowaniu konstrukcji	BIM technology in design	Students acquire knowledge and skills on modern techniques of structures design, methodology for Building Information Modeling (BIM) and management, as well as the Computer Aided Design (CAD) of engineering structures.	Master's degree studies	Winter
6.	Fundamentowanie II	Foundations II	This module extends the scope of geotechnical knowledge acquired at the first degree of studies with the knowledge of unconventional geotechnical solutions in matters related to the design of foundations, development and environmental protection. The lectures and projects.	Master's degree studies	Winter
7.	Konstrukcje sprężone	Prestressed structures	The module "Prestressed structures" includes theoretical and practical issues (design and implementation) on prestressed structures, whose aim is to add to the existing loads rationally selected additional loads, which co-acting with the effects of the design loads improves stress pattern by eliminating dangerous tension in concrete. Usually, but not limited to, this additional load is caused by pre-tensioned steel reinforcing bars, consequently becoming a regular concrete reinforcement. It is the most modern and developed branch of concrete structures, allowing the use of the highest strength materials for obtaining service effects of particular importance (bridges, nuclear reactors, tanks, railway sleepers, etc.). Application of prestressed structures is growing.	Master's degree studies	Winter

8.	Energie odnawialne w budownictwie	Renewable energy sources in building engineering	The types of energy sources, the development strategy of the energy sector. Characteristics of particular sources of renewable energy, solar energy, wind energy, water energy, geothermal energy, biomass and biogas. Other types of renewable energy, use of renewable energy perspectives. The practical importance of energy issues in the construction industry. The use of various renewable energy sources in a variety of building structures, the dimensioning of the energy systems which find application in the construction industry.	Master's degree studies	Winter
9.	Budowa dróg II	Roads construction II	Foundation stone - macadam and mechanically stabilized aggregate. A concrete foundation. Road surfaces of cement concrete. Technology process of maiking asphalt pavements. Surfacing and drainage kompaktas asphalt. Green area and sound barriers - protection of the environment against road noise	Master's degree studies	Winter
10.	Zarządzanie przedsięwzięciami budowlanymi	Construction management	The general information about the module: The subject provides information on the essence and methods of construction management. Apart from the new content, the subject summarizes and connects the knowledge previously gained in different university subjects, connected with preparation, implementation and controlling of a construction process. Formal basic requirements: Basic knowledge of the technology of construction works; building law; skill to use „Outlays In Kind Catalogues"; construction project cost estimation skill; construction project scheduling skill. The content realized in lectures: A construction company. Return on investment in a construction company. Estimation of outlays in kind in building production. Cost estimation. Powers and obligations of parties in a construction process. Optimization of technological and organizational solutions. Construction project scheduling. Construction project management. The content realized in exercises: Profit and loss statement and basic economic indicators in a construction company. Owner's and bidder's estimated prices. Optimization of construction project schedule. Optimization variants. Relationship: time of project completion - cost of construction works. The way of giving the final grade: On the basis of written assignments during a semester.	Master's degree studies	Summer

11.	Materiały do napraw i modernizacji konstrukcji	Materials for the repair and modernization of structures	The general information about the module: Subject provides knowledge of methods and materials for the repair of structures. Formal initial requirements: Completed a basic course in mathematics and concrete technology. The content realized at lectures: Causes and symptoms of damage. The mechanism of destruction. The destruction of concrete and reinforced concrete, the effect of moisture, temperature and mechanical loads. Examples of error analysis and performance design, examples of failures, disasters and structural damage. Diagnosis of the structure condition - algorithm for evaluation and repair methods. Repair materials and their selection and stages of repair. Strengthening the structure (passive and active). Protection of structure. The content realized at projects: Preparation of individual topical paper. Development of the evaluation of the technical condition of the object. The analysis of the damage and making recommendations on the repair of the material and technology. The way of giving the final grade: Written test in the content from the lectures and individually prepared presentation.	Master's degree studies	Summer
12.	Rozwój zrównoważony w budownictwie	Sustainable development in construction	Sustainable development - basic concepts and principles. Principles of sustainable development in construction. Taking into account the principles of sustainable development in construction in the context of reducing energy demand and environmental protection. Technical characteristics of buildings implemented in accordance with the principles of sustainable development, requirements for thermal characteristics of partitions in buildings. Choosing the most cost-effective improvement of the energy performance of buildings. Determining the payback time of a construction investment with the use of energy-saving technologies. Heat recovery in air and utility water exchange systems. Dimensioning of solar systems in terms of technical and economic profitability.	Master's degree studies	Summer
13.	Mosty z materiałów niekonwencjonalnych	Unconventional materials bridges	The aim of the classes is to learn the principles of shaping, constructing and designing bridges made of unconventional materials such as aluminum or FRP composite materials. The production technology, specific to that types of materials, is also presented. During the design classes, students design a footbridge in two variants: made of aluminum and composite materials.	Master's degree studies	Summer

Environmental Engineering
Inżynieria Środowiska

No.	Course name in Polish	Course name in English	Short description	Study cycle	Semester
1.	Geometria inżynierska i rysunek techniczny	Geometric and engineering drawing	Engineering drawing and descriptive geometry course provides information about geometrical bases of the graphical mappings and their applications in technical drawings of the geodetic, urban planning, building and installation industry.	Bachelor's degree studies	Winter
2.	Chemia 1/2	Chemistry part 1	Basics of general and inorganic chemistry: notation, units, the types of inorganic compounds and chemical reactions. Chemical solutions, solubility, electrolyte solutions, buffer solutions. Fundamentals of analytical chemistry and instrumental analysis. Chemical calculations.	Bachelor's degree studies	Winter
	Chemia 2/2	Chemistry part 2	Natural waters. The basic elements contained in natural waters. Speciation of the metal environment. The hardness of water. Methods of water softening. Nutrients. Eutrophication. Oxygen in natural waters. Self-cleaning rivers. Basic types of organic compounds. Water quality analysis and treatment. Work in the chemical laboratory. **Participation in the II semester is possible:** **- if the student has completed the part I module,** **- has a basis from a given module obtained from the home university.**	Bachelor's degree studies	Summer
3.	Geodezja i systemy informacji przestrzennej	Geodesy and spatial information systems	Geodesy and spatial information systems module provides information about what is and what role the surveying and mapping does in environmental engineering. Students learn methods of measurement, calculation and mapping of terrain details by carrying out some field works at the University campus. The results of field works are later developed in classroom.	Bachelor's degree studies	Summer

4.	Mechanika i wytrzymałość materiałów 1⁄2	Mechanics and strength of materials part 1	Basic principles of static, degree of freedom, constraints reactions. Concurrent force systems, equilibrium of plane and spatial systems. Static of solid, composition of plane forces. Reduction of spatial force systems, Varignion's theorem. Equilibrium of plane and spatial any force systems. Mass's centre of plane figures. Static of structures. Plane trusses, principle notions and definitions, static determinable of plane trusses. Methods of plane trusses analyze: equivalent of nodes, Cremona's, Ritter's. Geometrical characteristics of plane figures, static moment, moment of inertia (M.I.). Steiner's theorem, moment of inertia for turned axis. Statically determinate bar systems, classification of bars, connections of bars and bars systems. Generally case of spatial loading, definition of internal forces and their reduction. Determination of internal forces in beams and frames. Lecture: Basic principles of static, degree of freedom, constraints reactions. Concurrent force systems, equilibrium of plane and spatial systems. Static of solid, composition of plane forces. Reduction of spatial force systems, Varignion's theorem. Equilibrium of plane and spatial any force systems. Mass's centre of plane figures. Static of structures. Plane trusses, principle notions and definitions, static determinable of plane trusses. Methods of plane trusses analyze: equivalent of nodes, Ritter's. Geometrical characteristics of plane figures, static moment, moment of inertia (M.I.). Steiner's theorem, moment of inertia for turned axis. Statically determinate bar systems, classification of bars, connections of bars and bars systems.	Bachelor's degree studies	Summer
	Mechanika i wytrzymałość materiałów 2⁄2	Mechanics and strength of materials part 2	General case of spatial loading, definition of internal forces and their reduction. Determination of internal forces in beams. Definition of stresses, stresses matrix, simple tension/compression, Hooke's law. Static test of tension/compression. Displacement and deformations of bars axially. Relationship between stresses and strains in axially loaded members. Simple bending, normal stresses in members under bending, designing of bending bars. Strength hypothesis, classification, principle definitions and dependences.	Bachelor's degree studies	Winter

5.	Mechanika płynów 2/2	Fluid mechanics part 2	Fluid dynamics, Bernoulli`s equation for real fluids, fall hydraulic measurements and measurements of the flow velocity, flow in pipelines, movement laminar and turbulent motion, resistance calculation, calculation of hydraulic systems and pipelines, reservoirs and pumping stations cooperation with pipelines, Features power supplies and power. The fluid flow in open channels, curves efficiency, exercise subcritical and supercritical, hydraulic jump, hydraulic basin entrance point, move the variable set, unsteady movement, pressure and hydrodynamic reaction, converting - triangular shaped practical, wide crown - the sunken. Basic filtration of groundwater. Darcy `s law. Methods for determining the coefficient of permeability. The differential equation of groundwater filtration. The water supply to wells ordinary artesian and ditch. Depression and its coverage, capacity wells team. Gas flows through the holes and nozzles, gas flows in pipelines. Bernoulli's equation for gas in the adiabatic process. The pressure distribution in the atmosphere.	Bachelor's degree studies	Winter
6.	Hydrologia i nauki o Ziemi	Hydrology and earth science	The aim of the course is to familiarize students with issues related to the functioning of processes geoecosystems and forming part of the water cycle. Hydrology - general issues, sharing, application in environmental engineering and water management. Characteristic of water level and flow of water. The curves on the hydrological of level and water flow. Hydrometry - methods of measurement: of levels and flows of water velocity, depth and river sediment. Precipitation - types, measurement, rainfall intensity time distribution Statistical methods for forecasting hydrological phenomena.	Bachelor's degree studies	Winter

7.	Mechanika gruntów i geotechnika	Soil mechanics and geotechnics	This module enables the capture of knowledge (and related skills and competences) on issues related to the determination of the bearing capacity of the ground under the building structures, as well as stepping up ground against him does not meet the requirements. New knowledge also applies to non-conventional geotechnical solutions on issues connected with the development and protection of the environment. Range: Origins of rock and soil and physico-chemical properties. Igneous, sedimentary and metamorphic rocks. Glacial grounds. Granulation. Conditions. Water in the soil, groundwater flow, filtration, Darcy's law, pore pressure, a phenomenon suffosion, the calculation of the criterion of critical flow condition. The basic properties of soils. The recognizing of the ground for the construction of environmental engineering. The stresses and settlements in the ground. Design of foundation engineering environment. Rules of conduct earthmoving works. The stability of slopes and walls of excavations. The use of geosynthetics in civil engineering. Geotechnical aspects of landfill construction, construction principles, protection for the infiltration of pollutants into groundwater. Investigation of basic physical and mechanical properties of the soils. Methodology for determining the parameters characterizing them. The impact and significance parameters on the properties of the substrate.	Bachelor's degree studies	Winter
8.	Technologia uzdatniania wody I	Water treatment technology I	Surface water characteristics, coagulation, sedimentation, filtration, disinfection, sorption, ion exchange. Ground water characteristics, deacidification, manganese removal, iron removal. Water treatment for cooling and boiling, deoxidation, decarbonization, softening, demineralization. Laboratory: Coagulation, manganese removal, iron removal , deoxidation, water sorfteninig, chemical water softening, demineralization, deacidification. Project: Project of underground water treatment station	Bachelor's degree studies	Winter

9.	Podstawy budownictwa i konstrukcje inżynierskie 1⁄2	Building and engineering structures part 1	Lectures: General information about the buildings. Foundations of buildings. Movement joints in buildings. Paving the buildings. Earthworks. Securing the excavation walls. Dewatering of excavations. Foundations - Basic concepts, types, tasks and materials. Foundations direct. Special foundations. Walls built of bricks. Integrated bonds in the walls. The walls of hollow blocks. The walls of layered and mixed. Chimney flues: ventilation and internal combustion. Ceilings and planar roof covering. Roofs. Balconies. Bay windows. Stairs - classification, structure, materials and design. Roofs. Timber roof trusses. Roofing. Windows and doors. Floors. Insulation in buildings - types, materials and functions. Painting and decorating. Coatings and linings, distribution, materials and technology. Project: Exercise architectural design of the building according to individual assumptions	Bachelor's degree studies	Winter
	Podstawy budownictwa i konstrukcje inżynierskie 2⁄2	Building and engineering structures part 2	Lectures: Load standards. The types of loads acting on the structural components of buildings. Load combinations. Boundary conditions. The characteristic values. Design values. Imposed loads. Snow loads. Wind loads. Basic dimensioning of masonry structures. Basic dimensioning of timber structures. Basic dimensioning of reinforced concrete structures. Basic dimensioning of steel structures. Project: Implementation of the statement of loads acting on the structural elements of the building and design calculations selected element of building construction according to individual assumptions.	Bachelor's degree studies	Summer
10.	Ochrona powietrza	Air protection	Basic information about atmospheric air. Legal acts in environmental protection. Characteristics of sources of air pollution. Spread of pollutants in the air. The calculation formulas of the Pasquille model. Calculation of pollutant emissions. Calculations of the distribution of pollutant concentrations. Presentation of a computer program to calculate the spread of pollutants around the emission source. Completion of calculation of pollutant emission levels and computer simulation of concentration distribution for emitted pollutants. Analysis of the results obtained in the aspect of environmental law.	Bachelor's degree studies	Summer

11.	Technologia i urządzenia do oczyszczania ścieków 1/2	Technology and devices for wastewater treatment part 1	Sources and characteristics of wastewater are taught. Topics include biological treatment principles, process control, normal operation and preventative maintenance for collection systems, preliminary treatment devices , primary treatment devices, stabilization ponds and disinfection systems. Subjects covered include Sequencing Batch Reactors, Integrated Fixed Film Systems, Membrane Bioreactors, Nutrient Removal Systems (biological and chemical). Laws, rules, and regulations are also discussed.	Bachelor's degree studies	Summer
	Technologia i urządzenia do oczyszczania ścieków 2/2	Technology and devices for wastewater treatment part 2	Wastewater treatment devices are taught. Topics include devices of mechanical and biological wastewater treatment. Design principles are discussed for wastewater treatment systems. The technical project and calculations of the wastewater treatment plant are carried out. **Participation in the II semester is possible:** **- if the student has completed the part I module,** **- has a basis from a given module obtained from the home university.**	Bachelor's degree studies	Winter
12.	Wodociągi i systemy zaopatrzenia w wodę 1/2	Water supply systems part 1	The purpose of education is to learn the theoretical and practical issues related to the design elements of water supply systems. The tasks of water supply and its components, schemes of water supply systems. Methods for calculating and forecasting the demand for water, the unit rates of water consumption, water consumption characteristics of inequality, fire water demand. Equity and demand for water, groundwater, surface water. Designing water intakes. Pumping stations. Types of water network and the hydraulic calculation.	Bachelor's degree studies	Summer
	Wodociągi i systemy zaopatrzenia w wodę 2/2	Water supply systems part 2	Water network designing, materials used for construction of water supply, location of pipes, armature. Basic maintenance operations water supply. Water storage tanks designing. Designing of network pumping stations. Calculating of water supply systems.	Bachelor's degree studies	Winter

13.	Ogrzewnictwo i ciepłownictwo I	Heating and Heat Engineering I	The aim of the course is to familiarize students with the theoretical and practical issues related to the design of heating systems. Course main content: Thermal comfort requirements. The microclimate of the room - the parameters. Designed temperatures inside and outside. The rules of thermal transmittance factors and heat losses calculating. Heat load calculations. Classification, characteristics and criteria for the selection of radiators, boilers. Graphic imaging of central heating installation. Hydraulic calculations of central heating installation. Safety of central heating installations of open and closed systems. Requirements for boiler rooms. The quality of water for heating purposes. Students make the project of heating installation system according to individual data for building. The project involves preforming of: heat transfer calculations, designed heat load, selecting elements of installations, hydraulic calculations and graphical imaging of installation drawings.	Bachelor's degree studies	Winter
14.	Pompy i wentylatory w ogrzewnictwie i wentylacji	Pumps and ventilators in heating and ventilation	Flow resistance characteristics of the pipes. Classification of pumps. Positive displacement pumps. Centrifugal pumps - construction and application. Special pumps and vacuum pumps - the scope of applicability. Fans and blowers - construction, distribution and selection. The compressors in air conditioning and refrigeration. Displacement compressors Orbital centrifugal compressors – application. Case study for specific energy systems	Bachelor's degree studies	Winter
15.	Kanalizacja i systemy odprowadzania ścieków 1⁄2	Wastewater discharge and sewage systems part 1	**I semester - Wastewater discharge and sewage systems part 1:** The aim of the subject is to provide students with knowledge and skills in designing of network and facilities as part of different gravitational sewage systems in different terrain and topographical conditions.	Bachelor's degree studies	Winter
	Kanalizacja i systemy odprowadzania ścieków 2⁄2	Wastewater discharge and sewage systems part 2	**II semester - Wastewater discharge and sewage systems part 2:** designing of complex sewage systems in systemic terms	Bachelor's degree studies	Summer

16.	Ogrzewnictwo i ciepłownictwo II	Heating and Heat Engineering II	Types of heat. Characteristics of the nodes of the hot water service. Characteristics of nodes exchanger. Heating combi systems. Selection of heat exchangers, pumps, regulatory systems, measuring systems. The desirability of centralized heat supply. Centralized systems of heat supply. Determine the nature and amount of the heat. Structured graph heat loads. Heating control systems - Qualitative and quantitative regulation. Chart control. Control systems. Choosing the type and parameters of the heating medium. Integrated heating technology. Overview of types of boilers for heating. Selection of circulation pumps, stabilizing and supporting. Water treatment technology parameters for the heating system. Criteria for the selection of fuel. Fuel demand for heating season. Power supply to solid fuel. Requirements for boiler built. District heating systems. Types, construction of heating systems. Fixed points and sliding. Compensation expansion. Construction of pre-insulated networks. Hydraulic calculations network. Performing diagram the pressure. The project combi heat exchanger. Web Design heat and district heating technology. Analysis and study of the installation and heating equipment. Study of temperature distribution in heating systems. Study of hydraulic characteristics installation water heating. Determination of the efficiency of the boiler.	Bachelor's degree studies	Summer
17.	Instalacje sanitarne	Sanitary installations	The aim of the subject is to provide students with knowledge about designing, execution and operation of water supply installations (cold water, hot water, circulating) and wastewater installations (sanitary and rainwater sewage) in single-and multi-family residential and non-residential buildings.	Bachelor's degree studies	Summer
18.	Wentylacja i klimatyzacja	Ventilation and air conditioning	Course content: Tasks and meaning of ventilation and air conditioning. Classification of ventilation systems. Natural ventilation. Indoor microclimate, parameters and method of evaluation. Humid air characteristic. Molier chart and its utilization in ventilation. Air demand calculation rules – simplify and accurate methods. Equipment of ventilation installation. Ventilators, filters, heaters, ventilation central units. Ducts and ventilation units selection. Hydraulic calculation and air flow regulation. Acoustic in ventilation. Silencers selection. Heat recovery systems.	Bachelor's degree studies	Summer

19.	Ochrona wód i gospodarka wodna	Protection of waters and water management	Water management in Poland and EU. Elementary adjustment law in protection of waters and soils. Eutrophication of superficial waters, the role of biogens. Trophic conditions of polish lakes and rivers, reclamation of lakes. Self-purification of waters. Lentic waters, temperature-oxygen profiles. Forecasting of natural water quality.	Bachelor's degree studies	Winter
20.	Praca dyplomowa	Diploma dissertation	In the frame of the course 1st step Diploma Project, the student realizes an individual students work during the one semester (winter or summer), for example: project of sanitary installations of building, laboratory studies, etc., agreed with the teacher after arrival at the beginning of the semester.	Bachelor's degree studies	Winter or Summer

Master's degree studies					
1.	Monitoring środowiska	Environmental monitoring	Legal basis and scope of environmental monitoring in Poland. Basic definitions and legal acts related to environmental issues. Monitoring of surface and groundwater, air and soil. Noise and radiation monitoring. Pressures on the environment. Interpretation of the results of water, soil and air monitoring in relation to the applicable law.	Master's degree studies	Summer
2.	Systemy oczyszczania ścieków	Wastewater treatment systems	The main objective is having in-depth knowledge in wastewater technology and waste management, and skils to selection technologies for wastewater treatment.	Master's degree studies	Summer
3.	Balneotechnika	Balneotechnology	Balneology and spa therapy - essential problems. Spa healing sources: the division and definitions (mineral and healing waters, healing gasses, peloids, spa products). Characteristics of legislation relating to the spa and treatment, and the use of raw materials cubicles with particular emphasis on the use of mineral waters. Theoretical bases of designing balneological installation: installations used to exploit mineral waters, mineral and medicinal intake water sources (designing and exploitation principle). Arrangements of the installation depending on physico–chemical water composition. Thermal waters. Materials applied in balneological installations. Designing principles of municipal installations in places used for spa therapy.	Master's degree studies	Winter
4.	Chłodnictwo	Cooling	The main objective is to present the principles of operation of compressor, absorption and other heat pumps and cryogenic systems along with possible modifications.	Master's degree studies	Winter
5.	Technologie proekologiczne	Ecological technologies	General information on ecology, sustainable development, and energy situation of Poland and the world. Ecological installations. The examples of ecological installations in water and sewage management and energy production. Wastewater heat recovery systems. Rainwater harvesting systems and greywater recycling systems.	Master's degree studies	Winter

6.	Źródła i gospodarka cieplna	Heat sources and heat management	The aim of the course is to deliver knowledge of energy efficiency, rational and modern heat management.	Master's degree studies	Winter
7.	Wodociągi i kanalizacja wsi	Rural water supply and sanitation	Specific indicators and the overall water demand for the village. The non-uniformity of water demand, hourly and daily. Simulation distributions of water demand in the country. Intake subsurface and surface water and water treatment stations in rural conditions. Water supply network systems, interoperability of systems, expansion tanks and pumping power: the design principles of the countryside. Materials for the construction of water supply and sewer systems and equipment lines in rural areas. Execution of water supply and sewage systems. Sewage systems in rural conditions. Sewer gravity, vacuum and pressure. Locations pumping stations and sewage treatment plants in the country. Pump Systems. Local sewerage and sewage treatment.	Master's degree studies	Winter
8.	Zbiorniki retencyjne w kanalizacji	Storage reservoirs in sewage systems	The role of surface, cubature and network retention in efficient wastewater transport. The specificity of the storm water formation. Problem of wastewater retention in technical and economic terms under expansion and modernization of sewage systems.	Master's degree studies	Winter

Geodesy and Spatial Planning **Geodezja i planowanie przestrzenne**					
No.	**Course name in Polish**	**Course name in English**	**Short description**	**Study cycle**	**Semester**
1.	Technologie proekologiczne	Environmental technologies	To familiarize students with the concepts and information in the field of environmental technologies and the best available techniques. Acquiring the ability to understand the negative impact of industry on the environment. Getting to know the characteristics of renewable energy sources. To acquaint students with selected aspects of modern technologies, including the principles of rational use of raw materials and energy, the principles of creating technologies that care about the state of the environment, and the legal basis for implementing pro-ecological techniques.	Bachelor's degree studies	Winter
2.	Satelitarne techniki pomiarowe	Satellite measuring techniques	Lectures are aimed at understanding the structure and purpose of GNSS systems, with particular emphasis on geodetic surveying applications. The laboratory exercises are aimed at specific preparation for performing of GNSS measurements and for its numerical processing of results.	Bachelor's degree studies	Summer
3.	Geodezja inżynieryjna 1/2	Engineering geodesy part 1	The module covers the scope of basic surveying measurements and geodetic studies for the purposes of servicing construction investments. Laboratory exercises are practical activities carried out mainly in the field.	Bachelor's degree studies	Winter
	Geodezja inżynieryjna 2/2	Engineering geodesy part 2		Bachelor's degree studies	Summer

4.	Instalacje i sieci budowlane	Building installations and networks	During the course, the student will learn all types of technical networks and installations used in construction, and the materials used to build them. He will learn the basics of their design and principles of their operation. The student will become familiar with the conventional signs of the utilities used on the maps and project documentation. During the course, the student will learn all types of technical networks and installations used in construction, and the materials used to build them. He will learn the basics of their design and principles of their operation. The student will become familiar with the conventional signs of the utilities used on the maps.	Bachelor's degree studies	Winter

Power Engineering
Energetyka

No.	Course name in Polish	Course name in English	Short description	Study cycle	Semester
1.	Grafika inżynierska 1⁄2	Engineering Graphics part 1	Parallel and orthographic projection methods, including Mongean Method, Auxiliary Views, Axonometry, Topographic Projection; Subspaces: points, lines, surfaces, vectors; Development of plane and curved roofs.	Bachelor's degree studies	Winter
	Grafika inżynierska 2⁄2	Engineering Graphics part 2	General principles of making technical drawings. The elements of the mechanics drawing. Architectural and building drawing. Installation drawings.	Bachelor's degree studies	Summer
2.	Ochrona środowiska	Environment protection	**Lecture** Basic concepts related to environmental protection. State ecological policy. Environmental protection law in the world. Protection of water, atmosphere and soil. Problems of sustainable development: climate changes, sources of formation and legal basis for dealing with hazardous waste in the energy sector. Types of energy, energy resources in the world. Technologies for the use of renewable energies and possible threats to the environment. Rational use of energy resources. **Project** Techniques of environmental quality assessment with the use of indicator organisms (bioindication). Performing a natural inventory as an element of the report on the state of the environment.	Bachelor's degree studies	Summer
3.	Mechanika płynów 1⁄2	Fluid mechanics part 2	Basic properties of fluids. Perfect fluid. Hydrostatic pressure. Devices for measuring the pressure. The law of Euler. The equation of equilibrium liquids, the pressure of the mass forces. Pascal's Law. Hydrostatic pressure on flat and curved surfaces. Equilibrium of bodies submerged. Kinematics of fluid Lagrangian method, Euler's method The dynamics of a perfect fluid. Euler's equation. Bernoulli equation for a perfect fluid. Velocity measurements using the Bernoulli equation.	Bachelor's degree studies	Summer

4.	Ogrzewnictwo	Heating systems	The aim of the course is to familiarize students with the theoretical and practical issues related to the design of heating systems.	Bachelor's degree studies	Summer
5.	Wentylacja i klimatyzacja	Ventilation and air conditioning	Ventilation and air conditioning is an object that enables you to analyze problems related to thermal comfort, performance, natural ventilation, mechanical and heat recovery broadly defined.	Bachelor's degree studies	Summer
6.	Budownictwo wodne w energetyce	Water engineering in the energy industry	Tasks and distribution of hydraulic engineering. Types of hydraulic structures and their application. Dams: dams and dam, hydroelectric installations. Storage reservoirs for municipal, industrial and agricultural. The role of reservoirs in the country's water management system. The management of water in the storage reservoir. Failures of dams throughout history. Installation mountain streams. Characteristics of rivers. Adjusting the rivers. Flood protection: embankments of rivers, canals relief, flood control reservoirs.	Bachelor's degree studies	Winter
7.	Energetyka wiatrowa	Wind energy	Properties of atmospheric air, formation of winds, Wind speed and its measurement, Accumulation of electric Energy, Designing wind turbine installations	Bachelor's degree studies	Winter
8.	Budownictwo energoefektywne	Energy-efficient buildings	Introduction: sources of energy and their consumption, sustainable development. Selected aspects of the European Directives and National Set of Technical Conditions (which should be met by buildings and their location), consumed for energy efficiency in buildings. Using renewable energy sources in buildings. Active and passive solar systems, photovoltaics, heat pumps, ground heat exchangers. Energy-efficient equipment and systems used in buildings. Construction of buildings energy efficient technologies. Energy-efficient building materials, insulation and finishing. The methodology for calculating the energy performance of the building. Calculation of energy demand for heating, ventilation and hot water preparation. Shaping the heat balance of the building. The structure of heat loss.	Bachelor's degree studies	Winter

Transport
Transport

No.	Course name in Polish	Course name in English	Short description	Study cycle	Semester
1.	Mechanika teoretyczna	Theoretical mechanics	Student obtains basic knowledge and skills in the description of statics with respect to basic mechanical systems of non-deformable bodies.	Bachelor's degree studies	Winter
2.	Drogi samochodowe	Roads	The components of road. Distribution, classification and characteristics of roads in Poland. Bike paths, sidewalks.The car-speed in road design. Traffic and road capacity. Horizontal and vertical alignement. Road ramps. The human factor in traffic. Subsoil. Construction and classification of pavement. Surface or pit drainage. Methods and equipment for earthworks and pavement works.	Bachelor's degree studies	Summer
3.	Inżynieria ruchu drogowego	Traffic Engineering	Fundamental course of the traffic engineering. The main content of the classes includes: - Road and intersection capacity, - Determining Level of Services and density - Designing simple traffic control device - Traffic modelling	Bachelor's degree studies	Summer