

# Summer Semester

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\*elective course, announced at the beginning of the semester

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	General Construction 1
LECTURER'S NAME:	Maciej Król, PhD
E-MAIL ADDRESS OF THE LECTURER:	maciej.krol@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>0200-BO1
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	written exam/oral exam
COURSE CONTENT:	<p>W1 Introduction to the subject, basic concepts and terminology, systems and building elements.</p> <p>W2 Principles of building work construction systems, spatial stiffness, dilatations, safety and durability.</p> <p>W3 General principles of structure calculations, the method of limit states, checking with the method of partial factors.</p> <p>W4 Dimensional coordination in construction, modular coordination, system design, dimensioning of elements.</p> <p>W5 Walls and supports, tasks and classification, rules for erecting from small-scale elements, prefabricated and monolithic.</p> <p>W6 Foundation of a building, principles of cooperation, soil and foundation, types of foundation. Direct and indirect foundation.</p> <p>W7 Ceilings and flat coverings, ceiling tasks, structures of particular types of ceilings. Balconies and bay windows.</p> <p>W8 Elements of vertical communication in the building, stairs, ladders, ramps and elevators. Stair constructions.</p> <p>W9 Roofs and flat roofs, types, shape and structure. Wooden, steel and reinforced concrete structures. Roof drainage.</p> <p>W10 Chimneys in the building. Chimney flues, types, principles of guidance and methods of implementation. Chimney systems.</p>
ADDITIONAL INFORMATION:	<p>1. Fundamentals of Building Construction: Materials and Methods, Edward Allen, Joseph Iano, SBN13 (EAN): 9781119446194, editor: Wiley,</p>

	<ol style="list-style-type: none"> <li>2. Handbook for Building Construction: Administration, Materials, Design, and Safety (2021) Christine Fiori, ISBN13 (EAN): 9781260456882, Clifford Schexnayder</li> <li>3. Building Construction Illustrated, Ching, F, ISBN-10: 111958308X, WILEY; Edit 6 (2020)</li> </ol>
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FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Chemistry 1
LECTURER'S NAME:	Beata Janowska PhD, DSc, Eng.
E-MAIL ADDRESS OF THE LECTURER:	beata.janowska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>3300-Ch1
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	class test
COURSE CONTENT:	<p>Introduction to general chemistry: basic concepts and definitions, fundamental chemical laws. Structure of the atom (Bohr model of the atom, electron configuration). Periodic table of elements. Chemical bonds, structure of the molecule. Intermolecular interactions. Structure and properties of inorganic compounds. Properties of complex compounds. Characteristics of the physical states of matter. Elements of chemical thermodynamics, thermochemistry (heat of chemical reactions). Types of chemical reactions. Kinetics of chemical reactions. Chemical equilibrium (the law of mass action, Braun-Le Chatelier principle). Surface phenomenon. Chemical Equilibrium in aqueous solutions (constant and degree of dissociation, the ionic product of water, pH, hydrolysis). Theories of acids and bases. Chemistry mineral building materials: setting and hardening a cement, the mechanism of the corrosion processes of mineral building materials. Fundamentals of electrochemistry: electrochemical electrode potential, electromotive force, galvanic cells, electrolysis. The mechanisms of metal corrosion - corrosion protection.</p>
ADDITIONAL INFORMATION:	

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ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Chemistry in construction
LECTURER'S NAME:	Beata Janowska PhD,
E-MAIL ADDRESS OF THE LECTURER:	beata.janowska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	511>0200-ChB
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written reports
COURSE CONTENT:	Fundamentals of general chemistry (atom structure, periodic table, chemical bonds). States of matter. Surface phenomena and their importance in construction. Dispersion systems (colloidal systems, their preparation and properties, classification and application of emulsions). Chemical reactions - characteristics and classification. Chemical equilibrium and kinetics of chemical reactions. Basic of chemical thermodynamics. Phase changes. Structure and properties of water. Water for construction purposes. Chemical reactions in the aquatic environment (hydrolysis and hydration). Chemistry of mineral building materials. Chemistry of mineral binders. Hydraulic and air binders. Processes during the preparation, setting and hardening of mineral binders. Mechanism of corrosion processes of mineral building materials. Metal chemistry. Basic electrochemistry. Corrosion of metals. Protection of metals against corrosion. Introduction to organic chemistry (structure and properties of organic compounds). Chemistry of plastics and bitumen. Synthetic resins and adhesives. Modifications of building materials. The use of composite materials. Recycling of building materials
ADDITIONAL INFORMATION:	

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FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Photogrammetry - field exercise
LECTURER'S NAME:	Piotr Kędziorski
E-MAIL ADDRESS OF THE LECTURER:	piotr.kedziorski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-ĆTzF
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Other - practical
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	presentation
COURSE CONTENT:	Photogrammetric field surveying, Aerotriangulation, Image processing
ADDITIONAL INFORMATION:	

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ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Biomass energy use or Technologies of biomass conversion for energy purposes *
LECTURER'S NAME:	Bartosz Walendzik
E-MAIL ADDRESS OF THE LECTURER:	bartosz.walendzik@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>3300-EWB or 0511>3300-TKB
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15 Lectures + 15 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT for Biomass energy use:	<p>Legal regulations concerning renewable energy sources. Classification and general characteristics of conventional, renewable and unconventional energy sources. Types and energetic properties of biomass. Characteristics of solid biomass. Technical conditions for the cultivation of energy crops. Methods of biofuel production. Analysis of the methane fermentation process. Operation of an agricultural biogas plant. Possibilities of using biogas from municipal landfills. Hydrogen from waste biomass. Ways of managing waste resulting from thermal processing of biomass. Quality of fuels obtained from biomass. The role and future of biomass in Poland and Europe.</p> <p>Characteristics of low-power solid fuel boilers. Characteristics of industrial boilers. Characteristics of gasification and pyrolysis systems. Associated hybrid systems. Possibilities of using the carbonizate from biomass gasification. Economic and ecological efficiency of thermal conversion of biomass. Installations for the production of liquid fuels. The use of distillation and hydrolysis processes in the production of biofuels. Esterification technologies in the production of biofuels. Analysis of the technological process in an agricultural biogas plant. Technical aspects of biomass conversion into energy in an agricultural biogas plant. Characteristics of physicochemical parameters in selected biomass raw materials. Drawing of a schematic diagram</p>

	for the selected biomass processing technology. Material balance of the selected biomass processing technology.
COURSE CONTENT for Technologies of biomass conversion for energy purposes:	<p>The role of biomass in the energy sector. Technologies processing of biomass. Straw as a source of renewable energy. Processes of biomass combustion and co-combustion. Possibilities using of biogas in energy production. Technologies for obtaining biogas (biogas plants, municipal waste landfills, sewage treatment plants).</p> <p>Biofuels as an energy source. Rapeseed biofuels - properties and parameters. Co-hydrogenation technologies. Bioethanol - properties and production. Methods of obtaining hydrogen from biomass. Quality of fuels obtained from biomass. Passive solar energy systems.</p> <p>The role and future of biomass in Poland and Europe. Technical and economic possibilities of wood biomass combustion. Technical and economic possibilities of burning straw. Characteristics of the production processes of granules and briquettes from biomass. Characteristics of production technology of liquid fuels from biomass. The using of distillation and hydrolysis processes in the production of biofuels. Esterification technologies in the production of biofuels. Analysis of the technological process in agricultural biogas plant. Municipal sewage sludge as an energy source. Technical characteristics of cogeneration systems in the conversion of biomass for energy purposes. Characteristics of gasification and pyrolysis systems. Characteristics of physicochemical parameters in selected biomass raw materials. Drawing of a schematic diagram for the selected biomass processing technology. Material balance of the selected biomass processing technology.</p>
ADDITIONAL INFORMATION:	

\*elective course, announced at the beginning of the semester



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ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Satellite geodesy in engineering practice
LECTURER'S NAME:	Miłosława Rutkowska and Krzysztof Deska
E-MAIL ADDRESS OF THE LECTURER:	miloslawa.rutkowska@tu.koszalin.pl krzysztof.deska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	4
COURSE CODE (USOS):	0511>0900-GSwPI
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30 lectures + 30 group tutorials
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lecture + group tutorials
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	written exam, written reports, project work
COURSE CONTENT:	<p>Lecture (30 h): Construction of the earth satellites for geodetical and geophysical purpose. Two body problem, formulation of motion equation for artificial satellite. Computation and conversion Keplerian and Cartesian orbital elements. Theory of the numerical integration methods for satellite orbit estimation. Osculating and mean orbital elements. Gravitational and nongravitational perturbations of satellite orbits. Description of measurement techniques used to satellite geodesy: Satellite Laser Ranging (SLR), Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS), Global Navigation Satellite Systems (GNSS), Very Long Base Interferometry (VLBI) and Satellite Altimetry. International Terrestrial Reference Frame (ITRF) based on different kind satellite measurements.</p> <p>Group tutorial part I (15 h): Description of construction of selected geodetic satellite. Computation of satellite orbits. Conversion of Keplerian elements to Cartesian elements and Cartesian to Keplerian elements. Computation of station position and correction caused by plate motion.</p> <p>Group tutorial part II (15 h): Planning of GNSS measurements. Configuration and settings of GNSS receivers. Static and RTK/RTN measurements. Basics of post-processing GNSS observations, report creating.</p>
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ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Geodetic investment service
LECTURER'S NAME:	Czesław Suchocki Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	czeslaw.suchocki@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-GOI
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Exam
COURSE CONTENT:	<ul style="list-style-type: none"> <li>- Structural survey of high rise building and structures.</li> <li>- Displacement and deformation study of engineering structures.</li> <li>- Types of control network for surveying.</li> <li>- As-built geodetic inventory of building and structures.</li> </ul>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Mechanical-biological waste treatment installations or Thermal waste treatment installations *
LECTURER'S NAME:	Prof. Robert Sidelko
E-MAIL ADDRESS OF THE LECTURER:	robert.sidelko@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	4
COURSE CODE (USOS):	0511>3300-IMBPO or 0511>3300-ITPO
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30 Lectures + 15 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test, written reports
COURSE CONTENT for Mechanical-biological waste treatment installations	<p>Lectures:</p> <p>The current legal status of waste management and circular economy. Collection and disposal of waste. Waste segregation. Municipal waste recycling. Waste neutralization technologies. Modern technologies for the construction of landfills. Processes of mechanical and biological waste treatment. Methods of biological waste treatment. Basics of the composting process. Composting of municipal waste. Examples of technical solutions for the oxygen processing of the organic fraction of waste. Composting process and equipment.</p> <p>Practical classes:</p> <p>Capital expenditure on construction and operation of a municipal waste landfill. Impact of the facility on the natural environment and people. Capital expenditure and construction costs of a waste sorting plant, mechanical and biological plant (MBP), composting and fermentation facilities. Examples of land area calculations for a compost heap. Comparative analysis of the processing costs of composting, mechanical-biological and thermal methods.</p>
COURSE CONTENT for Thermal waste treatment installations	<p>Lectures:</p> <p>The current legal status of waste management and circular economy. Collection and disposal of waste. Waste segregation. Municipal waste recycling. Characteristics of waste for thermal processing. Technologies of thermal waste neutralization. Examples of installations operating in Poland and other European Union countries. Collection</p>

	<p>and preparation of waste for incineration. Construction of a municipal waste incineration chamber. Methods of heat recovery from combustion and its management. Emissions of pollutants from the incineration process. Methods of exhaust gas treatment. Examples of incineration of municipal waste and other organic waste. The impact of incineration plants on the natural environment and people.</p> <p>Analysis of exemplary costs of building incineration plants. Future of municipal waste incineration plants in Poland.</p> <p>Practical classes:</p> <p>Calculations of energy generated from the incineration of the organic fraction of municipal waste. Calculations of the emission of volatile pollutants generated in the process of incineration of municipal waste. Analysis of the degradation kinetics of selected groups of toxic organic compounds. Comparative analysis of the processing costs of composting, mechanical-biological and thermal methods.</p>
ADDITIONAL INFORMATION:	

\*elective course, announced at the beginning of the semester

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Computer methods for calculation
LECTURER'S NAME:	Jacek Piekarski
E-MAIL ADDRESS OF THE LECTURER:	Jacek.Piekarski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	4
COURSE CODE (USOS):	0511>3300-KTO
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15 Lectures + 30 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test, project work
COURSE CONTENT:	<p>Lecture:</p> <p>Algorithm, selected programming methods, program compilation. Characteristics of the selected programming application. Structure of a program written in the selected programming language. Basic data types, conditional instructions, loops, arrays, procedures, functions and more. Presentation of the calculation of the suction-pressure pumping system.</p> <p>Practical classes:</p> <p>Basics of metalanguage - creating flowcharts. Practical use of various data types, conditional instructions, loops, arrays, procedures and functions. Implementation of simple applications using groups of instructions. Implementation of an application for calculating and modelling, using computer methods. Application test. Defining the boundary conditions.</p>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Metal structures 2
LECTURER'S NAME:	dr inż. Przemysław Krystosik
E-MAIL ADDRESS OF THE LECTURER:	przemyslaw.krystosik@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0201-KM2
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	written exam
COURSE CONTENT:	<p>L1 - (4h) Trusses - applications, principles of design and dimensioning</p> <p>L2 - Industrial halls - types of halls, static schemes, frame corners (6h)</p> <p>L3 - Industrial halls - hall bracings (roof and wall bracings); dimensioning of bracing according to EC3 (6h)</p> <p>L4 - Composite steel and concrete structures - rules for dimensioning beams and composite columns according to EC3 (4h)</p> <p>L5 - Industrial halls - types of halls with traditional plate girders; with web of corrugated sheets) (6h)</p> <p>L9 - Runway beams, flyovers - technological loads, principles of construction and dimensioning in terms of load-bearing capacity, stiffness and durability conditions. (6h)</p>
ADDITIONAL INFORMATION:	Academic books and Eurocodes

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ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	CAD Laboratory 1
LECTURER'S NAME:	Renata Pigoń
E-MAIL ADDRESS OF THE LECTURER:	renata.pigon@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0200-CAD1
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Preparing of architectural and construction drawing in AutoCAD and continuous assessment of work in the classroom.
COURSE CONTENT:	<p>The following topics will be taught on the lessons in AutoCAD:</p> <ul style="list-style-type: none"> <li>• Introduction to CAD.</li> <li>• The principal rules of creating drawing in AutoCAD.</li> <li>• Selecting commands and working with drawing.</li> <li>• Viewing drawing and working with coordinates.</li> <li>• Creating simple entities by using draw commands.</li> <li>• Layers.</li> <li>• Modifying entities.</li> <li>• Getting drawing information.</li> <li>• Working with text and practice.</li> <li>• Dimensioning drawing and practice.</li> <li>• Descriptive elements in the drawing.</li> <li>• Isometric views.</li> <li>• Working with blocks.</li> <li>• Preparing drawings for printing.</li> </ul>
ADDITIONAL INFORMATION:	All the above will be conducted in accordance with the actual standards and regulations.

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E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Biomass energy use laboratory
LECTURER'S NAME:	Bartosz Walendzik
E-MAIL ADDRESS OF THE LECTURER:	bartosz.walendzik@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	1
COURSE CODE (USOS):	0511>3300-EWB-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test, written reports
COURSE CONTENT:	Introduction to exercises, general requirements. Determination of the bulk density in selected forms of biomass. Determination of moisture and ash in biomass sample. Determination of carbon content in selected biomass samples. Testing the calorific value in selected biomass samples. Dry distillation of selected forms of biomass. Application of gas chromatography with mass spectrometry (GC-MS) for the determination of Volatile Organic Compounds in biomass. The use of the AAS technique to determine the content of main and trace elements in biomass and ash from biomass.
ADDITIONAL INFORMATION:	



FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Photogrammetry and remote sensing 2 laboratory
LECTURER'S NAME:	Piotr Kędziorski
E-MAIL ADDRESS OF THE LECTURER:	piotr.kedziorski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-F-lab2
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	project work, written exam
COURSE CONTENT:	<ul style="list-style-type: none"> <li>• calibration,</li> <li>• aerotriangulation,</li> <li>• digital terrain models,</li> <li>• rectification and orthoprojection,</li> <li>• laser scanning.</li> </ul>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	CAD Basics 2
LECTURER'S NAME:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE LECTURER:	tomasz.dabrowski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>3300-GWPCAD2-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Computer laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Project work
COURSE CONTENT:	Selecting and filtering objects in the drawing. Advanced layer management, layer isolation. Local coordinate systems. Dynamic blocks. Printing drawings. Working with sheet sets. Parameterization and tool palettes.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	3D computer modelling laboratory
LECTURER'S NAME:	Leszek Dawid Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	leszek.dawid@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	1
COURSE CODE (USOS):	0511>0900-LKM3D
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Continuous assessment, class test
COURSE CONTENT:	The course will give out an introduction to AutoCAD including basic tools and understanding of workspace. The course will give a background in designing in CAD systems. Furthermore, an introduction will be given on basic conceptions of work in 3D space as well as generating regular solids models. Finally, the course will teach about processing data obtained with photogrammetric methods and laser scanning.
ADDITIONAL INFORMATION:	Prerequisites for the course include background in methods of presenting geometric shapes and solids in drawings as well as ability of reading and understanding the latter. Additionally basic knowledge in general information technology, computer and program use is required.

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Computational structural mechanics laboratory
LECTURER'S NAME:	Mariusz Ruchwa, PhD, BSc, MSc
E-MAIL ADDRESS OF THE LECTURER:	mariusz.ruchwa@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0202-MB-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	computer laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	calculation reports
COURSE CONTENT:	Structural finite element analysis of frames (3D) structures with RFEM (Dlubal). 1. Linear static analysis of frames (calculation of displacements and internal forces), 2. Buckling analysis (critical loads values and buckling modes), 3. Free vibrations analysis (natural frequencies and modes of vibration).
ADDITIONAL INFORMATION:	Three finite element analysis projects with computer program RFEM (student edition, Dlubal).

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Land surveying and geomatics 2 laboratory
LECTURER'S NAME:	Bernatowicz Anna Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	anna.bernatowicz@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>0900-PGiG2-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	class test
COURSE CONTENT:	Instruments for geometric levelling; Types of levels used for Levelling in surveying; Methods of measuring height differences; Level traverse - field procedures, determine the elevation of benchmarks; Principles of geodetic sketches for different surveying purposes. Orthogonal method in situational measurements; Preparation of a large -scale map. The scattered point levelling method; Total station and some applications in surveying.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Unit processes in water and wastewater treatment laboratory or Unit processes in industrial waste processing laboratory*
LECTURER'S NAME:	Jacek Piekarski
E-MAIL ADDRESS OF THE LECTURER:	jacek.piekarski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>3300-PJ-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test, written reports
COURSE CONTENT for Unit processes in water and wastewater treatment laboratory:	Laboratory tests of following processes: gravitational sedimentation, flocculation, gravitational filtration, centrifugal sedimentation, centrifugal filtration, pressure filtration
COURSE CONTENT for Unit processes in industrial waste processing laboratory:	Laboratory tests of following processes: Granulometric analysis – screening, shredding, flotation, dynamic olfactometry, recycling of paper waste, identification of polymer waste.
ADDITIONAL INFORMATION:	

\*elective course, announced at the beginning of the semester

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Least square adjustment alignment method 2 laboratory
LECTURER'S NAME:	Katarzyna Kraszewska Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	Katarzyna.kraszewska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-RW2-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Laboratory, group tutorials
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT:	Least square method; alignment of networks: levelling, angular, angular-linear; accuracy of alignment; use of computer methods in alignment
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Technical drawing laboratory
LECTURER'S NAME:	Renata Pigoń
E-MAIL ADDRESS OF THE LECTURER:	renata.pigon@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	1
COURSE CODE (USOS):	0511>0200-RT-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test and continuous assessment of work in the classroom.
COURSE CONTENT:	<p>The following topics will be taught on the lessons:</p> <ul style="list-style-type: none"> <li>• Introduction to technical drawing. Different equipment in manual engineering drawings. Drawing Standards, literature.</li> <li>• Different types of construction drawings, drawing sheet formats, drawing table, preparation of the sheet for classes in accordance with the standard requirements.</li> <li>• Different types of lines used in a technical construction drawing and their application. Graphical markings in the architectural and construction drawings.</li> <li>• Technical writing.</li> <li>• Dimensioning rules on a building drawing as per the standard.</li> <li>• Drawing symbols used on building drawings.</li> <li>• Preparation and marking of cross sections.</li> </ul>
ADDITIONAL INFORMATION:	All the above will be conducted in accordance with the actual standards and regulations.



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FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Geographic information system 2 laboratory
LECTURER'S NAME:	Tomasz Oberski
E-MAIL ADDRESS OF THE LECTURER:	Tomasz.oberski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-L.SIP/SIPO
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	project work
COURSE CONTENT:	<ol style="list-style-type: none"> <li>1. DTM analysis (aspect, slope, shaded relief, landform classification, visibility)</li> <li>2. Network analysis with GIS environment</li> <li>3. Task automation with GIS tools.</li> <li>4. Project work.</li> </ol>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Computer Aided Design in building engineering laboratory
LECTURER'S NAME:	dr inż. Mariusz Staszewski
E-MAIL ADDRESS OF THE LECTURER:	mariusz.staszewski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0201-WkwB-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Group tutorials, seminar, individual consultations
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Project work
COURSE CONTENT:	General rules, loads, combinations, two way bent slabs, flat slabs with and without drop panels, footings and foundations.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Geodetic investment service laboratory
LECTURER'S NAME:	Czesław Suchocki Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	czeslaw.suchocki@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0900-GOI-lab
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	laboratory
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	project work/ class test
COURSE CONTENT:	<ul style="list-style-type: none"> <li>- Preparation of control network projects for surveying and setting out of building.</li> <li>- Development of measurement results for mast deviation from verticality.</li> <li>- Measurement of the underground utilities network cable.</li> <li>- Surveying of building and structures geometry.</li> </ul>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Mathematics 2
LECTURER'S NAME:	Dr hab. Volodymyr Sushch, Prof. PK
E-MAIL ADDRESS OF THE LECTURER:	volodymyr.sushch@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	5
COURSE CODE (USOS):	0511>0200-Mat2
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30 Lectures + 30 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	English
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written exam
COURSE CONTENT:	<p style="text-align: center;"><b>Integral calculus</b></p> <p><b>The indefinite integral of real-valued functions of a single real variable:</b> formal definition, properties of integrals, finding the value of an integral (integration).</p> <p><b>Techniques for computing integrals:</b> integration by substitution, integration by parts, integration by trigonometric substitution, integration by reduction formulae, integration by partial fractions, integration using Euler's formula.</p> <p><b>The definite integral (the Riemann integral):</b> definition and properties, fundamental theorems of calculus (the Newton-Leibniz theorem).</p> <p><b>Applications of definite integrals:</b> calculating areas, volumes, arc length.</p> <p><b>Improper integrals:</b> convergence of the integral, singularities.</p> <p style="text-align: center;"><b>Ordinary differential equations (ODE)</b></p> <p><b>Basic concepts and classifying of differential equations:</b> solutions of differential equations (a particular solution and the general solution of a differential equation), initial-value and boundary-value problems.</p> <p><b>First order ODE:</b> separable equations, homogeneous equations, exact equations, linear equations (homogeneous and non-homogeneous), Bernoulli equations, solved problems.</p>

	<b>Second order linear ODE:</b> linear differential equations (linearly independent solutions, the Wronskian), linear homogeneous ODE with constant coefficients, the characteristic equation, linear non-homogeneous ODE with constant coefficients, the method of undetermined coefficients, variation of parameters, linear ODE with variable coefficients.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Land surveying and geomatics 2
LECTURER'S NAME:	Bernatowicz Anna Ph.D.
E-MAIL ADDRESS OF THE LECTURER:	anna.bernatowicz@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	4
COURSE CODE (USOS):	0511>0900-PGiG2
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	written exam
COURSE CONTENT:	Standards and specifications for geodetic situational and height control networks; Fundamentals of height measurements; Types of height measurements; Basics of direct levelling ; Technical levelling of benchmarks; Geodetic high-altitude field measurements - levelling of scattered points, grid levelling, profile levelling; Principles of presenting the relief on large-scale maps.; Interpolation and plotting of contours.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Pumps or Ventilators *
LECTURER'S NAME:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE LECTURER:	tomasz.dabrowski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>3300-P or 0511>3300-W
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15 Lectures + 15 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT for Pumps:	<p>Lectures: Pumps and pumping systems, calculations, parameters, energy balance. Pump characteristics. Construction and operation of vortex pumps. Construction and operation of reciprocating and special pumps. Cavitation phenomenon. Anti-cavitation surpluses. Installation, start-up and operation of pumps.</p> <p>Practical classes: Pump calculations. Pump characteristics. Pump performance regulation. Calculations of the pumping system.</p>
COURSE CONTENT for Ventilators:	<p>Lectures: Division and scope of application of fans and compressors. Construction and operation of fans. Working parameters of fans and compressors. General principles of operation of fans and compressors. General characteristics of motors used in pumps, compressors and blowers.</p> <p>Practical classes: Calculations of parameters of fans and compressors. Calculating the efficiency of fans and their cooperation with the network. Selection of fans, compressors and motors for their drive.</p>
ADDITIONAL INFORMATION:	

\*elective course, announced at the beginning of the semester

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Unit processes in water and wastewater treatment or Unit processes in industrial waste processing *
LECTURER'S NAME:	Jacek Piekarski
E-MAIL ADDRESS OF THE LECTURER:	jacek.piekarski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>3300-PJwOWiŚ or 0511>3300-PJwPOP
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	W
HOURS IN SEMESTER:	15
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT for Unit processes in water and wastewater treatment:	Classification of mixtures. Characteristics of various mixtures. Mixture composition parameters. Balance equations of medium flow through devices. Separation process of gravitational sedimentation including coagulation and flocculation, as unit processes supporting gravitational sedimentation. Separation of suspensions under the influence of centrifugal force. Theoretical basics of the filtration and adsorption process. Other methods of water and wastewater treatment. Technical novelties in the field of water and wastewater treatment.
COURSE CONTENT for Unit processes in industrial waste processing	Technological basics of the screening process. characteristics of selected devices for the screening process. Technological basics of the grinding process. Characteristics of selected devices for the grinding process. Theoretical basics of the flotation process. Systematics of flotation reagents and principles of their operation. Characteristics of selected devices for the flotation process. Application of the flotation process in various industries. " Theoretical foundations of the separation process in heavy liquids. Separation in a pulsating water stream. Other methods of processing industrial waste. Technical novelties in the field of industrial waste processing.
ADDITIONAL INFORMATION:	

\*elective course, announced at the beginning of the semester



FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Municipal waste management design
LECTURER'S NAME:	Prof. Robert Sidelko
E-MAIL ADDRESS OF THE LECTURER:	robert.sidelko@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>3300-GOK-proj
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Practical classes on design
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Project work
COURSE CONTENT:	Legal basics of installations for mechanical and biological processing and examples of real objects at an industrial scale. Balance of municipal waste. Technological calculations. The effectiveness of the applied processes in the context of the recovery of raw materials and energy.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Least square adjustment method 2
LECTURER'S NAME:	Miłosława Rutkowska Prof.
E-MAIL ADDRESS OF THE LECTURER:	miloslawa.rutkowska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>0900-RW2
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	written exam
COURSE CONTENT:	Least squares parametric method for measurement adjustment. Formulation of observation equations for selected techniques (angular, range, level, GNSS, SLR, DORIS, VLBI) and adjustment on the base of observation equations. Analysis of covariance matrix and determination accuracy of estimated unknowns . Exemplary computations performed for different kind of measurements.
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Geographic information system 2
LECTURER'S NAME:	Tomasz Oberski
E-MAIL ADDRESS OF THE LECTURER:	tomasz.oberski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	1
COURSE CODE (USOS):	0511>0900-SIP2och.
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT:	<ul style="list-style-type: none"> <li>• Using Digital Terrain Models for GIS analysis.</li> <li>• Network analysis.</li> <li>• Task automation with GIS tools.</li> </ul>
ADDITIONAL INFORMATION:	

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Remote sensing
LECTURER'S NAME:	Tomasz Oberski
E-MAIL ADDRESS OF THE LECTURER:	tomasz.oberski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0901-T
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Presentation
COURSE CONTENT:	<ul style="list-style-type: none"> <li>- Introduction to remote sensing.</li> <li>- Electromagnetic radiation.</li> <li>- Spatial and radiometric resolution.</li> <li>- Sensors.</li> <li>- Histogram.</li> <li>- Extracting objects from image.</li> </ul>
ADDITIONAL INFORMATION:	The course allows you to understand remote sensing fundamentals.

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Town planning and architecture
LECTURER'S NAME:	Maciej Siekierski
E-MAIL ADDRESS OF THE LECTURER:	maciej.siekierski@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	2
COURSE CODE (USOS):	0511>0200-UiA
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	lecture
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	presentation + project work
COURSE CONTENT:	Architecture and urban planning - comparison of concepts. Principles of city design. Types of cities. The history of construction solutions in architecture + Construction project of single-family house in the indicated location
ADDITIONAL INFORMATION:	The course is based on examples from Europe, Asia, Central America and South America

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FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Heat exchange
LECTURER'S NAME:	Magdalena Orłowska
E-MAIL ADDRESS OF THE LECTURER:	magdalena.orłowska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	3.06M.SIB
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	15 Lectures + 15 Practical classes
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures + Practical classes
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written pass a subject
COURSE CONTENT:	1.Types of heat transfer 2. Heat exchangers 3. Heat conduction 4. Natural and forced convection 5. Radiation 6. Heat sources 7. Heat receivers 8. Thermal comfort 9. Thermal factors 10. Heat installations 11. Construction of heat exchangers, operation diagrams 12. Examples of heat exchanger calculations 13. Measurements of pressure, temperature and flow rate at the didactic and research stand.
ADDITIONAL INFORMATION:	Literature: Wiśniewski S., Wiśniewski T. Wymiana ciepła, WNT, 2017 Madejski J., Teoria wymiany ciepła, Szczecin, 1998 Skoczylas A., Przenoszenie ciepła, Wrocław, 1999

FACULTY:	Civil Engineering, Environmental and Geodetic Sciences
FIELD OF STUDY:	Civil Engineering, Environmental and Geodetic Sciences
ERASMUS COORDINATOR OF THE FACULTY:	Tomasz Dąbrowski
E-MAIL ADDRESS OF THE COORDINATOR:	tomasz.dabrowski@tu.koszalin.pl
COURSE TITLE:	Energy resources or Energy management *
LECTURER'S NAME:	Magdalena Orłowska
E-MAIL ADDRESS OF THE LECTURER:	magdalena.orłowska@tu.koszalin.pl
ECTS POINTS FOR THE COURSE:	3
COURSE CODE (USOS):	0511>3300-GE or 0511>3300-ZE
ACADEMIC YEAR:	2022/2023
SEMESTER: (W – winter, S – summer)	S
HOURS IN SEMESTER:	30
LEVEL OF THE COURSE: (1 <sup>st</sup> cycle, 2 <sup>nd</sup> cycle, 3 <sup>rd</sup> cycle)	1 <sup>st</sup> cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures
LANGUAGE OF INSTRUCTION:	<b>English</b>
ASSESSMENT METHOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Class test
COURSE CONTENT for Energy resources:	The role and importance of energy in the country's economy. Energy resources in Poland and their extraction. Fossil fuels, their distribution and extraction. Natural gas and crude oil transport systems. Types of power plants. Energy law - basic information. Environmental issues, laws and regulations. Structure of energy resources in the production of energy and electricity. Energy consumption in selected countries of the world. Development of energy systems in the country
ADDITIONAL INFORMATION for Energy resources:	Literature: Marecki J., Podstawy przemian energetycznych, WNT, Warszawa 2007 Charun H., Podstawy gospodarki energetycznej w zarysie. T. 1, Politechnika Koszalińska, 2016 Młynarski T., Tarnawski M., Źródła energii i ich znaczenie dla bezpieczeństwa energetycznego w XXI wieku, Difin, 2016
COURSE CONTENT for Energy management:	Energy acquisition and use. National energy system. Energy subsystems: solid fuels, liquid fuels, gas and electricity. Energy subsystems: thermal energy and renewable energy sources. Energy and the environment. Human-friendly energy. Nuclear energy and distributed energy. Rationalization of energy use. Conventional energy resources. Selected issues of fuel combustion. Elemental analysis of solid fuels. Associated energy management. Energy issues in water and sewage management.
ADDITIONAL INFORMATION for Energy management:	Literature:

	<ol style="list-style-type: none"> <li>1. Chmielniak T. 2013. Technologie energetyczne. Wydawnictwo WN-T Warszawa.</li> <li>2. Charun H. 2004. Podstawy gospodarki energetycznej. Cz. 1, 2 i 3. Wydawnictwo Politechnika Koszalińska.</li> <li>3. Ziębik A. 2008. Wprowadzenie do energetyki. Politechnika Częstochowska.</li> </ol>
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\*elective course, announced at the beginning of the semester